



THE HISTORY OF THE CORPS OF ROYAL ENGINEERS



Volume XII
1980 – 2000

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VOLUME XII



Her Majesty the Queen,
Colonel-in-Chief of the Corps of Royal Engineers.

HISTORY OF THE CORPS OF ROYAL ENGINEERS

VOLUME XII

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Foreword

by General Sir Peter Wall,

KCB, CBE, ADC Gen

Chief Royal Engineer and Chief of the General Staff

This twelfth volume of the history of the Corps of Royal Engineers chronicles the final two decades of the second millennium AD. This period from 1980 to 2000 straddles the fall of the Berlin Wall and with it the end of the Cold War; an end also to the relative certainty of the bipolar world that had dominated UK's security concerns since 1945. This was replaced by a less direct but more complex array of challenges which saw the Army committed to UN and NATO operations in the Balkans under the 'force for good' notion of humanitarian intervention. These operations were fertile territory for Sappers as the history relates. They also shaped the Army that was to find itself in the first decade of the next millennium in intense counter insurgency and stabilisation operations back in Iraq and Afghanistan after many decades of respite from those awkward theatres. So as well as being a hectic and challenging time for the Corps and the Army at large this era was important in shaping our competence for the demands of the extraordinary period post the terrorist attacks on the World Trade Centre in New York on 11 September 2001 (9/11).

The domestic campaign in Northern Ireland provided a continuous backdrop to our other expeditionary exploits. These saw limited wars in the Falklands, which we have been garrisoning since; and in Kuwait and Iraq in 1990-1. In both, the Corps contribution was as important to victory as it was courageous and inventive.

Over this period the Army reduced in size by about one third to 100,000 at the end of the Cold War, and the Corps, regular and territorial proportionally so, more or less. But the full range of technical and combat skills in support of all three services was retained at above critical mass. This was also a period of relatively well resourced training and exercises, with investment in

combined arms manoeuvre skills up to formation level, as well as the array of Sapper skills upon which the expeditionary ambitions of each service were to depend so critically in the campaigns after 2000.

The latter part of the period saw much conceptual change borne of operational experiences in the Falklands, the Gulf and the Balkans, and the changing nature of conflict. The advent of the Permanent Joint Headquarters and standing joint command structures, coupled with the 'comprehensive' cross-government approach, provided a new doctrinal model in the aftermath of mass NATO operations in the Central Region. Technology delivered steady-state electronics, exponentially growing computing power, and facilitated digitisation of the battlefield. Mass analogue warfare gave way to networked digital precision engagement. Much of the Sapper repertoire changed little, such is the nature of field engineering.

This volume, skilfully and painstakingly crafted by Brigadier Alasdair Wilson and his team, articulates how the Corps contributed to operations, adapted to the changing geo-political scene, and responded to the inevitable demands on its ingenuity. It does ample justice to each of these, as well as telling the remarkable story of our people who, regardless of time or place, peace or war, get on with their military engineering with the minimum of fuss. It tells the tale of another remarkable epoch in the history of the Corps.

Ubique!

General Sir Peter Wall
January 2011

Preface

by Brigadier A. A. Wilson

Our chief Royal Engineer has eloquently laid out the major events that this volume covers in his Foreword. It has been a protracted undertaking by many committed contributors over the last eleven years and more. I echo the preface in Volume XI, which lamented the lack of historical data available to the authors of the last volume. This has been made worse by increased use of information technology, which, paradoxically, has made it more difficult to research historical events. No formal unit histories were available, and the RE Library is almost empty of documents covering this period. This needs addressing, and it is strongly hoped that the RE Library may again become the authoritative archive of the Corps' history, for the edification of future generations.

This volume has been assembled primarily from the memories of the authors and the many others who have been consulted. Inevitably, some material will have been missed and there will also be readers whose interpretation of events will differ from those expressed in this volume. It is hoped that, where this occurs, those who wish to add to the accuracy of this history will do so by writing their version and sending it to the Institution for inclusion in the *Journal* or the archives.

The Corps owes an enormous debt to Colonel Gerald Napier, who began the task of putting this history together; both he and his team did a tremendous amount of research that laid a firm foundation for what was to follow, and they are fully recognised in the list of contributors. The baton was passed in 2008 to me as editor-in-chief, assisted by an experienced steering committee consisting of Brigadier Ian McGill (chairman), Brigadier Phil Wildman, Colonels Chris Bates, Chris Davies, John Field and Mike Stancombe, Lieutenant Colonels Knobby Reid and David

Hamilton. As a team we collated, wrote, revised and cross-checked this volume until it appears as it does now. We also owe a great debt to David Gibbons, our publisher who joined it all together. The very valuable contributions made by so many other individuals and organisations are as listed at the end of this volume; please forgive us if we have left any out. It has not been possible to list contributors by chapter, as so many were involved in more than one part of this complex and interactive history.

We hope that we have produced a volume which met our aim:

'To tell the Corps' story so that it is an inspiring,
accurate and enjoyable account.'

Alasdair Wilson

Revolution and Regeneration

The Evolution of Defence Policy

1980–2000

The story of the Corps from 1980 to 2000 can be told against a background of change, one in which there were major shifts in both world and domestic politics. In 1980 the Army was focused on meeting the all-encompassing threat from the Soviet Union and the Warsaw Pact; the Corps' emphasis was on preparing for operations in support of NATO on the North German Plain and the Inner German Border. There was also the challenge of Northern Ireland and the need to support our overseas garrisons.

By 2000 the tasks confronting the Corps were very different. There was hope that peace in Northern Ireland would be secured soon, and there remained a few overseas commitments, but defence responsibilities now included maintaining the security of a wider Europe as part and parcel of the defence of the UK. When that security was threatened, as it was in the Gulf War of 1991 and in the former Yugoslavia, then Britain's capacity to contribute would determine the degree of influence it could expect to exercise afterwards. This volume sees the emergence of a new Corps capable of meeting the calls upon its expertise in a quite different strategic environment.

Deployment of the Army

In 1980 the bulk of the Army was deployed in the United Kingdom and in the British Army of the Rhine (BAOR); a few small garrisons remained overseas elsewhere. Field units in the UK were commanded from Headquarters United Kingdom Land Forces (HQ UKLF) at Wilton, which was responsible for mounting operations anywhere in the world other than in Central Europe. Headquarters BAOR, based in Rheindahlen, was responsible for the whole of the British Army in Germany

and on the lines of communication back to the Channel ports. Front-line units in Germany were allocated to Northern Army Group for operations and commanded from 1 British Corps based in Bielefeld. Engineer command in the Field Army was exercised through the Chief Engineer at Rheindahlen (a two-star appointment), the Corps Commander Royal Engineers (one-star) at Bielefeld and Commander Engineers UKLF (one-star) at Wilton.

By 1980, Britain's commitments outside Europe had reduced effectively to five areas in which a military presence was necessary: Hong Kong, the Cyprus Sovereign Base Areas, Gibraltar, Belize and the South Atlantic.¹

Hong Kong, Cyprus and Gibraltar were permanent peacetime stations offering the opportunity of overseas tours. In 1980 the army strengths in these garrisons were respectively: five battalions in Hong Kong with a squadron of Army Air Corps; an enhanced battalion in Cyprus with an armoured reconnaissance squadron and an Army Air Corps flight; and an infantry battalion in Gibraltar. The contribution from the Corps was a regiment in Hong Kong (Queen's Gurkha Engineers), a support squadron in Cyprus and a specialist team in Gibraltar. Belize required a battalion group with a field and an air defence battery but, apart from a small permanent staff, was manned by units rotating from the United Kingdom, which included a field squadron. There was no Sapper element in the South Atlantic in 1980.

Britain also contributed to the United Nations forces mostly by sending individual specialists, as in Sinai. However, there was also a requirement for a field troop as part of the United Nations Force in Cyprus (UNFICYP), manning and maintaining the border between the Turkish and Greek communities on that island. Another commitment was the continuing programme of training exercises and, particularly for the Corps, of projects. These could range from pre-planned exercises, normally as part of a defence-relations or defence-diplomacy agreement for training facilities, to particular projects, often sponsored by the Foreign and Commonwealth Office in connection with economic development or disaster relief. In 1980 the Corps (excluding

Postal and Courier Communications) had individuals or units in more than 33 overseas countries.

The Home Base. Defence of the home base was seen as primarily an air and maritime task, with relatively small land forces being earmarked and reliance placed on the Territorial Army. The major Army task in the event of war would be mobilising to reinforce BAOR with men and materiel, specific forces being assigned exclusively as a mobile reserve, the Allied Command Europe (ACE) Mobile Force, a multinational force of which the British Army element was a battalion group plus support; and the UK Mobile Force, comprising some 13,500 Regular and TA, including an air element and a parachute battalion.

Northern Ireland. By 1980 the emergency in Northern Ireland had entered its twelfth year. Operational deployment was still related to the three brigade areas described in Volume XI of this history, with headquarters at Lisburn (39 Infantry Brigade), Portadown (3 Infantry Brigade) and Londonderry (8 Infantry Brigade). The permanent Sapper presence was an independent field squadron and engineer park at Antrim, support in the other two brigade areas being provided by field squadrons from BAOR and UKLF on rotation, backed by a strong works team under the Commander Royal Engineers (CRE). Chapter 8 tells of the type and conditions of work of these various units throughout the period of this volume.

Cold War Postures

Throughout the 1980s the commitment to NATO and the Cold War reigned supreme in the apparent national defence posture. For the Army this meant that priority went to BAOR where, apart from the minor restrictions of a moratorium on training, serious savings would carry too high a political price. BAOR was equipped, trained and motivated for a possible European war that might escalate into a nuclear exchange. Units in Germany had to maintain the necessary level of preparedness for their operational role, and their only commitments undertaken Out of Area were in Northern Ireland and in the Falklands Islands

shortly after the war. The UK-based Army likewise had NATO support as its first priority, the Field Army being committed to despatching reinforcements to both Central Europe and the flanks.

For those serving in the UK, the real world was the myriad calls on their expertise that are the subject of later chapters in this volume. The Cold War was still seen as priority one, but few commanding officers woke up in the morning worrying about the possibility of the Cold War having 'warmed up' overnight. Instead they had to be prepared for a variety of possibilities that arose during this period – from limited wars such as in the Falklands and the Gulf, 'wars amongst the people' as in Northern Ireland and the Balkans, and numerous relatively minor interventions on behalf of the United Nations or national interest, often driven by humanitarian considerations, such as those in Rwanda and Sierra Leone. In due course, far from the Cold War warming up, the reverse happened with extraordinary speed.

Collapse of the Warsaw Pact (1989)

The suddenness with which the Communist Party lost its dominant grip on the monolithic government structure of the Soviet Union and its client states of the Warsaw Pact astonished Western nations – even the basic *raison d'être* for NATO seemed threatened. In July 1988, Soviet President Gorbachev announced fundamental shifts in policy at a Warsaw Pact summit with the words, 'Life changes and this alliance, too, will be transformed. Alliances are not forever.'² By that time economic restructuring (*perestroika*) was already on the way and was now presented to the Soviet people and the world under the new policy of openness (*glasnost*).

The first cracks in the edifice appeared in Poland. In 1988, strikes throughout the country led to the reinstatement of the workers' movement, Solidarity, which had been banned since 1981. Accommodation with Solidarity's demands led to elections the following year and a non-Communist government was formed. In 1990 fully-free elections then disposed of the

remaining Communist officials throughout the country. By that time, a peaceful revolution led by massive demonstrations had already produced a non-Communist government in Hungary. Events in East Germany were marginally slower due to efforts by the hard-line Communist leader Erich Honecker to stem the tide. He failed. The Berlin Wall was opened in November 1989, and the first free elections were held in March 1990. Germany was reunified in October the same year. Czechoslovakia soon followed, its new government being formed in June.

Only in Romania did events taken a more violent turn. There repression of striking miners resulted in demonstrations in many parts of the country. Measures to restore order culminated in the deaths of thousands of demonstrators in the city of Timisoara in December 1989. In Bucharest protestors stormed government buildings, and an opposition movement, the National Salvation Front, emerged. The President, Nicolae Ceausescu, and his wife were put on trial and summarily executed. A new government led by the National Salvation Front was established early in 1990.

The Soviet Union itself could only look on as the genie escaped from the bottle. In an effort to maintain some semblance of the old unity, President Gorbachev created the Commonwealth of Independent States (CIS) as each of the former elements of the USSR declared their autonomy.³ In due course his own ambition to keep the Communist Party the dominant influence in the new Russia was thwarted, and on Christmas Day 1991 he himself was replaced by Boris Yeltsin, who had distanced himself from the old order by resigning from the Party in July 1990.

Budget Pressures

Although defence had been given a high priority in the Conservative party's 1979 election campaign, the fiscal policy the Government introduced when in office inevitably resulted in severe cutbacks in programmes. While it was accepted that overall defence expenditure would reach the NATO 3% of GDP target set in 1977, equipment cost inflation was running at 5%. By late 1980 the Ministry of Defence was heading for an overspend that could only be averted by a cut of £200 million and cash limits

imposed through a three-month moratorium on expenditure. This had an immediate effect on training and on the infrastructure development (such as barracks accommodation), both of which hit the morale of servicemen. Commanding officers did their best, however, as explained in the following comment on the situation by Lieutenant Colonel M. J. (Mike) Payne, the CO of 39 Engineer Regiment from 1980 to 1982:

Financial pressures on public spending following on from economic difficulties and the so-called Winter of Discontent produced the moratorium but what was remarkable was the extent to which it was possible to maintain so much of the normal pattern of regimental life. The range and quality of engineer projects continued to be excellent value with each of the four regiments usually having at least one major construction task in any one year, in Canada, Kenya, Belize or the UK. The 1977 reorganisation had dispersed the RAF support capability previously concentrated at Waterbeach to give each of the UK regular regiments an airfield damage repair squadron; great care was in consequence taken to maintain the training and support, including attendance at TACEVAL, to the affiliated airfield in RAF Germany to ensure that the RAF continued to feel that it was getting value for money. These training periods were well funded with the right stores and equipment – and sacrosanct – in some contrast to the equivalent training with regiments' affiliated Army formations. Remarkably, the economic downturn produced a quite unexpected bonus for the four [UK] regiments, in terms of manpower; recruits were flooding in to the Corps and, as a result of a ruling that over-manning could not be borne in BAOR because of the extra costs this would involve, they all came to the UK regiments. At the peak in 1982, regiments were overmanned by as much as 130, so that trade training could continue and regimental posts be filled without depleting the squadrons. It was a rare luxury not seen since the days of National Service. What suffered, and quite badly, was training to support the formation in its General War role, both because of other operational commitments and because of cuts in training stores, fuel, track mileage and spares. ... Training stores were in short supply, particularly consumable items like dummy demolition stores and the biodegradable training barmine but the scale of training bridges, trackway, minelayers, was also noticeably less than for BAOR and it always made training problematical.⁴

In such a climate, a defence review was inevitable, and a White Paper was produced in 1981. Entitled *The Way Forward*, it proposed changes that would leave 'the RAF better off, the Army about the same and the Navy considerably worse off'.⁵ For the Army, while the BAOR minimum strength of 55,000 would be maintained, cost savings would be made by reorganising the four armoured divisions of two brigades into three divisions of three brigades, of which a divisional headquarters and one brigade would be permanently stationed in the UK. However, the effect of the indignation that the White Paper produced within the Navy and the country at large was pre-empted by the Falklands War and the subsequent 1983 election, which resulted in a new Secretary of State for Defence, Michael Heseltine, plus a new strategy proposed by the Chiefs of Staff. Support to NATO would continue, but the 3% per annum real rise in expenditure would end in 1986. Out of Area commitments were to be recognised by greater emphasis on coordinated military assistance (through training teams, etc.) and by improvements to strategic mobility.

Savings in Command and Administration

As the budgetary pressures began to bite in the aftermath of the Falklands War, Michael Heseltine embarked on a root-and-branch reorganisation of defence management. What emerged was that the Chief of Defence Staff would cease to be merely 'primus inter pares' but would speak for all three service chiefs. The latter would lose their vice chiefs, and a single Vice Chief of Defence Staff would become the channel through which four functional departments would report on commitments, systems, programmes and policy, and personnel. The Secretary of State would have his own Office of Management and Budgets. Yet another Secretary of State, George Younger, was to steer these proposals towards implementation. New cuts were now introduced, justified on the grounds of efficiency; the 3% real terms growth was ended; and the Defence share of GDP fell from 5.2% in 1984 to 4.3% by 1988.⁶

A project, *Sharp Sword*, designed to improve the teeth-to-tail ratio in the armed forces, included a review of the whole two-star

Options for Change

Options for Change arrived not so much in consequence of the search for the 'peace dividend' held out by the collapse of the Warsaw Pact but as a result of the earlier economy-driven policies. Rather than being a single event, *Options* developed into a process, giving birth to numerous studies, most of which are outside the scope of this volume, but which recognised that the future required general capability-based rather than specific threat-based armed forces.

The July 1991 Government White Paper (Cm 1559) entitled *Britain's Defence for the 90s* envisaged a roughly 18% reduction in the armed forces by the mid-1990s: the Army to 120,000; the Royal Navy to 60,000 and the Royal Air Force to 75,000. The White Paper also announced the NATO decision to create a multinational Allied Command Europe Rapid Reaction Corps (ARRC) under British command, the national component of which would include an armoured division based in Germany, and two divisions based in the UK, one predominantly mechanised and the other air-mobile. Other measures announced at the time included the formation of the Adjutant General's Corps and the Royal Logistics Corps to absorb the various formations then responsible for the administration and supply of the Army. (The effects on the main body of the Corps are covered in Chapter 2.)

A radical consequence of *Options for Change* was the removal of all but two of the divisional headquarters from the Order of Battle. 1 (United Kingdom) Armoured Division, with its headquarters established at Herford in 1993, remained as the only two-star formation in Germany, with three armoured brigades (4, 7 and 20). 3 (United Kingdom) Division, with its headquarters established at Bulford in 1992, acquired two mechanised brigades (1 and 19) and 5 Airborne Brigade. Also in the UK Order of Battle during the 1980s were 24 Airmobile and 3 Commando Brigade. In 1999, 24 Airmobile and 5 Airborne Brigades amalgamated to form 16 Air Assault Brigade, whose first commander was a Sapper, Brigadier P. A. (Peter) Wall, a former commanding officer of 9 Parachute Squadron.

Strategic Defence Review

By the time of the arrival of Tony Blair's New Labour government in May 1997, the assumptions of *Options for Change* were already being overtaken, while domestic political pressures called for reform of the public services. Inevitably the Defence budget was to suffer in favour of contributing more to the Health and Education services. The new Secretary of State for Defence, George Robertson, initiated a defence review that was announced to Parliament on 10 July 1998; it was to lead to yet more studies and the *Strategic Defence Review* (SDR). Implementation of the SDR began almost immediately, but it was the view of many that there was still more change to follow. Summarising the situation in his 1998 Annual Report to the Corps, the EinC made the following comment:

Within an expeditionary era, the Royal Engineers have a key role before, during and after any conflict. But ... the SDR is unlikely to provide the final solution. We have not yet tied our military engineering in with likely future allies, nor attempted to address any common weaknesses in conjunction with them; an illustration is the more robust wide river crossing capability of other armies which we might need to use in some future campaign. Neither have we fully addressed the opportunities offered by our manifold contributions to defence diplomacy. Further changes are inevitable, not only with the delivery of a military capability, but right across defence.¹⁰

The essence of the SDR was continuing support to NATO, still seen as the guarantor of stability in Europe, the maintenance of an effective capability for intervention overseas with the stress on the Gulf, the Near East and North Africa, and a reduction in emphasis on Home Defence. A reform of the procurement system was to be initiated and a concept of 'defence diplomacy' developed. The last two ideas accelerated the already well-advanced trend to joint working between the three services, integration of headquarters and rationalisation of responsibilities that might be capable of being shared. The most controversial measure was the reduction of the Territorial Army (see Chapter 11) based on the logic that Home Defence, its principal *raison d'être*, had greatly reduced in significance. Reserves would,

however, be required more and more to make up unit establishments on deployment on operations.

The overall strength of Britain's Regular armed forces was to be increased, but this would be at the expense of the Territorial Army, which would reduce to some 41,200. In principle, this review was to be 'foreign-policy-led' rather than simply a Treasury-driven cost-cutting exercise and envisaged a capability for intervention overseas, including in the Near and Middle East, normally as part of an international force. This in itself necessitated greater emphasis on joint operations and rationalisation between the services in the interests of interoperability. The intervention capability was to be realised through the Joint Rapid Reaction Force (JRRF), developing the reinforced brigade-sized Joint Rapid Deployment Force (JRDF) and Permanent Joint Headquarters (PJHQ) concept introduced in 1996.¹¹ The nature of recent operations in the Gulf and the Balkans proved beyond doubt the extent that future operations were likely to depend on military engineering. As the next chapters in this story explain, the long battle for the Corps to be equipped to work effectively alongside armour was being won.

The Strength of the Army 1980-2000

Over the two decades covered in this volume, the Corps reduced its Regular strength from 14,504 to 8,450 and almost halved the number of its TA members. The table illustrates these figures in comparison with those for the Services as a whole.

Field Army Command and Control

By the turn of the century Land Command, formed in 1995 from the former Headquarters UK Land Forces, was the sole overall Army command authority analogous to the other services' Fleet and Strike Commands. Land Command thus became the ultimate arbiter on deployment of the Field Army, including BAOR units, and all Army policy on doctrine and combat development and on matters affecting the administration and efficiency of the Army. The Commander Engineers (a brigadier) commanded the theatre engineer units, directed Royal Engineer operations and training

Strength comparisons, 1980 to 2000

Trained and untrained personnel (excluding Gurkhas)	1980 ¹²		2000	
	<i>Regular</i>	<i>Volunteer Reserves</i>	<i>Regular</i> ¹³	<i>Volunteer Reserves</i> ¹⁴
All Services	320,600	77,100	207,600	57,800
Royal Navy	72,000	5,900	42,800	3,800
Army	159,000	70,700	110,100	52,300
RAF	89,600	500	54,700	1,700
Royal Engineers ¹⁵	14,504	6,311	8,450	3,370
% of REs in the Army	9.1	8.9	7.7	6.4

in the UK and worldwide and advised the CinC Land Command.

The single service headquarters (Fleet, Land and Strike) then served the new Permanent Joint Headquarters (PJHQ) and allocated the contingency forces for the Joint Rapid Deployment Force (JRDF).

In the uncertain circumstances following the collapse of the Warsaw Pact, the NATO countries decided that security in Europe should be provided by a multinational corps commanded by a multinational headquarters under a UK commander. Thus the Allied Command Europe Rapid Reaction Corps (ARRC) was set up at Rheindahlen. The first Chief of Staff and architect of the headquarters was a Royal Engineer, Brigadier A. D. (Tony) Pigott; and the first Chief Engineer was Brigadier A. R. E. (Alwin) Hutchinson. Britain's forces stationed in Germany would be committed to the ARRC, and additional reinforcements would come from 3 (UK) Division and other NATO formations; the precise order of battle would depend on the needs dictated by different operations and the willingness of the other nations to participate.

Brief Summary of Defence Trends from 1980 to 2000

There was a substantial reduction in the size and funding of the UK's military forces during these two decades. Throughout this

period the Corps had to adjust to a series of changes in the UK's Defence Policy, driven by some key factors:

- The adjustment to the new security environment following the end of the Cold War.
- The ability to change and meet new threats.
- Continuous budgetary pressures and the drive for efficiency measures.
- A continued world-wide role.
- An unexpectedly high level of operational commitments.
- Crucially, balancing military capability against affordability.

NOTES

- 1 The full list given in Jackson, *Withdrawal from Empire*, was, in 1985: Anguilla, Ascension, Bermuda (internally self-governing), British Indian Ocean Territories, British Atlantic Territories, British Virgin Islands, Falkland Islands and Dependencies, Gibraltar, Hong Kong, Montserrat, Pitcairn Islands, St Helena, Tristan da Cunha, Turks and Caicos Islands, Cayman Islands, Cook Islands and Niue Island.
- 2 Cipkowski, Peter, *Revolution in Eastern Europe*, John Wiley and Sons Inc., 1991.
- 3 Russia, Ukraine, Belarus, Moldova, Georgia, Armenia, Azerbaijan, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan and Chechnya (which did not receive international recognition).
- 4 Letter to Colonel G. W. A. (Gerald) Napier, June 2002, held in Volume 12 Archive, RE Corps Library.
- 5 Jackson and Bramall, *The Chiefs*, p. 396.
- 6 *Ibid.*, p. 435.
- 7 *REJ*, March 1986, p. 5.
- 8 AHB. D/DASD/8/1/4 (ASD 1e) dated 7 Dec 1984 (New MOD org effective from 2 January 1985) – Single Service Chiefs to answer to SoFS through CDS – titles 2-star Dir Gen, 1-star Dir. Also D/DASD/176/1/9 (ASD 2) dated 10 April 1987 – Directives for EinC, DG Mil Svy. Also Army Organisation and Manpower Committee AOMC/P (85) 5 – Higher Management Implementation Plan.
- 9 AHB AOMC/P (85) 1.
- 10 *REJ*, August 1998, p. 92.
- 11 More at www.armedforces.co.uk/mod/listings/l0006.html
- 12 1980 figures of Regular forces from Defence Statistics 1998 (DASA) Table 2.8 and MOD Statistical Bulletin TSP1 (October 1998). Figures of Reserves from Defence Statistics 1998 (DASA) Table 2.13 and TSP7 (April 1998).
- 13 Regular Forces figures from UKDS 2004, Chapter 2, Table 2.7.
- 14 Reserves figures from UKDS 2004, Chapter 2. Figures exclude FTRS personnel but include OTCs and non-Regular permanent staff.
- 15 RE figures from MOD Corporate Memory Analysis letter HB(A)6/2 dated 19 May 2006.

A Corps for the New Millennium

The Development of the Royal Engineers Organisation, 1980–2000

The Corps in 1980

Royal Engineers Order of Battle

The traditional role of the Corps is to help the Army is to live, move and fight, while preventing the enemy from doing so. Priority for the Corps in 1980 was to ensure that the equipment and skills for both mobility and counter-mobility were maintained, especially in support of 1 British Corps. Effective engineer support in Germany also depended on an intimate understanding of the terrain over which the battle for Europe might take place, a special requirement being the need for close cooperation with potential host nations, particularly West Germany, both for the tactical battle and for the logistic engineering needed.

The table overleaf lists the Regular and TA Field Regiments in the Royal Engineers in 1980.

The Corps was engaged in a wide variety of commitments outside Germany, but its operational priorities and training were focused on supporting 1 British Corps and operations in Northern Ireland. Rhine Army units were mechanised, mounted in tracked armoured personnel carriers (APCs) and with radio communications down to section level. United Kingdom based units and the Queen's Gurkha Engineers (QGE) were lorry-mounted, their organisation, communications and equipment being more orientated towards operating on light scales either on the flanks of NATO or overseas. The Territorial Army Sappers' field regiments were organised into two engineer brigades and formed an essential back-up to the regular part of the Corps. In the dispersed nature of the TA there were also eight independent squadrons filling important roles in the order of battle; the details are at Annex F.

Regular and TA Field Regiments in the Royal Engineers, 1980

	Regiment	Location
Germany	1 Armoured Division Engineer Regiment Soon to revert to 21 Engineer Regiment	Nienburg
	2 Armoured Division Engineer Regiment Soon to revert to 23 and 25 Engineer Regiments	Osnabrück
	3 Armoured Division Engineer Regiment Soon to revert to 26 Engineer Regiment	Iserlohn
	4 Armoured Division Engineer Regiment Soon to revert to 35 Engineer Regiment	Hameln
	28 Amphibious Engineer Regiment	Hameln
	32 Armoured Engineer Regiment	Munsterlager
UK	22 Engineer Regiment	Tidworth
	33 Engineer Regiment (Explosive Ordnance Disposal)	Chattenden
	36 Engineer Regiment	Maidstone
	38 Engineer Regiment	Ripon
	39 Engineer Regiment	Waterbeach
	Royal Monmouthshire Regiment Royal Engineers (Militia)	Monmouth
	71 (Scottish) Engineer Regiment (Volunteers)	Glasgow
	72 (Tyne Electrical Engineers) Engineer Regiment (Volunteers)	Gateshead
	73 Engineer Regiment (Volunteers)	Nottingham
	74 (Antrim Artillery) Engineer Regiment (Volunteers)	Belfast
Overseas	75 Engineer Regiment (Volunteers)	Manchester
	111 Engineer Regiment (Volunteers)	Minley
	The Queen's Gurkha Engineers	Hong Kong

- Engineer resources and equipment were provided from Engineer Resources in the UK and 40 Engineer Support Group in BAOR.
- Professional engineering expertise was concentrated in the Military Works Force, with both its regular and TA component, and the Corps was also fortunate to be able to call on expert advice from the Engineer and Logistics Staff Corps when necessary.
- The regular field element of Military Survey consisted of a single regiment in the UK and an independent field squadron in Germany.
- Support for 3 Commando Brigade Royal Marines was provided by 59 Independent Commando Squadron RE and 131 Independent Commando Squadron RE (V), both equipped for cold-weather operations on NATO's northern flank in Norway.
- The Corps training organisation had two main elements: the Royal School of Military Engineering at Chatham, with the Depot Regiment and 12 RSME Regiment, and 11 Engineer Group, whose headquarters was at Minley Manor (Blackwater) and which commanded 1 and 3 Training Regiments at Minley, the Junior Leaders Regiment in Dover and the Army Apprentices College at Chepstow.
- Royal Engineers Survey and the Postal and Courier Services were outside the EinC's control other than for 'cap-badge' matters. Postal and Courier Services were soon to leave the Corps, despite the posties' immense pride in their Sapper cap badge, as the creation of the Royal Logistics Corps replaced long-standing historical arrangements. The transfer was marked in a final parade at Mill Hill on 1 April 1993.¹

Engineer Command Structure

The EinC as head of the Corps was located in the Old War Office building in Whitehall. As one of the Arms Directors, he reported to the Vice Chief of the General Staff (VCGS) on matters to do with operations and training, having direct control over all training and support functions. Operational control of field RE units was

exercised through the chain of command at each level, where there was an Engineer headquarters responsible to the commander for the professional efficiency of the Royal Engineers and for engineer operational planning and logistics. The exception was 33 Engineer Regiment (EOD), an MOD-controlled unit, whose role became ever more significant during the period: it was not designed to deploy as a regiment but to provide subunits and detachments as operational calls were made upon it.

Unlike many of the other Arms Directors, the EinC had additional specialist responsibilities – for construction to the Quarter Master General via the Director of Engineer Services; for support to the RAF via the Vice Chief of the Air Staff; and for EOD via the Vice Chief of the Naval Staff and the Vice Chief of the Air Staff.

The Royal Engineers as a Career

In 1980 a career in the Corps was as attractive as ever to the aspiring soldier. The opportunity to learn a trade and the prospect of such work in interesting parts of the world remained a recruiting draw during the period covered by this volume. Military skills, however, had to be learned first, and the newly joined Sapper, after his basic training, would initially qualify as a combat engineer. His first unit would often be in Germany where he might add AFV driving and signalling to his combat qualifications. He could also upgrade in these or in combat engineering. If he showed leadership qualities, he might then obtain his first promotion and go through a junior NCO's cadre. At this stage he could decide that soldiering was not for him and obtain his discharge; alternatively he could sign on for an appropriate length of time and undertake a trade course leading normally to a posting to a UK-based regiment where he would practise his new skills.

In this way a soldier's career proceeded from posting to posting, gaining qualifications and experience, often involving emergency tours in Northern Ireland or other deployments overseas. Military and leadership skills would be developed and lead to a successful career, with the opportunity for a late-entry

commission, with a ceiling of lieutenant colonel. Those who followed a trade career would not have such a natural path to the top unless their trade expertise led to qualification as a clerk of works or military plant foreman.

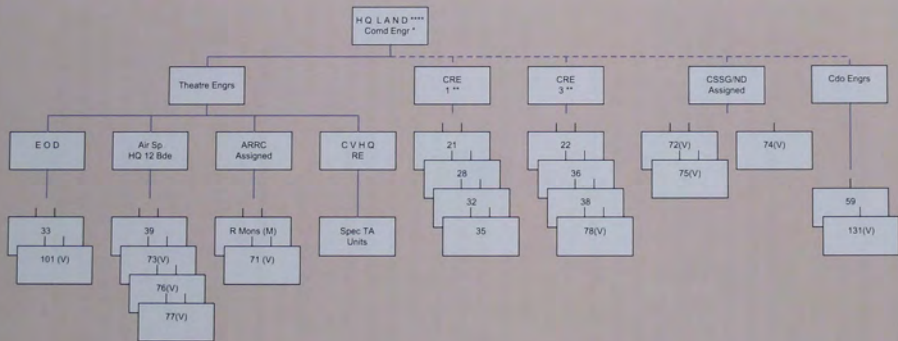
This dual path had its parallel in the officer's career. Throughout the two decades, the majority of officers would either already have obtained a degree, not necessarily in engineering, or acquired one shortly after commissioning. Understanding and gaining experience in combat engineering was then the first priority. However, after two or three tours at regimental duty and possibly some staff experience, the officer faced a choice that would determine his career pattern and prospects for eventual promotion. He could specialise either in survey, in professional (chartered) engineering, or as a staff officer by attending the Staff College. While the first two options offered interesting jobs professionally, they could limit employability. Staff College combined with successful experience in command was considered essential if he aspired to the very highest ranks. One famous exception was General Sir John Stibbon, who became Master General of the Ordnance in 1987 without ever having been a student at Staff College. He had been a member of the Directing Staff at Camberley and commandant of the Royal Military College of Science at Shrivenham, giving him the unique post-nominal letters of sq, psc, psc† (see List of Abbreviations, page 753).

Options for Change

The Effects of *Options for Change* on the Royal Engineers Structure

The outline schematic shown overleaf illustrates the Sapper command and control arrangements within Land Command after *Options for Change*, initiated in 1991 and mentioned earlier in Chapter 1. Additionally, Annex F provides the details of the many different unit changes and moves during the two decades covered by this volume. Under *Options for Change*, the regular element of the Corps in the Field Army reduced from thirteen regiments to ten. Three brigade-affiliated regiments and a fourth

Royal Engineers Command and Control in Land Command after *Options for Change*



Note: 25 Engr Regt in Northern Ireland was OPCOM
HQ NI and not part of Land Command

Key

Peace OPCOM

Engr Tech
Direction

general-support regiment would be based in Germany as part of 1 (UK) Armoured Division. Six regiments would be based in the UK: one air support, one EOD, a new regiment (25) for Northern Ireland, plus two close-support brigade-affiliated regiments and a general-support regiment for 3 (UK) Division. These reductions were somewhat offset by increases in the TA, with the formation of two air support regiments, 76(V), 77(V), and another regiment, 78(V), under CRE 3 (UK) Division.

The substantial commitment the Corps now had for air support was to be met by 39 Engineer Regiment and three TA regiments, one of which (73(V)) would also take on the Harrier role. The two new regiments (76(V) and 77(V)) would command the eight airfield damage repair squadrons. These were under the command of Headquarters 12 Engineer Brigade, which had been in existence at Waterbeach since 1982. By 1991 it had developed strong links with Headquarters Strike Command. The third new TA regiment (78(V)) was to command the UK-based amphibious engineers and the field squadrons in the south of England. 29 and 30 Engineer Brigade Headquarters were both disbanded, but Headquarters 29 Engineer Brigade was to reappear later in modified form, after the 1998 *Strategic Defence Review (SDR)*.

The operational rationale for these changes is covered in more detail in Chapter 3. Crucially, the principle was established that a regimental headquarters was the most effective level of Sapper support for a brigade. In war the three BAOR regiments would regroup to provide a field and an armoured squadron to each armoured brigade. In the UK, two armoured engineer squadrons were created to enhance the support of the mechanised brigades.

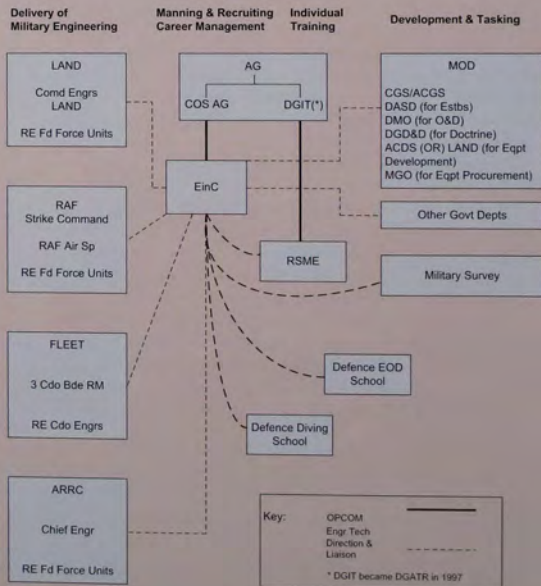
All the Royal Engineer field units were now an integral part of Land Command, less 25 Engineer Regiment in Northern Ireland under OPCOM HQNI, which in turn answered directly to the MOD.

The EinC's post, along with that of the other Arms Directors, was reduced to one-star status in 1995. The role remained much the same as before, with responsibilities ranging across the Army and the other services as well as Whitehall, except for one

significant change – the EinC no longer commanded the RSME. However, the importance for Arms Directors to nurture their own Arms, especially in a period of so much turbulence and change, was recognised by the Army Board. A paper from HQ Adjutant General (AG) in 1996² directed that the principal functions of the Arms Directors were to:

- Direct special-to-arm doctrine, including the development of their Arm in response to Force Development work directed by

Schematic diagram illustrating the EinC's lines of influence after *Options for Change*



Director General Doctrine and Development (DGD&D), and play an important part in defining professional standards for their Arm.

- Develop Regimental and Corps ethos and values.
- Assist in the specification of trained manpower and in the provision of manning policy for the Army.
- Continue their involvement in both individual and collective training.
- Be responsible for preparing special-to-arm individual training policy.
- Contribute to the formulation of collective training policy for HQ LAND. They would further assist in setting the training requirement, formulating training objectives and validating individual training.

More specifically, the paper directed that the EinC(A) would also provide professional judgement to a wide range of Top Level Budget Holders (TLBs) and other government departments; be responsible for specific aspects of EOD and all military counter-terrorist search policy, training requirements and advice;³ and have Operational Research (OR) sponsorship for a wide range of engineer equipment.⁴ The diagram on the opposite page illustrates the EinC's influence and revised role. He retained the right of direct access to Chief of the General Staff (CGS) on Regimental issues, along with the other Arms Directors.⁵

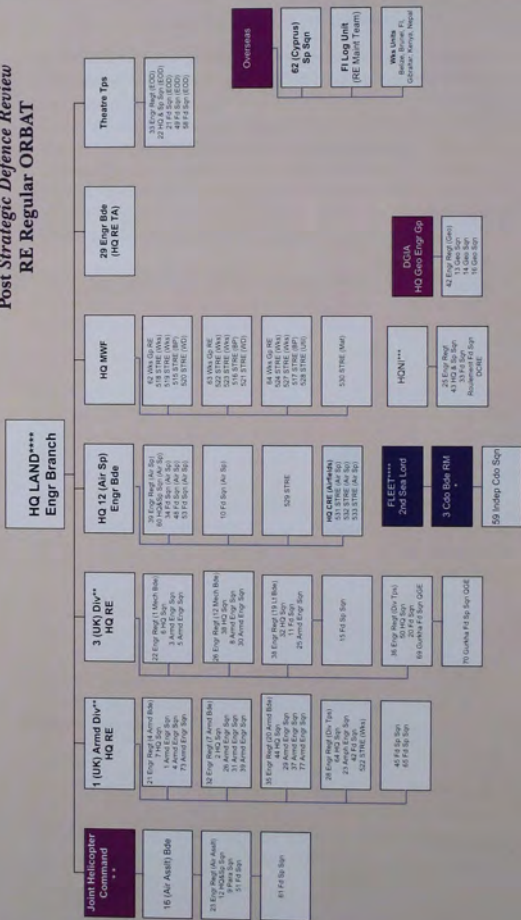
The effects of the Strategic Defence Review (SDR) on the Corps

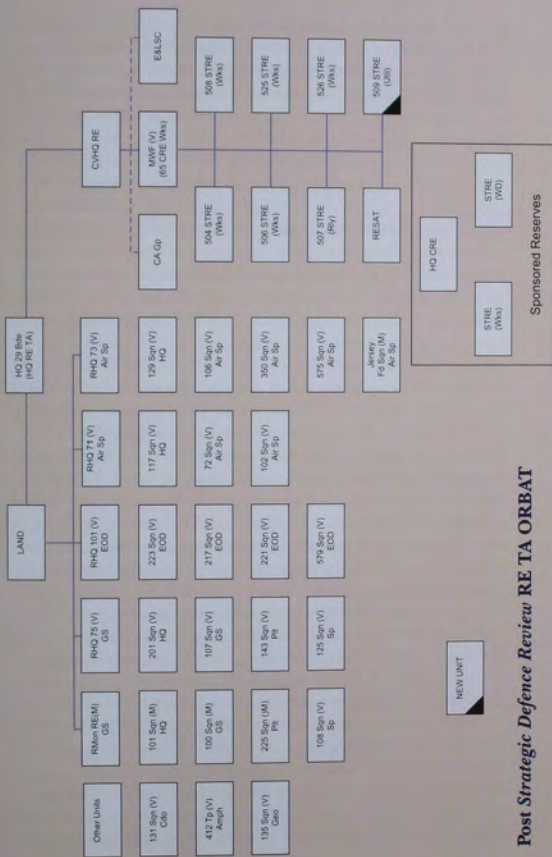
The diagrams on the following pages show the Royal Engineer structure for Regular and TA formations and units after the SDR in 1998. The organisation of specialist units is covered later in the chapter.

Continued Restructuring during the Strategic Defence Review

What emerged later from the SDR reinforced the principle that Sapper support to six deployable brigades plus an airmobile

Post Strategic Defence Review RE Regular ORBAT





Post Strategic Defence Review RE TA ORBAT

brigade should be provided at the scale of an engineer regiment per brigade and a close-support squadron to a battle group. Armoured engineers were now integral to the formations they supported rather than being concentrated in a central specialised unit. Close-support squadrons, units in which the troops were mounted in engineer tanks and AFVs, had superseded armoured engineer squadrons, and the need to regroup was eliminated by incorporating the armour within each brigade regiment. In 1 (UK) Armoured Division, based in Germany for the foreseeable future, all squadrons would be close support. In 3 (UK) Division based in the UK the available assets would only allow for one close-support and two mechanised squadrons in each regiment, including the planned re-formation of 26 Engineer Regiment at Ludgershall. Overall, the effect of the *SDR* on the Corps was a 13% increase in regular manpower and a 20% increase in the number of regular subunits.⁶

There were to be significant increases in other areas as well. For example, in September 1999, 5 Airborne Brigade amalgamated with 24 Airmobile Brigade to form 16 Air Assault Brigade. The new Sapper regiment to support this brigade was to be 23 Engineer Regiment (Air Assault), taking on the name of the old 23 Engineer Regiment disbanded as a result of *Options for Change*, but with a very different role. The new Regiment would include 9 Parachute Squadron, 51 Field Squadron, 12 Headquarters Squadron (Air Assault) and 61 Field Support Squadron (Air Assault). More air support was to be provided by newly formed regular squadrons, and 33 Engineer Regiment (EOD) was to be enhanced.

Much of this regular *SDR* enhancement was at the expense of the TA (see also Chapter 11) with the RE TA regiments reducing to just five (one EOD, two General Support and two Air Support). The Jersey Field Squadron and 131 Independent Commando Squadron were retained, along with specialist STREs in the MWF(V) and the air-support roles (Air Support). HQ 29 Engineer Brigade (under the command of a colonel) was formed to provide command and control for Corps engineer troops for the ARRC.⁷ The headquarters was based on the former CVHQ RE, whose role it continued to perform; it had command in

peacetime over the units that would be assigned to the ARRC in war and over the Military Works Force (V) and Civil Affairs Group. In war it would function as an ARRC-ruled multinational engineer brigade, taking on a Dutch and an Italian battalion in addition to its own units.

The Engineer and Logistics Staff Corps (V)⁸

The Engineer and Railway Staff Corps, founded in 1865, became the Engineer and Logistics Staff Corps (E&LSC) in 1985 and provided critical support to the Corps with the increasing tempo of operations during these two decades. Manned by many of the most eminent senior engineers and logisticians from British industry, the Staff Corps contribution was highly rated, especially in the following operations:

- **The Falkland Islands.** The unit assisted the repair of the airfield at Stanley by procuring original drawings and construction details. More significantly, the Staff Corps' invaluable advice, following a visit to the Islands by the Commanding Officer, Colonel I. (Ian) Campbell and Acting Adjutant, Major J. P. (John) Taberner helped the EinC convince the UK Government that it was more sensible for civilian contractors to build a new airfield at Mount Pleasant than to overcommit the Corps to such a major task. Later, an E&LSC geologist, Major S. C. L. (Steve) Hobden provided assistance in locating suitable quarry locations for the crushed rock needed for the many engineer tasks in the aftermath of the war. Advice was also given on the berthing of floating accommodation units for troops, the anchoring of mountaintop early-warning radar sites and on power and water supply for the temporary camps built by Royal Engineers.
- **Northern Ireland.** The E&LSC was the main facilitator of assistance from UK industry for many of the Royal Engineer projects in Northern Ireland.
- **Kuwait.** Valuable information was provided about the construction details of oil pipelines and advice on how to cross them, together with burning rates for crude oil, the con-

sequences of major spillages, the effects of vapour hazards, terrain and going, oil wells and installations, electricity generation and transmission, water supply and construction resources.

- **Bosnia.** In 1996 the Commanding Officer of the E&LSC, Colonel W. (Walter) Hogbin, visited Bosnia with the EinC to assess what future help could be provided to the Royal Engineers in theatre. Assistance was subsequently sought on the safe demolition of bridges and buildings, bridge reconstruction techniques, a high-voltage distribution system, quarries, the procurement of a floating railway bridge and the repair of a damaged geothermal well by Lieutenant Colonel F. R. D. (Rodney) Chartres who flew out specially for that.
- **Kosovo.** The E&LSC was engaged early in the planning phases. It also identified suitable locations for water supplies and aggregate sources as well as enabling the repair of two main power stations in Pristina. Prior to the latter, an E&LSC member, Lieutenant Colonel R. J. (Roger) Urwin, the Managing Director Transmission of National Grid plc, visited Kosovo himself for a two-day appraisal within 48-hours of the request being made. He arranged for a joint National Grid/Powergen team to help the Sappers re-establish power in the region.

Queen's Gurkha Engineers

The Queen's Gurkha Engineers did not escape the tide of reorganisation. On top of the demands for economy and of the post-*Options* role of the Army as a whole, the future of the Gurkhas was seen by many as questionable once Hong Kong was handed over to China in 1997. *Options for Change* reduced the Brigade of Gurkhas to an overall strength of 2,500, comprising two infantry battalions plus supporting arms and services. By October 1996, after the final disbandment parade in Hong Kong of 67 Gurkha Independent Field Squadron, all that remained of the Queen's Gurkha Engineers was 69 Gurkha Independent Field Squadron, which had been based in the UK since 1981. They moved to join 36 Engineer Regiment in Maidstone, and under the *Strategic Defence Review* remained part of that regiment

as divisional troops, 3 (UK) Division. Fortunately, 70 Gurkha Field Support Squadron was then revived under the SDR as it became increasingly obvious that more than one Gurkha squadron was needed in order to retain effective critical mass.

Of all the reductions under *Options for Change* and the SDR, those of the Gurkha Engineers were perhaps the hardest to implement. Most manpower reductions amongst Regular British Sappers could be managed through normal wastage and voluntary redundancy. This was not an option for the Gurkha Sapper, for whom redundancy meant the end of a career with fine prospects and a wholly uncertain future back in his homeland. Despite immense care by unit commanders, some men felt aggrieved at their treatment. Nevertheless, in November 1996, OC 69 Squadron, Major T. (Tim) Treanor, was able to write:

My own experience in handling the final phase of Drawdown has left me humbled by the men's reaction. 40% of my Squadron proceeds on pension, redundancy or transfer to RGR in late 1996/97. I am sure that no British squadron could deploy on operations and shed such numbers, indeed during Op Grapple 1 (the deployment of British forces in the former Yugoslavia with UNPROFOR), when the first British redundancies were announced, and many were volunteers, the men were sent back to Bosnia. My experience was that Gurkha officers, senior NCOs and Sappers continued to work hard and with unflagging loyalty and commitment.⁹

Berlin

After the collapse of the Warsaw Pact there was no further *raison d'être* for the Berlin garrison, which since 1945 had been the symbol of the West's resolution to prevail in the Cold War. The British element of the three powers occupying West Berlin was essentially the Berlin Brigade, with its own Sappers, 38 (Berlin) Field Squadron. As previous volumes have shown, the Squadron was tailor-made to meet the special needs of the Brigade in a well-refined operational scenario. Two of the brigade commanders during the period of this history had been Sappers – Brigadiers J. A. M. (John) Evans and R. A. (Richard) Oliver.

The Corps had also always provided the Area Works Officer, uniquely a Corps post rather than civilian because of the special operational role for Berlin (and much sought-after for the wide range of professional experience it offered together with an agreeable lifestyle). Many Royal Engineers had also served in the British Commander-in-Chief's Mission to the Soviet Forces in Germany (BRIXMIS), the official observer group allowed to patrol the Soviet Zone and report on any possible breaches of the international treaties.

All this was dismantled, and the last joint military parade of the British, French and American elements of the Four Powers was held on 18 June 1994. The Russians departed a week later.

Explosive Ordnance Disposal (EOD)

Volume XI of this history recorded a shift of emphasis in the commitment of the Corps to 'bomb disposal', as the specialisation was then known, towards meeting the threat of air-delivered munitions by Warsaw Pact countries, including the neutralisation of unexploded intercontinental ballistic missiles with nuclear



Disbandment Parade of 38 (Berlin) Field Squadron, March 1994.

warheads.¹⁰ However, what really created the momentum for changing the EOD component of the Corps from a scarcely deployable, predominantly civilian organisation to one integrated in the main Corps order of battle was the Falklands War. As Chapter 5 reveals, the task there fell to the senior instructors who possessed the necessary expertise. Another important factor at the time was the rising significance of High Risk Search and Search Training as a Corps responsibility. As a result, EOD was able to swim against the tide of economy and reductions over this period to become an area of growth rather than decline.

In 1980 the two TA EOD squadrons (590 and 591) were under the command of the Regular headquarters of 33 Regiment (EOD) based at Chattenden, which then had only one Regular squadron, 49 Squadron (EOD). In spring 1982, two new squadrons were formed (583 and 579). In June 1988, the TA component was detached from 33 Regiment to form 101 (London) Engineer Regiment (EOD) (V), with the four TA (EOD) squadrons under command.

In 1983 a second Regular EOD squadron, 58, was formed to join 49 at Chattenden and boost the capability of 33 Engineer Regiment (EOD). In 1986, 22 HQ and Support Squadron (EOD) was added. In 1990 a third Regular field squadron, 21 (EOD), was added and the Regiment moved to Wimbish in 1993. Although the move was completed under the umbrella of *Options for Change*, it was driven primarily by operational considerations. It marked the 'coming of age' of the Regiment and enabled it to break away from the RSME and its commitments to the Defence EOD School and the EOD Technical Information Centre.

Despite the expansion in the 1980s, the Regiment found itself in some difficulty when the Gulf War broke out in 1990. Although 58 Squadron (EOD) had been in existence for seven years, its role was predominantly search and counter-terrorist business. The brunt therefore fell on 49 Squadron (EOD), which, in order to operate effectively, had to borrow equipment. 21 Squadron (EOD) was then created urgently in order to provide a capability for roulement. Even then, as Chapter 6 relates, they became

deeply committed in an unforeseen way in the gruelling and dangerous aftermath of the war.

During the operations in the Balkans, another watershed was reached. The Regiment was now in a position to field EOD at up to squadron strength to Bosnia and did so for the duration of the emergency, as Chapter 7 testifies. This in turn established a pattern that could be followed in other emergency deployments worldwide such as in Angola, Rwanda and Kosovo, along with a continuing deployment in the Falklands. The Regiment was also able to fulfil the continuing commitment to what had become known as Battle Area Clearance (BAC), but within the UK being confined largely to training areas. BAC was re-designated Explosive Ordnance Clearance (EOC). Two such clearances took place at the former Ordnance Depot at Bramley, Operations *Apple* and *Cornelius*, where hundreds of items were returned to Porton Down containing chemical munitions that included mustard gas, phosgene and lachrymatory agents. During Operation *Apple* one of the lachrymatory grenades exploded while being lifted – the chemical medical evacuation and decontamination system was tested for the first time with live chemical agents and contaminated casualties. Luckily, there was only one lightly injured Sapper, and the system proved to be most successful, which gave enhanced confidence to all involved. The lessons learnt there were adopted and proved valuable in the Gulf War.

Thus the EOD element of the Corps had grown by the early 1990s through the pressures of operational necessity. It remained substantially the same after the *SDR*. However, the division of responsibility between the services and within the Army between RE and RLC continued to cause friction and needed tactful handling.

Throughout this period, 33 Regiment continued to clear and make safe Second World War bombs and munitions unexpectedly discovered in many different parts of the country. The Ukrainians, who as displaced persons at the end of that war had formed the nucleus of the BAC teams, retired and were replaced by UK civilians. The country owed a huge debt of gratitude to the Ukrainians, who in all weathers had worked for a pittance to

make our beaches and training areas safe. A silver centrepiece was commissioned of a Ukrainian in national dress to commemorate their time working for bomb disposal.

Most conventional bombs were dealt with in the traditional manner, with the Bomb Disposal Officer (BDO) working alone in a pit. However, in 1987 a German 1,000lb unexploded bomb was located in a gasometer in London's docklands. The inside of the gasometer was pitch black, and the bomb jammed the rising mechanism under ten metres of water. The render-safe procedure required a team of three from the regimental diving team working by torchlight to free the bomb, to lift it by block and tackle into a rubber dinghy, carry out the fuze neutralisation and lift the bomb to the top of the gasometer and out through the narrow hatch. As all three individuals were exposed to the same danger throughout, citations were written to include them all, and they were all recognised with the same award. The Queen's Gallantry Medal (QGM) was awarded to Major R. G. R. (Robbie) Hall, Staff Sergeant N. H. (Nigel) Daly and Sapper J. P. (Paul) Wright.

The 'Bermondsey Bomb' of October 1987 saw Captain A. J. (Chris) Goddard and Corporal G. A. Fisher also both awarded the QGM for dealing with a bomb dug up on a building site just South of Tower Bridge. The bridge was closed during the render-safe procedure, and half of Bermondsey was evacuated, save one old lady who said the Germans had not driven her out in the war and she was not moving now! The team of two had to work upside down to get at the fuze, which is why it was particularly dangerous. Other awards were made for counter-terrorism operations on the mainland of the UK, the details of which cannot yet be published for security reasons. During the two decades between 1980 and 2000, members of 33 Regiment were awarded a DSC, a CGM, an MC, 12 QGMs, 2 OBEs, 19 MBEs and 5 BEMs.

Air Support

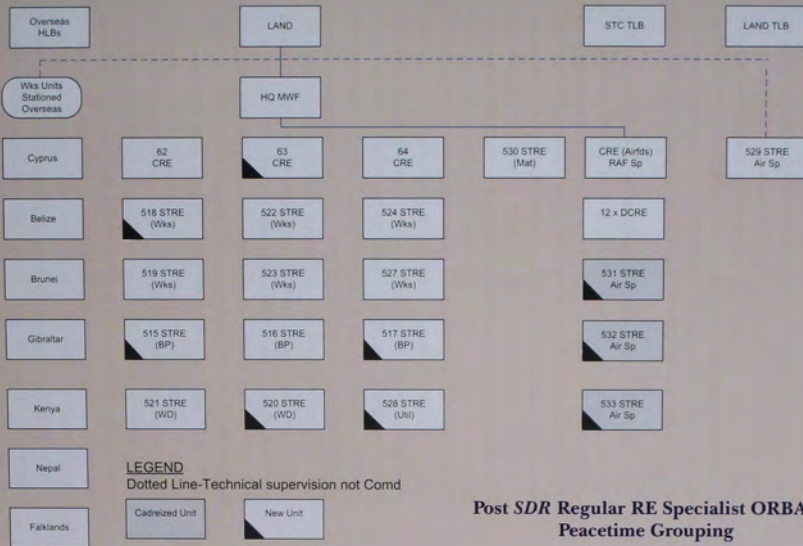
Volume XI traced the changes in organisation as the Corps found its feet in its new responsibilities for supporting the Royal Air Force. Essentially these were:

- RE support to Harrier operations, including the construction of hides, field take-off strips, landing pads, engine test-pads, taxiways and fuel and power supply.
- Airfield Damage Repair (ADR), which included:
 1. Emergency repairs to the aircraft operating surfaces of RAF Priority One airfields at home and overseas.
 2. Restoration of Essential Services and Facilities (RESF) such as power, fuel and water at main bases.
 3. Works for War, such as improvements to field defences.

The separation of the PSA from MOD Works in the early 1990s produced a third responsibility: meeting the peacetime works services requirements on the RAF stations of Strike Command.

By 1980, the responsibility for the first two historic wartime roles had been spread among the UK field regiments in the form of construction squadrons in 22, 36, 38 and 39 Regiments except for Harrier support, which in the UK had been allocated to 38 Engineer Regiment and in Germany remained with 10 Field Squadron.¹¹ These arrangements, inherited from the Army Restructure Plan of the 1970s on the principle of greater flexibility of the roles of field units, were never satisfactory. The dispersal of the airfields raised difficulties in training and manning. Inconsistencies arose in standards and procedures. During the 1980s the ADR responsibility returned to 39 Regiment under the command of 12 Engineer Brigade. The new field squadrons (construction) contained several clerks of works, a military plant foreman, artisan tradesmen and plant operators, and this enhanced their capability. The Brigade became the focus for all the Corps' executive responsibilities towards the Royal Air Force, although Harrier support did not become a Brigade responsibility until later. A dominant feature of this was its obligation for training units, including the STREs, TA field squadrons and regular field squadrons in preparation for the Falkland Islands tours after the Falklands War.

Options for Change and the need to economise on regular manpower led to the decision to meet the ADR commitment at



Post SDR Regular RE Specialist ORBAT Peacetime Grouping

UK bases from two new TA regiments (76, with its centre of gravity in Scotland, and 77 in East Anglia). The existing 73 Engineer Regiment (V) was given the ADR role in support of the RAF overseas. 39 Engineer Regiment was allocated to the multinational air element of the ARRC and was also expected to support RAF operations outside the NATO area. Both 39 and 73 Engineer Regiments also subsequently became responsible for the Harrier support role.

Further evolution became necessary in the mid-1990s when the one-star post of Commander 12 Engineer Brigade had to be given up and the whole capability became the direct responsibility of Headquarters LAND. The RE Air Support Group formed up on 1 April 1995 under a colonel but with much the same resources as the former 12 Engineer Brigade; an STRE (Airfields) being added in 1997 together with further resources from MWF(V). The Air Support Group was re-designated 12 (Air Support) Engineer Brigade in 1997. By that time the third (peacetime) role had been taken on by the Corps. In 1993, CRE (Airfields) was established at Strike Command. Three STREs (Air Support) were provided, each looking after two RAF Stations with a DCRE and two clerks of works at each station. A DCRE filled the role of Establishment Works Consultant (EWC) at High Wycombe.

Under the *SDR* and with experience of RAF operations in the post-Warsaw-Pact era, two new Regular field squadrons (airfields) and further specialist STREs were established. Although not all these measures had been implemented by the end of the period, in 1999 the EinC was able to say that after the *SDR* some 11% of the Corps would be dedicated to the support of air operations.¹²

Royal Navy Support

Throughout these two decades, the demand for Sapper support to 3 Commando Brigade, Royal Marines, increased as the Royal Marines became more aware of the Royal Engineer capabilities. 59 Independent Commando Squadron was ably assisted by 131 Independent Commando Squadron (V), but, as with the Army, it became clear that a regimental level of command was needed at brigade level. The Royal Navy funded the Army manpower

allocated to its support, and so it was a welcome vote of confidence from the Navy that it supported the argument for increased RE manpower, thus easing the way for the planning of support at regimental level.¹³

In 1997, 59 Independent Commando Squadron moved from Crownhill, Plymouth, to a new barracks co-located with the Commando Logistic Regiment in Chivenor, North Devon.

Infrastructure Engineering – The Military Works Force

The Military Works Force (MWF) was based at Barton Stacey, near Andover, until 1986 when it moved to Chilwell Station (now Chetwynd Barracks), near Nottingham. MWF consisted of two units: 62 CRE, with three Specialist Teams Royal Engineers (STRE) (Construction), and 64 CRE, with three STREs, Bulk Petroleum (BP), Electrical and Mechanical (E&M) and Well Drilling (WD). Due to the multidisciplinary nature of the majority of infrastructure engineering tasks, the structure of the Military Works Force was changed in 1980 to give each CRE a more general capability. The three Construction STREs and the E&M STRE were renamed STRE (Works) and two were allocated to each CRE. Each STRE (Works) now had a civil, electrical and mechanical capability. 521 STRE (WD) remained a specialist team but was moved to 62 CRE, while 64 CRE retained 516 STRE (BP).

MWF was initially mainly concerned with providing infrastructure and force protection engineering in Germany and Northern Ireland, while also supporting annual overseas exercises undertaken by RE units. Under the general title 'Works for War', it conducted reconnaissance of existing German infrastructure such as schools, hospitals and industrial facilities for use in the event of war. In Northern Ireland the MWF, often in support of the DCRE Works based with the CRE at HQNI in Lisburn, designed and supervised the construction of numerous patrol bases, sangars, hilltop sites and border observation posts, often in dangerous and challenging circumstances. Exercises in Canada, Kenya, Norway and Gibraltar saw the MWF provide technical design and construction supervision to enable engineer

squadrons and troops to practise their trade skills. The MWF also deployed to many different countries over these two decades to assist in a range of tasks that included disaster relief and support to training teams.

The period of this history saw a revolution in the 'professional engineering' stream of the Corps no less than in the combat side. The term 'Professionally Qualified Engineer' (PQE) was used throughout the last few decades of the twentieth century to differentiate those who had passed one of the civil, mechanical or electrical engineering long courses from 'mainstream' officers. In the 1990s 'PQE' was dropped and the distinction 'chartered engineer' used, which better reflected operational experience. The Falklands and Gulf Wars, followed closely by the Balkans emergency, transformed attitudes to the provision of engineer services in an operational theatre. 'Infrastructure Engineering' became a crucial component of a force's overall capability. Additionally the PSA's monopoly of works services ended, and the Corps now provided more supervision in this area. Thus the technical side of the Corps was drawn into closer contact with the mainstream of Army life, the status of professional engineering was raised, and the indispensability of this capability of the Corps came to be better understood by the Army as a whole.

In 1999, following the experience gained throughout the 1990s, changes to the chain of command of the MWF and its expansion to relieve tour intervals of MWF units supporting multiple, simultaneous operations were introduced. Military Engineer Services was incorporated into the G4 Estates and Works Organisation in HQ Land under Assistant Chief of Staff (ACOS) Estates and Works. A lieutenant colonel infrastructure post was established at PJHQ in Northwood, and additional STREs were established.

Engineer Logistics

Earlier reviews had all recommended that provision of engineer resources was essentially organic to the engineering to which it was related, unlike the 'fire and forget' commodities of the RAOC or the 'routine repair' of the REME. As a result, the well-proven

structure by which resources arrived with their user, having left their base depots at Long Marston and Willich and been ordered, controlled, stored, inspected and repaired through a system totally under RE control, remained in place and little altered until 1990. Until then, Headquarters Engineer Resources controlled five engineer parks in the UK and three in Germany through which resources reached their customers in the field support squadrons. Workshops facilities were provided in the UK at Long Marston and in Germany at Willich. Nevertheless, a *Logistic Support Review* in 1990 recommended the transfer of these functions to the RAOC and REME, as well as the closure of the Willich Depot.

The EinC objected, and only a limited number of equipments were transferred for storage to the RAOC. No inspection or repair functions were transferred to the REME, but Director Engineer Services did transfer his equipment management responsibilities to Director General Equipment in Andover. 40 Army Engineer Support Group in Willich also closed in considerable haste, transferring some stock to 65 Field Park Squadron in Hameln in early 1992.

In an attempt to reduce the overall number of base depots, an option of moving Engineer Resources from Long Marston to Chilwell was considered. However, following another *Engineer Logistic Review* published in 1995, it was decided instead to transfer those elements of the base engineer resources that were not 'core' to the RE to those whose core business they were, thus implementing the full recommendations of the 1990 *Logistic Support Review* and overturning the reprieve won by the EinC earlier. In 1998 the equipment and spares, worth £200 million, moved out of Long Marston to the Ordnance Depots at Bicester, Donnington, Ashchurch and West Moors (under the Army Base (later Defence) Storage and Distribution Agency). The Storage and Distribution agency also took under command the four Engineer Parks at Waterbeach, Ripon, Stirling (Drip Camp) and Longmoor. These were the remnants of 320, 322, 324 and 321 Engineer Parks which had been at Thetford, Hessay, Stirling (Forthside) and Longmoor before *Options for Change*.

The provision of spares became the responsibility of the Equipment Support Provisioning and Procurement Authority; and the Defence Clothing and Textile Agency somewhat bizarrely took on the responsibility for the procurement of general construction stores and equipment for operations and projects at the end of 1998. At about the same time the last Resources Specialist trade course took place at Long Marston, training now being transferred to the RLC Training Centre at Deepcut (under the Army Training and Recruiting Agency). Technical publications joined the remainder of Army publications at Llangennech in 1997. The closure of the Engineer Workshop required the shift forward of some responsibilities in the field repair category. This transfer was achieved in October 1998. At the same time the Army Base Repair Organisation took on the remainder, along with the base repair of engineer equipment.

It fell to the Commander Engineer Resources, Colonel T. J. (John) Ludlam, to oversee this complex project in which the greatest limiting factor had been the time needed to carry out the £4 million worth of Property Management work. In this he was greatly helped by the dedicated work of a small planning team under Lieutenant Colonel C. (Colin) Mildenhall. Throughout 1998 the dismantling of Long Marston gathered pace. A weekend of events in September marked the closure, including the final official functions in Stratford-upon-Avon to mark the Freedom of the Town held by the Corps. Thus came to an end an organisation on which the Corps had depended since the early days of the Second World War, when the site had been taken over in September 1940.¹⁴ Every operational emergency since then had benefited from its fine record for the provision of stores and other back-up, as witnessed in the pages of this history. Generations of Sappers had confidence in a system that was managed by their own people and could be relied upon to respond with sympathy to emergencies. Not surprisingly, there was some anxiety about the future. The new arrangements, with engineer logistics now part of the normal Army supply chain, had to be made to work, and the Corps converted to them both

in practice and in spirit. Operations in the Balkans and elsewhere could not wait while they settled down.

An essential proviso was that RE staff were to be embedded in key posts in organisations of the new service providers and elsewhere in the Army supply chain to give advice and be a point of contact with staff officers and commanders and generally to interpret the military engineering significance of requests from units. These posts included staff officers at Grade 1 and 2 level, together with technicians and tradesmen ranging from Warrant Officer Class 1 to Corporal. One of the chief reservations expressed about the changes came from experience of the single supply chain in the Gulf War, with which considerable difficulties had been experienced. However, there the main culprit had been a lack of information on the availability of stock rather than any fundamental weakness. New information technology systems were in hand to solve this problem. It was realised that a separate system for engineer logistics would be impractical, even if it were desirable.

While many other concerns about the changes were expressed and debated in the Corps, ranging from the effect on operations of dependence on a non-dedicated supply chain to career and training anxieties, the logic of identifying core business and placing that where it could best be handled won the day. On a more positive note, the development of professional logistic skills in the Corps through the wider experience that beckoned was seen to represent a career opportunity rather than a threat. The arrangements were soon fully tested in the Balkans, and their introduction marked a step-change in attitudes to engineer logistics in the Corps.

The Engineer logistic elements core to the Royal Engineers moved with Commander Engineer Resources from Long Marston to HQ QMG in Andover. They joined Colonel Engineer Services who had recently moved from HQ EinC in Minley and were joined shortly afterwards by Director Engineer Support as their commander. Colonel Engineer Resources, as Commander Engineer Resources was now titled, continued to provide Engineer logistic policy and doctrine, run the management and materiel inspectorate

Engineer Logistics in 1980 and 2000

UK		Germany	
	1980	2000	1980
4th (Base)	CEP Long Marston HQ Engr Resources Long Marston	DSDA – Storing ABRO – Repair ESSPA – Purchase DCTA – Purchase ERMC – Control	40 Army Engr Sp Gp
3rd	CEP Long Marston CEP Engr Parks at: Livingstone / Stirling Hessay / Ripon Thetford Longmoor 198 Fd Pk Sqn(V)	DSDA Engr Parks at: Stirling Ripon Waterbeach Longmoor 15 Fd Sp Sqn for 3 (UK) Div	40 Army Engr Sp Gp, incl RCZ War Reserve Park at Hamm 65 Corps Sp Sqn War Reserve Parks at: Hildersheim Hameln Sennelager Trg Park at Hameln 65 Corps Sp Sqn
2nd	Regt Sp Sqns and Sp Sqns(V)	61 Fd Sp Sqn 70 Gurkha Fd Sp Sqn 272 Fd Pk Sqn(V) for Air Sp	Regt Sp Sqns
1st (Front)	Fd Sqn Sp Tps Air Sp Sqn Sp Tps	Regt HQ Sqns 60 HQ and Sp Sqn for Air Sp	Fd Sqn Sp Tps 10 Fd Sqn (Harrier Sp) 38 Berlin Fd Sqn

DSDA Defence Storage and Distribution Agency stored Engineer equipment at four locations in UK.

ABRO Army Base Repair Organisation carried out 3rd and 4th line repair to Engineer equipment.

ESSPA Equipment Support and Spares Procurement Agency purchased Spares.

Central Engineer Park, Long Marston, Warwickshire provided 4th, 3rd and 2nd Line support.

in Germany and the UK, and also control Engineer Resources in the supply chain through the Engineer Resources Management Cell in Bicester. This changed again when QMG was disbanded on the arrival of the Defence Logistic Organisation in April 1999. Director Engineer Support was disbanded and Colonel Engineer Resources and Colonel Engineer Services moved to HQ LAND. This provided a welcome boost for Engineer Logistics. For the first time the policy, management, execution and inspection were under the same one-star officer, Commander Engineers.

The table on the preceding pages provides a summary of the Corps' Engineer Logistic organisation in 1980 and 2000, broken down from Fourth (Base) to First (Front) Lines.

Survey

Survey is covered in Chapter 10, but it is worth highlighting in this chapter the radical changes experienced by the Military Survey Branch of the Corps between 1980 and 2000. The first seeds of change had already been sown in technological shifts in the 1970s, with the advent of substantial computing power and the growth of data in computer readable format transforming the civilian elements of Military Survey. Digitisation was to transform the uniformed elements also, but not in the early years of this period.

The Gulf War of 1991 forced a reappraisal of the role of Military Survey as a whole and the Military Survey soldier in particular. Throughout the preparation and deployment period in 1990 and in the war itself, staff in the UK worked intimately with staff in theatre to produce new forms of terrain analyses and target support, with some tasks requiring an overnight turnaround. Telephone and fax communications from the UK to theatre and the UK to allies were tested to the limit. This resulted in a fundamental reappraisal of the readiness criteria and 'just in time' support. Whereas the uniformed surveyor had in the past partly supplemented the work of the civilian-led UK base production capability, it was now recognised that the focus of the military units should henceforth be exclusively on the provision of advice and support to operational HQ and units in theatre.

The restructuring of the Ministry of Defence and its financial management also had a major effect. Military Survey, comprising 42 Survey Engineer Group, DG Military Survey's staff, special project units and the mostly civilian-manned units in Feltham and Tolworth, was formed into a 'Defence Agency' in 1991. This involved substantial devolution of financial power and accountability to the Director General, now named also as an Agency Chief Executive. By 1992, the process was completed by the transfer of the financial and strategic oversight from the Army to the Chief of Defence Intelligence (CDI). This made sense in many ways: operational readiness for both Military Survey and CDI was defined in similar terms, and the protocols, financial mechanisms and the range of interests worldwide were also similar.

Traditionally, Military Survey soldiers had served in Military Survey units only and not in the mainstream of the Corps; to a degree, a separate identity from the remainder of the Corps could be discerned. With more operational deployments, there was an increasing and welcome integration of the Survey soldier or detachment into the military command chain. The over-riding thrust was that Survey Sappers would provide support right across the battlespace. Thus, Geo detachments were now to be commanded in a variety of ways: by General Staff officers from the Operation or Intelligence branches; by RE Geo staffs; or by the local Engineer Commander.

Unit Merry-go-round

Inevitably such a programme of reorganisation, combined with the drive to economise led to much physical movement for units. Change of role, enhanced armoured capability and the close-support squadron concept all contributed to the complexity of these relocations. Annex F gives the details in full, including the dates of the various moves. Throughout the 1980s unit turbulence was relatively slight, limited largely to the aftermath of the 'Restructure Plan' recorded in Volume XI.¹⁵ *Options for Change* and the *SDR* brought about a completely different order of upheaval. Under *Options for Change*, in BAOR the barracks at Munsterlager and Iserlohn were given up with the move of 32 Armoured

Engineer Regiment to Hohne and the temporary disbandment of 26 Regiment. In UK the major unit barrack plot with regiments at Ripon, Tidworth, Waterbeach and Maidstone remained unaltered except for the move of 33 Regiment (EOD) from Chattenden to Wimbish. However, within units there were numerous squadron moves in the mid-1990s as reorganisations took effect.

Under *SDR*, the main moves in BAOR were that Assaye barracks at Nienburg and Bindon at Hameln, so long home to Sapper units, were given up. The brigade regiments moved closer to their affiliated formations: 21 Engineer Regiment (4 Armoured Brigade) and 35 Engineer Regiment (20 Armoured Brigade) respectively to Quebec Barracks in Osnabrück and Barker Barracks in Paderborn; 32 Armoured Engineer Regiment (7 Armoured Brigade) remained in Campbell Barracks, Hohne; 28 Amphibious Engineer Regiment remained in Hameln but moved to Gordon Barracks. In the UK, although the old regimental centres remained, the opportunity was also taken to reorganise the assets into rational groupings for the support of the three brigades of 3 (UK) Division as well as providing appropriate support for 16 Air Assault Brigade and RAF Strike Command. 26 Engineer Regiment was resuscitated in Ludgershall to support 12 Mechanised Brigade, and 23 Engineer Regiment (Air Assault) was destined for occupation of a new barracks near Woodbridge to support 16 Air Assault Brigade. 22 and 38 Engineer Regiments remained based at Tidworth and Ripon respectively and were allocated to 1 and 19 Mechanised Brigades. 39 Engineer Regiment remained at Waterbeach as part of 12 (Air Support) Engineer Brigade with considerably enhanced air support capability. 25 Engineer Regiment remained at Massereene Barracks, Antrim.

Training

At the time of *Options for Change*, the Army training structure was at risk of heavy cuts. In 1983 a major Army-wide study under a Sapper Major General J. P. (John) Groom had recommended substantial reductions in the fifteen major, sixteen junior intake and ten 'phase I' training establishments, in which army training was carried out. At the time the changes this would have entailed,

such as centralising basic recruit, driver and signals training, were too radical for the Arms Directors guarding their own influence over standards, and so the recommendations were shelved. Nevertheless, as attitudes changed in the aftermath of *Options*, they were dusted off. A new Army Individual Training Organisation was set up in 1996, headed by another Sapper, Major General C. L. (Chris) Elliott. Thus there evolved a direct line of responsibility from the Adjutant General, through Director General Individual Training to the arms schools (which were named 'operating divisions'), including the RSME, bypassing the Arms Directors. In 1994 the training of Royal Engineer drivers was taken over by the Army School of Mechanical Transport at Leconfield. In 1997 recruitment was taken over by the Director General Individual Training (DGIT) in a new organisation to be called the Army Training and Recruiting Agency (ATRA), and DGIT became Director General Army and Recruiting (DGATR). Royal Engineer initial training was concentrated at Bassingbourn under a common military syllabus that aimed to familiarise recruits with Army life and, in eleven weeks, train them to a standard from which they could move on to Royal Engineer courses.

Options for Change also saw the reduction of junior leaders training in the Army, with the introduction of the 'Single Entry' for recruits from sixteen years upwards. The Junior Leaders Regiment at Dover closed in 1990. In another sweep of the economy broom, the Apprentices College at Chepstow also closed in 1994. This brought to an end a system that had provided the Corps with exceptionally well-trained tradesmen and future technicians that had been the backbone of the Corps' artisan trade structure for a generation. It had provided a substantial proportion of the Clerks of Works and Garrison Engineers on which the Corps depended to meet its obligations over the years. Apprentice training was, however, to continue on the basis of an introductory course of 'core' military subjects and combat engineering at Minley, followed by trade training to Class 2 level at Chatham. However, it was not long before the folly was realised of abandoning a system that had been so attractive to

young men of suitable skills and so much the foundation of the technician element of the Army. The former Army Apprentices College at Arborfield was resuscitated and in 1998 took on RE Apprentice training. When it subsequently closed, RE apprentice training moved to the Army Foundation College at Harrogate.

Reorganisations at the Corps' two main training centres, Chatham and Minley, were inevitable, both to meet the needs of economy and to adjust to Army-wide developments. In 1992 the former 11 Engineer Group at Minley was disbanded, and the RSME took over responsibility for both establishments, to be called RSME (Chatham) and RSME (Minley). Virtually all combat engineer training moved to Minley, and Chattenden Barracks ceased to be part of the RSME in 1995.

By the end of the decade the two parts of the RSME were renamed the Construction Engineering School (at Chatham) and the Combat Engineer School (at Minley). Commander Construction Engineering School, a full colonel, was responsible for the training design and standards of four wings: Command, Civil Engineering, Electrical and Mechanical Engineering, and Counter Terrorist Search, with 1 RSME Regiment established as the parent unit. The Defence Explosive Ordnance Disposal School remained at Chattenden and in 1998 came under the command of the RSME.

The Combat Engineer School at Minley became responsible for two wings: Battlefield Engineering and Communications Training, with 3 RSME Regiment as the holding unit. The RE Diving Establishment amalgamated with the Royal Navy's Minewarfare and Diving Department at the School of Maritime Operations to become an integral part of the Defence Diving School in 1995, located in a purpose-built facility on Horsea Island.

These evolutions were the outcome of the Army's drive for better value for money. For many, however, the ultimate logic would have been to locate all RE training at a single site. By 2000 the Corps was the only arm left whose training was undertaken in more than one place. This was a matter of hot debate for most of the period of this history, leading to study after study. Arguments took place at all levels about the merits of concentrating at either

Minley (better placed for liaison with other arms) or Chatham (with its unique facilities for watermanship training and historic connections), or even at a third site as yet unidentified. The matter was overtaken by the idea of *Public Private Partnership*, given impetus in 1997 by the new government. A case for private sector involvement in the RSME (eventually the whole of Chatham Garrison and the Minley sites) was approved by ministers in November 1998. The aim was for an arrangement under which the military staff of the School would continue to be responsible for the quality of training and those courses for which military staff would be required. They would also be responsible for the military and civilian staff other than those employed by the 'Partner', most likely a consortium, contracted to participate in the PPP.¹⁶ The RSME PPP project was launched in 1999 with six consortia being invited to produce outline proposals. The following year, three of the six responded to an 'invitation to negotiate' and later made formal presentations of their proposals. The subsequent development of this project will be covered in the next volume of *Corps History* (Volume XIII).

NOTES

- 1 *REJ* 107/2, August 1993, p. 126.
- 2 D/AG2405/96 dated 15 July 1996.
- 3 DCI JS 57/95.
- 4 D/LSOR 10/22/2/1 dated 11 November 92.
- 5 ECAB/P(94)20 dated 21 December 1994. ECAB agreed that the Arms Directors should be able to represent to CGS, on behalf of Colonels Commandant, given the continuing significance of the regimental system in the structure of the Army.
- 6 *REJ*, 114/3, December 2000, p. 172.
- 7 *Sapper Telegraph*, 10, p. 22.
- 8 Further detail about the E&LSC is in Chapter 11.
- 9 Bowen, *Queen's Gurkha Sapper*, p. 271.
- 10 *Corps History*, Volume XI, p. 295.
- 11 10 Field Squadron was under command of 38 Engineer Regiment.
- 12 D/EinC(A)/193/6 dated 8 July 1999.
- 13 The Regiment was eventually established in 2008 as 24 Commando Engineer Regiment, based at Chivenor, near Barnstaple.
- 14 *Corps History*, Volume VIII, pp. 132-3.
- 15 *Corps History*, Volume XI, p. 57.
- 16 *Sapper Telegraph* 15, Jan 2002, p. 15.

Matching the Tools to the Task

Doctrine, Equipment and Training

Doctrine

Earlier chapters have shown how the 1980s was a period in which broad UK policy for defence continued down the tramlines imposed on it by the Cold War and the national economy. There was no serious debate about alternatives. Such variations in doctrine as there were arose from differing views about the conduct of possible operations in Western Europe, largely at a tactical level. For example, EinC's concerns at his address to the Corps in 1980 centred on what was to happen in Germany following the Army Restructure Plan. Developments in the UK base were unclear. Therefore equipment and training for the Corps were governed by a set of closely defined criteria based on the policy of forward defence developed from West Germany's political imperative not to concede more of her homeland than absolutely necessary in the event of an attack by the Warsaw Pact. The consequence was a more or less linear defensive plan based on largely artificial obstacles to be prepared in a hypothetical period of warning on ground chosen more for political than military reasons. After any breach of this defensive position, withdrawal to a second line of defence would have had to be accepted, even allowing for counterattack at divisional or corps level.

In the 1980s a new doctrine began to emerge. A conviction grew among senior commanders in Northern Army Group that the qualitative superiority of Allied forces, particularly in terms of tank mobility and armament, could be more successfully exploited by accepting a degree of penetration into more defensible terrain, checking the enemy's momentum by counterattack by brigade and divisional reserves until the opportunity could be contrived for a massive counterstroke at

army group level. An influential voice in this was General Sir Nigel Bagnall, Commander-in-Chief BAOR and Commander Northern Army Group from 1983 to 1985, who had also commanded 1 British Corps and 4 Armoured Division.

For the Sappers of 1 British Corps, this switch of emphasis towards a more mobile, aggressive defence meant a reduction in the size of the massive barrier minefields of the past, albeit with increased use of defensive and tactical minefields and anti-tank ditches, allowing opportunities for manoeuvre while forcing the enemy to concentrate. Digging for protection of hides became increasingly important to counter the threat from conventional artillery, ground-attack aircraft and nuclear and biological weapons. First and foremost, all arms had to be provided with greater ability to move around the battlefield. At the same time, the Sappers in support of divisional units had to be able to move with them with the same degree of mobility and protection.

While BAOR and the requirements of the Central Region called the tune on the major areas of defence policy and expenditure, Britain's strategic reserve was also committed to NATO as a Priority 1 task. It also had to train and prepare for unspecified operations outside the NATO area, either in pursuit of national defence policy or as part of a United Nations force. The nature of its equipment and training made it appropriate for allocation to the flanks of the Alliance area, and plans were formulated for action in both the Northern and Southern Regions. However, within the requirements of strategic mobility, dwindling resources made special-to-role equipment programmes almost impossible to promote in the 1980s.

Underlying all this tactical thinking was the very real possibility of nuclear, biological and chemical (NBC) warfare. These threats, taken seriously, presented special problems for the Royal Engineers, most obviously of maintaining routes through areas devastated by nuclear blast and maintaining water supply in contaminated areas for decontamination systems. Readiness for chemical and biological warfare had to be built into all new equipment and training. NBC clothing (popularly known as the 'Noddy suit') was worn on all exercises, and respirators were

carried, to be donned from time to time as appropriate to the tactical situation being portrayed.

This highly focused attitude was blown apart by the collapse of the Warsaw Pact. Indeed, while the Gulf War was conducted under the threat of the type of warfare envisaged in north-western Europe, albeit in totally different terrain and climate, the real demands being placed on the Army thereafter called for a total re-examination of the needs of national defence. The Balkans campaign (Chapter 7), following closely on the heels of the Gulf War (Chapter 6), highlighted many issues. Operations in the former Yugoslavia, heavily influenced by sensitive political situations, carefully contrived rules of engagement, international cooperation and close contact with civilian populations, typified the significant interventions made normally under the aegis of the United Nations in many parts of the World. The role and membership of NATO itself was also in a state of flux. Up to the early 1990s the term 'NATO-type warfare' conjured up a picture to any professional soldier of mobile armoured warfare in an NBC environment. As it turned out, the first troops to die in action under a NATO flag during this period were to be in peace-support operations rather than general war circumstances.

By 1996 doctrine for the Army had emerged in the shape of a 'Development Agenda' endorsed by the Executive Committee of the Army Board, which set out to be a continuous process 'to identify imperatives which demand change and therefore study by various parts of the Army'.¹ A paper presenting two speculative views on future warfare emerged. View 1 postulated a conflict of high intensity and lethality involving professional forces; in View 2 the opposition could be an armed force directed by a social entity that was not necessarily a state, conducted by organisations that were not necessarily armies and fought by people who were not necessarily soldiers in the conventional sense of the term. Common to both views (which were not seen as mutually exclusive) would be the multi-directional and multi-dimensional nature of the battlefield. This led to considerations of a 'divisional' level of command roughly the size of the then

current division but with responsibilities akin to those of a corps and more self-sufficient manoeuvre brigades.

New situations demanded new organisations, new equipment and therefore new skills and more specialised training. This chapter describes how the Corps reorganised to meet the new situation, how equipment programmes developed over the period and how the training of officers and soldiers was restructured to meet the new situation.

Organisation

The stimulus for change in field unit organisations was felt even before the upheavals following the end of the Cold War. The experience on exercises in Germany and field training at the British Army Training Unit, Suffield (BATUS) in Canada exposed the qualitative and quantitative inadequacy of Sapper support for mobile armoured battle groups and formations. Advances in digitisation and in more realistic training where 'enemy hits' on armoured vehicles, equipment and individual soldiers were accurately recorded further highlighted the vulnerability of battle groups at obstacles and the imperative for more agile and robust engineer support, both in equipment and in command and control arrangements.

By the end of the 1980s it was generally agreed that the goal was to achieve armoured engineer support with the same level of mobility and protection as the battle group being supported. Commensurate reconnaissance capability must be available. Levels of command should be designed to match the all-arms situation by providing a Royal Engineer lieutenant colonel at brigade and a major, normally, at battle group. As well as ensuring that commanders at all levels would have proper support, this would remove the anomaly experienced throughout the 1980s of the commanding officer of the divisional engineer regiment 'floating' between divisional headquarters as a sort of back-up to the CRE and brigade headquarters, where he would displace the squadron commander. During a visit to BATUS in August 1997 by Brigadier I. D. T. (Ian) McGill, then EinC, the principle of a

squadron supporting a battle group was very strongly endorsed by Commander BATUS, Colonel (later Brigadier) Andrew Bellamy, who said that during his time at BATUS: 'The Engineers' performance had improved dramatically. At long last the troop commanders could concentrate on commanding their troops while the considerable engineer effort needed to support a battle-group was being properly commanded by a major with the requisite experience and a tactical headquarters. This had, in turn, improved the effectiveness of the battle-groups.' Colonel Bellamy further highlighted this improvement against the inadequate engineer command and control he had experienced some eight years earlier while a major serving with BATUS.

While this policy of regiments supporting brigades arose mainly from BAOR experience, its logic could also be applied to the UK-based army. The prospect of rapidly mounted interventions at perhaps brigade level called even more for the experience of a lieutenant colonel to take on the variety of resources that might be needed in these circumstances. It also brought with it the potential for improved integration at all levels and the building up of personal relationships and common practice on which the success of such operations would depend. Experience in the Balkans further reinforced the need for a more effective structure for Corps units, better tailored for their parent and supported formations. The story of the Corps' contribution there is covered in Chapter 7, but it is worth emphasising here that the command and control span of an engineer regiment, together with its resources, were critical to the successful deployment of the brigade level force on Operation *Grapple*, the deployment to former Yugoslavia.

The role of the Corps to help the Army to live, move and fight, while preventing the enemy from doing so was widening with its expanding use on operations other than war and in aid of other Government departments. The Corps was no longer focusing so exclusively on supporting the Army or on defeating the enemy. Its extraordinary versatility and utility was increasingly demonstrated, and military engineering in its widest sense was

shown to be relevant in 'soft' security (e.g., conflict prevention, nation building, etc.) as well as 'hard' security (e.g., close-support and general-support military engineering).

Options for Change and the *SDR* saw a significant reduction in the size of the Army, particularly in the number of regular brigades. However, the outcome for the Corps was not all bad, and there was an overall increase in the number of regular squadrons after the *SDR*. The squadrons were generally slightly smaller, but the brigades, each with their own engineer regiment, now had far more effective and flexible Sapper support. Nevertheless, the reduction in combined arms training during this period, together with an increase in the number of construction tasks, challenged the Corps to maintain its focus as a teeth arm. The doctrine, equipment and training had to reflect that those in the Corps were first and foremost soldiers who are military engineers, not simply engineers in the military.

The realities of life inevitably imposed restraints. Plans had to be developed within existing allocations of manpower and equipment or at the expense of other arms. Nor could new equipment be conjured up out of thin air. By the end of the period the reshaping of the Corps still had some way to go, but at least the principles on which it was to be based were generally accepted.

Equipment

The story of engineer equipment throughout this period is of huge effort by experienced officers and NCOs of the Corps – with limited access to funding – to bring into service equipment that was vital to success on operations. The fact that by 2000 the Corps was adequately equipped owes a huge debt of gratitude to those who struggled, despite constant setbacks, to achieve the desired results. This section cannot be written chronologically; rather it follows the development of each type of equipment from the Cold War, via the Falklands, to the Gulf, into Bosnia and Kosovo. The continuing development of equipment to support operations in Northern Ireland is covered in Chapter 8.

Mobility

Ever since the late 1970s, Sapper commanding officers and CREs had become increasingly concerned at their inability to offer reliable support to all-arms battle groups. The lightly armoured FV 432 APC, workhorse of the mechanised field squadron, was hardly an appropriate vehicle to accompany units mounted in Chieftain and Challenger tanks. Such close support could only be provided by Royal Engineer tanks, the Armoured Vehicle Royal Engineers (AVRE) for general tasks and Armoured Vehicle Launcher Bridge (AVLB) for bridging. However, planning began in 1985 to replace the APC and other light armoured vehicles with the Future Light Armoured Vehicle (FLAV) programme. By 2000 this had still not progressed beyond the concept stage.

Volume XI of this history recorded how the Centurion AVRE remained in service.² But this had been 'by the skin of its teeth', having been traded in against the acquisition of the Combat Engineer Tractor (CET). All exercises designed to test new organisations had revealed the serious capability gap that would result from the loss of the AVRE, and by 1985 only thirty of them existed in the three armoured squadrons that comprised 32 Armoured Engineer Regiment. This was a manifestly inadequate contribution to the four armoured divisions in 1 British Corps, especially when it is remembered that the vehicles themselves were considerably older than the crews who manned them and two generations earlier than the Challenger main battle tank then entering service. Nor was it simply a question of acquiring a better vehicle: far more were needed. The greater armour awareness that grew at working level owed much to the live battle-group training that took place at the BATUS in Canada, which was attended by battle groups accompanied by their affiliated field troop – itself providing an inadequate level of support.

Squeezing a new AVRE out of the overstretched defence budget became a top priority. After examining the possible options of skipping a generation to an AVRE based on Challenger, or a Chieftain reworked with an updated automotive system, it was decided to settle for the solution that would provide



Chieftain AVRE carrying fascines and firing Giant Viper.

a more immediate answer. This was simply to use existing Chieftains, the hulls of which were becoming available as the Challenger programme progressed, and add the necessary Sapper gadgets. Such a solution had been experimented with in an initiative undertaken by 32 Armoured Engineer Regiment, picking up an idea produced by the RE Wing at Bovington. The result of this was a 'concept demonstrator' consisting essentially of a Chieftain, stripped of its 12-ton turret, as a base for carrying and laying fascines and Class 60 trackway and delivering a spare No. 9 tank bridge. It also mounted a mine-plough, was capable of towing a Giant Viper (GV) explosive minefield-breaching hose and carrying sufficient tools and stores to enable the crew to act as half of a field section. A properly engineered prototype was produced in 40 Army Engineer Support Group's workshops in Willich. Seventeen Chieftain AVREs were delivered to Corps units over the course of eighteen months from the autumn of 1986. This provided a quick and substantial improvement to the Sapper close-support capability and gave time for a full Chieftain AVRE project to be processed through the normal procurement system, resulting in a contract for Vickers to provide the remainder.^{3,4}

Despite this, the inability of the RE armoured engineers to keep up with the mobile battle became starkly obvious during the Gulf War. One Centurion AVRE had to be rescued from the Tank Museum at Bovington to make up numbers, and two self-destructed in the desert because of leaky fuel (petrol) systems, which caused fires that spread to the main ammunition with catastrophic results. (See Chapter 6.) It was obvious to everyone that modern armoured engineer support was needed, but funding could not be found. Plans were prepared to provide a replacement bridgelayer and AVRE, based on Challenger. But year after year the plans were rejected as being unaffordable, until in 1995 the new attack helicopter programme slipped two years, freeing up the finance needed to get both replacements funded. Trojan, the new AVRE, and Titan, the new AVLB, started development and by 2000 were ready for troop trials.

Future bridging requirements (BR90) had been under consideration in the research and development (R&D) programme already touched on in Volume XI.⁵ The concept for this included a family of bridges from 12 to 62 metres span built from common, interchangeable components and launched both from tanks (close support) and from a new special wheeled



BR90 being launched.

launching vehicle (general support). Until these ideas bore fruit, existing equipments had to suffice. The AVLB situation was reasonably well catered for with the Chieftain-mounted Nos. 8 and 9 bridges, which by 1980 had been in service for some six years. The main enhancement introduced in 1985 was the trestle to provide a two-span capability, a requirement specifically demanded to deal with the canals of north-west Germany, which greatly constricted movement.

Development of BR90 went ahead throughout the 1980s. User trials of the close-support and the 32-metre general-support bridges were complete by April 1994. 1997 saw user trials of the long-span and two-span versions, both of which were in service by the end of the century, by which time the trestle was also well advanced. The improvement in mobility these new equipments gave was colossal. In order to provide a 30-metre tank crossing, a squadron could build a Bailey bridge in six hours; a troop could build an Medium Girder Bridge (MGB) in two hours; and a section could build a BR90 in 30 minutes. That was a real force multiplier (product of manpower and time) in the ratio of effort 108:12:1.

Rapid fixed-bridge support bridging in the combat zone would continue to be provided by the Medium Girder Bridge.



Medium Girder Bridge in Bosnia.



Chieftain crossing a multi-span AVL bridge.

Designed to meet a BAOR requirement, the bridge had sufficient versatility for worldwide application, and the simplicity with which it could be transported and then erected by manpower made it popular for sales overseas. It was introduced in 1971 in its standard 31-metre Class 60 version, but two enhancements had already been introduced. Span junction sets, using inbuilt hydraulically operated hinges in the bridge, gave a theoretically unlimited multi-span capability, piers to be provided by a number of options such as an existing pier, a floating improvised pier or the special portable pier set. The linked reinforcement system, in the form of an underslung pin-jointed chord, allowed Class 60 a span of up to 63 metres. The latter highly successful concept was carried forward into BR90. However, the older, well-tried support bridges, Extra Wide Bailey and Heavy Girder, were also still in service, both for their possible employment on main supply routes (MSRs) in north-west Europe and also for overseas aid projects, United Nations intervention operations and military aid to the civil community (MACC).

All forms of Bailey bridge were still being made and old Baileys restored during the period, mainly for sale to developing

countries and mostly by a British firm called Mabey & Johnson. The Army still maintained a large stock of them, but they were no use for carrying the weight of modern formations. However, when stronger equipment bridging was needed in Bosnia, Mabey & Johnson developed a larger, aluminium form of Bailey that could take the loads required – the Mabey & Johnson Bridge (MJB). A form of procurement was proposed in which old Bailey would be exchanged for new MJB. This suited the manufacturer (who could renovate and sell on the old) and the Corps but not HM Treasury, who would not allow it; so the Baileys were sold for scrap and the full price paid for the MJBs.

The concentration of resources on meeting the needs of armoured warfare in north-west Europe resulted in no new floating bridges or rafts entering service in the 1980s. The old equipments of the 1960s and 1970s lingered on for possible use by UK-based units. The possibility of introducing a general-purpose lightweight pontoon suitable for giving MGB a floating capability was examined, but this never advanced beyond the feasibility stage. Perhaps the most venerable of all in this category was the Heavy Ferry, retained in Berlin until as late as 1995 against a limited operational requirement, but it was no longer economic to maintain for general service elsewhere.



Amphibious M3 2-rig open coupled ferry.

Upgrading the Corps' amphibious bridging was, however, a priority at this time. The M2 amphibious ferry had served well since its introduction in 1969 but was wearing out and needed replacement. In 1985 the UK joined the German project to develop M3 as a collaborative project. M3 was a major advance on M2, with water jet replacing screw propulsion, much longer ramps (hydraulically powered to dispense with anchors in most applications), tyre pressure variable from the cab and, as trials were to prove, an extremely high ferrying rate in its four-rig close-coupled ferry configuration.

Experience in the 1970s had identified the need for, and led to the introduction of, the Combat Support Boat (CSB). Its procurement was an excellent example of the intelligent modification of commercially available equipment. Despite a most rigorous staff requirement, asking for a fast tug capable of floating in fifteen inches of water and being launched over a metre-high bank, competing prototypes in Glass-Reinforced Plastic (GRP) and aluminium were procured from specialist boat-builders, trialled, modified and the final design approved for production within two years. To meet the conflicting requirements of shallow draft, a fast planing hull and high thrust at low speeds, an ingenious water-jet propulsion system was



M3 4-rig close coupled ferry.

adopted. The craft remained an indispensable part of the Sapper capability for many roles, not only in bridging operations but also for such tasks as support of diving, laying obstacles on river lines and safety in training. It was also extensively used in the Falklands War as a personnel carrier, ferrying Sappers between work sites and floating accommodation. The equipment, designed and developed at the Military Vehicles Research and Development Establishment (formerly MEXE) at Christchurch, became a world bestseller.

Countering potential enemy mine warfare needed to be addressed throughout the period. The Warsaw Pact had developed aerial delivery systems, and these posed a serious threat to the new plans with their emphasis on mobility. Equally serious from the Northern Army Group viewpoint was how best to deal with their own minefields, laid as an essential element of the defensive plan but inhibiting subsequent manoeuvre in local counterattacks or the army group counterstroke. The explosive minefield-clearing hose Giant Viper (GV), 25-years-old by 1980, though somewhat more reliable than its earlier versions, was the only available response to this mine threat. Normally launched from AVRE equipped with mine ploughs, GV was the main minefield breaching equipment available in the Gulf War, and over 60 were fired in training, though none in anger. After the Gulf War they needed replacement, and a programme to develop Python was put into being. However, Giant Viper alone was not good enough to give the required level of clearance, and mine ploughs were needed, many being rapidly manufactured for the war. A new plough was to be a major part of the Trojan and Titan programmes.

With the emphasis moving from mine warfare to counter-mine, many research and development projects began to find ways of safely detecting and rendering safe all types of mine. The Corps was at the forefront of these and spent a large part of its R&D budget on counter-mine projects. Most are classified.

Counter-Mobility

The early 1980s saw little change in the armoury of British mines from those that had been in service over the previous two

decades. Both the tilt and influence fuzes introduced in the late 1970s had given the barmine a substantial, full-width, improvement in capability and, although it had never been tested in battle, there was considerable confidence in its effectiveness and the efficiency with which it could be laid. However, policy for mine warfare was to undergo a major change as a result of the political decision, implemented in 1999, to forego the use of anti-personnel mines.

Worldwide concern had built up over the years about the proliferation of mines, particularly in countries where insurgencies had been in progress for long periods of time. Chapter 5 touches on the consequences of the Argentinian mining in the short Falklands War. This was insignificant compared with the situation in Afghanistan, Cambodia and many African countries such as Angola, Mozambique, the Sudan and Ethiopia. Not only were there tragic consequences for civilians, killed and maimed by mines while going about their everyday business, but there were serious economic implications resulting from the inability to develop agriculture and normal commercial life where people were so prone to injury or death from mines. Pressure grew for action in which, among other public figures, Diana, Princess of Wales, was prominent. The result was the Ottawa Convention on landmines, arising from an international conference in 1997, which came into force on 1 March 1999. The UK Landmines Act, meeting the requirements of the Convention, had been passed in July 1998 and the British Secretary of State for Defence, George Robertson, was able to make a statement on 23 February 1999 that all British stocks had been destroyed. Mr Robertson claimed: 'The Army's mine destruction programme is now complete. No British soldier will ever again lay an anti-personnel landmine.'⁶ It has to be recorded, however, that the definition of a landmine within the Act embraced only those 'designed to be detonated by the presence, proximity or contact of an individual', so command-detonated devices, anti-tank mine and anti-handling devices were excluded.⁷

Demolitions also formed a key part in the obstacle plan. By 1980 it was appreciated that the proliferation of reinforced-

concrete bridges, such as on the autobahns in Germany, presented a particular problem, and studies had been completed into how best they could be dealt with. To this end, Rapid Demolition Devices (RDD) were improved, and ideas were being examined whereby explosive slurries might be pumped into pre-laid pipes under some of the most difficult and important demolition targets, although this idea never came to fruition. It is of historical interest that at the beginning of this period, and until the end of the Cold War, RE plans were in place to use Atomic Demolition Mines (ADM) to destroy the larger bridges.

The new family of demolition charges, entering service in the early 1990s, came in the form of shaped charges. Hitherto, except where bridges had been built with demolition chambers, the only quick method for dealing with a mass-reinforced-concrete (RC) bridge was simply to overload it by means of a massive explosion. The cost in manpower, time and logistic effort for this approach was unacceptable. RARDE research developed more effective explosive charges to be placed on top of and underneath an RC target to cut through the concrete and the reinforcement bars in one shot. For the pre-stressed RC bridges, a large conical charge, not unlike the 'Beehive', was developed. This blew away the concrete from around the pre-stressing tendons and led to the failure of the beam concerned. With careful reconnaissance of post-tensioned RC bridges, small cutting charges of 500 grams fixed to the tensioning points of the cable proved enough to cause bridges to collapse – which would have been more economical than a 5 kiloton ADM.

Small linear-cutting charges and explosive tape also came into service at this time. They had a variety of uses from bridge demolition to safe cracking on counter-terrorist operations. Another important innovation was the Demolition Remote Firing Device (DRFD), which enabled individual charges to be fired remotely without the complication of vulnerable electrical or explosive ring-mains and for initiating large numbers of pre-prepared preliminary demolitions, not to mention regimental firework displays.

In addition to mines and demolitions, anti-tank ditching became a key part of operational planning. The high output of

modern machinery offered a real prospect of producing effective obstacles in the limited warning time that might be available, and heavy wheeled excavators were purchased and taken into service for this purpose. Digging for protection of command groups and artillery with alternative positions for 'shoot-and-scoot' tactics was also a high priority, and the holdings of earthmoving equipment reflected this commitment. The combat engineer tractor (CET), the development and characteristics of which were covered in Volume XI of this history, had only just entered service at the beginning of this period and was developing its role.⁸ The pathfinder aspects that were important in its original conception now had less application, but the machine's mobility, protection and excellent communications fitted it well for the combat digging role, and it was in that area that it began to come into its own. It was used extensively in the Gulf War to dig in a variety of HQs and support units. Indeed it was in action before the guns, digging them in. It was used most effectively to construct bunds around all units living in flat desert where the main threat was being run over by a unit on the wrong bearing.

Command and Control at Divisional Level

The consequences of the new tactical doctrine extended well beyond the question of equipment. First, the enhancements argued for reorganisation on the basis of armoured close-support squadrons at brigade level and general-support regiments at divisional level. These ideas were carried forward into the 1990s following the *Options for Change* reshaping of the Corps (see Chapter 2). Second, the question of command and control and the level of advice that should be available to formation commanders also needed resolving. A debate that had run since the 1970s centred on whether divisional HQs RE with a full colonel CRE should be provided over and above the commanding officer of the divisional field regiment. On the one hand, it was considered that commanding officers could not make themselves available to their GOCs while at the same time ensuring the proper operational command of their units; on the other hand, unless they were close to divisional headquarters,

they would inevitably lose touch with the battle. Many other considerations came into the argument, such as the control of resources, the size and manoeuvrability of divisional headquarters, and the command and control of corps and army level engineer units allocated to the division. Others were 'influence' at brigade and divisional headquarters and, by no means a minor factor, the promotion and career-structure implications for the lieutenant colonels and colonels concerned. Suffice it to record that operational command of Sappers in the division remained with full colonel CREs both in BAOR and the UK throughout the period of this history.

Employment and Individual Training

Background

During the period 1980 to 2000 there were major changes to Sapper deployments, with the inevitable knock-on effect on the type of employment for officers and soldiers alike. The training of the individual had to be re-addressed to enable the Corps to be operationally effective on the new battlefield, wherever that might be.

Although the career structure that had evolved in the 1970s was still standing the Corps in good stead, increased mechanisation a decade later called for a massive expansion in the number of drivers and signallers to man and maintain new equipments. It was also the case that, as more joint training was undertaken with other arms, the standard of tactical awareness continued to rise: to ensure a better chance of survival on the contemporary battlefield, more soldiering skills were required. However, the proportion of a soldier's time spent in practising and performing these made it increasingly difficult for the tradesman to maintain requisite artisan skill levels. The policy was therefore introduced whereby artisan trade training only became available to soldiers who, after their initial engagement, were prepared to extend to further service. Typically a soldier would learn his combat trades (combat engineer for all, plus driver or signaller), serve his first tour in BAOR, where he would

upgrade in those employments, and then opt for artisan training if he wished to continue with his career in the Corps. After basic trade training at RSME, he would then normally be posted to a UK field unit, where his new-found skills were more likely to be put into practice. In reality, this meant that the Sapper's trade training was usually conducted some two years after he had joined his first field unit, so 'potential tradesmen' filled established posts but often could not fulfil the role. For example, a 'potential plant operator mechanic' probably held a driving licence but could neither operate nor service the machine for which he was responsible. Delayed trade training was highly disruptive, both to the unit and to the soldier, and could adversely affect careers; for example, a Sapper who had been identified as a potential JNCO could not attend a cadre to qualify for promotion if he was away on a course at RSME. On occasions, soldiers did not return to their original units, which compounded the issue. The 'rising star' who had been identified in his initial squadron would have to start once more, in a new environment, to prove his leadership potential. In response, some soldiers decided to forego their trade training, which in turn reduced their employability. To counter this, forms of limited training were introduced in the early 1990s. Thus a Sapper would attend a reduced Class 3 course, typically some twelve weeks long, prior to joining his unit. It was intended that this would be followed by a shortened form of Class 2 training and then Class 1. Clearly, units preferred soldiers to arrive trained, but the level of instruction given was inadequate. In the event, Sapper Class 3 tradesmen were little better than assistants and required careful supervision by the Class 1 soldiers, which in turn reduced their capability. This form of training eventually ceased as it was disruptive, wasteful and did not enable the individual to meet the operational requirement.

In short, this emphasis on combat engineering and combined-arms training in preparation for war in north-west Europe resulted in a deterioration in the skills of Royal Engineer tradesmen. Shortfalls were apparent when a squadron was deployed on a short-notice construction project or when units

undertook emergency tours in Northern Ireland. To remedy this, the provision of refresher training at the RSME prior to such tasking became de rigueur, with the added advantage that it provided the opportunity to learn specialist techniques that had been identified prior to the deployment. Thus there evolved an inescapable reduction in the flexibility afforded to commanders over the deployment of Sapper units. UK-based squadrons tended to focus on construction operations, and BAOR units on combat-engineering support. In the short term, any well-led squadron, reinforced as necessary with specialists such as chartered engineers, clerks of works and even tradesmen, would invariably win through; but all-round engineer capability became less sustainable over the longer term.

On the positive side, the emphasis on combat engineering during the Cold War years did act as a 'glue' to provide a powerful, cohesive effect on all squadrons. The team effort required to achieve many of the tasks and meet deadlines, often in the most challenging of circumstances, was very significant. It engendered squadron pride and meant that the Sappers had the inherent flexibility and drive to take on a very wide range of operations, often at short notice and without all the resources necessarily immediately available. Individual Sappers, sections, troops and squadrons had to improvise frequently wherever they were in the world. This was a strong 'selling-point' for the Corps and no doubt differentiated the Sappers from the other technical corps of the Army.

Nevertheless, by mid 1993, it was recognised by the EinC that it was timely to review the RE employment and training structures, following the far-reaching *Options for Change* part of which was a review of the training base. It had been more than twenty years since a study of any magnitude had taken place. The RE Training and Employments Committee (RETEC) initiated this major project, which enabled the Corps to examine operational requirements and put in place a training structure that, after detailed design, would meet the remit. This wise decision was to have significant benefits for the Corps and would lead the way for the remainder of the Army. The basic principle

that training should be provided to meet the operational requirement, at the optimum time in the soldier's career, was to be the driving force.

The RE Employment Structure Review (REESR)

This was launched in late 1993. The team consisted of Colonel M. B. (Mike) Mounde, Lieutenant Colonel J. W. G. (John) Rogers, OBE, and Warrant Officer Class 1 McConnachie. The aim⁹ was to identify the optimum future employment and training structures for soldiers in the Corps and recommend the way forward. It sought to meet the Field Army requirement for:

- A better balance between combat and artisan skills to be achieved at the time in a soldier's career when the skills were most required in the unit.
- An increased number of skilled tradesmen within units.
- Improved command and supervisory capability of NCOs and WOs.

The approach taken by the team was to establish the range of operational capabilities needed and then develop the requirement for training, including the level of skill required to achieve a task both competently and safely. The identification of these facts was considered crucial as for so long there had been 'salami slicing' of training to achieve financial savings. This process had produced cumulative effects contributing to de-skilling. The REESR team consulted widely; they visited MOD, HQ LAND, all formation HQs and unit commanding officers. During the process, they concentrated on identifying the fundamental strengths and weaknesses of the system. A transition plan was developed in early 1995. The follow-on detailed work commenced later that year and was undertaken by the RE Training Development Team. This was reinforced by some twenty SNCOs selected for their trade experience. In accordance with the principles of Systems Approach to Training (SAT), they undertook job analyses of all RE employments to identify the tasks, the range of conditions in which the soldiers were expected

to operate and the standards they must achieve. This was achieved for the differing levels of responsibility. By this stage, not only did the Northern Ireland campaign provide important data but the experience of the first Gulf War and the Balkans was beginning to change the focus while the dominance of the Cold War diminished. A wider range of skill sets was required for these different operations. New job descriptions were prepared and, from them, a relevant training framework developed. This meant that in theory not only would soldiers be trained to meet specific operational requirements but each component of the course could also be justified. If cuts were to be made in future, the concomitant impact on operational capability could be presented clearly. Furthermore, the benefit of having detailed documentation, which showed a clear audit trail of the competencies required of the Sapper, was beneficial when the *Public-Private Partnership (PPP)* process for the RSME commenced in earnest in the late 1990s. The implementation¹⁰ of this successful but complicated plan began in 1997 and was led by Lieutenant Colonel Rogers, who had been involved from its beginnings in 1993. He drove it through to completion.

The outcome was that all RE soldiers would become 'military engineers' trained in both the foundation skills of combat engineering and a trade that was aligned to the Army's operational requirement. This meant that:

- Both the foundation skill of combat engineering and a trade relevant to the Corps' role were demanded for employment as a military engineer and for career progression. No longer could a soldier of the Royal Engineers rely largely on being a combat engineer as the primary means of developing a full career and achieving promotion.
- Initial training in both combat engineering and, where possible, trade skills would be carried out prior to a soldier joining his first field unit
- A number of soldiers would continue to be trained in armoured, amphibious and bomb disposal skills.
- Initial artisan and plant operating training would produce

tradesmen who would be able to work largely unsupervised.

- Class 1 would be a skill level related to a specific regimental requirement.
- Command training for JNCOs, SNCOs and, where appropriate, for WOs would comprise common courses, complemented by specialist training limited to those selected for promotion.
- The JNCOs' cadre would be standardised.

By July 1997 the new Royal Engineer and career employment structure had been put into effect, and courses were being redesigned by RSME. Soldiers were held in Career Employment Groups (CEGs), the titles of which remained unchanged. The main one was the General CEG for all RE employments not listed under the remainder, which comprised Combined Military Survey, Clerks of Works (Construction), Electrical and Mechanical. Finally there was the Military Plant Foreman CEG. It was at this time that the term 'Military Engineer' (ME) was introduced formally as part of the title for each of the career streams in the General CEG. So, for example, the former RE trade of Carpenter and Joiner became part of the Military Engineer (Artisan) CEG. The other career streams introduced at this time were Fitter/Q, Design/Q, Plant/Q, Driver/Q, C3 Systems, Armoured and lastly Resources. There were other minor variations for the Amphibious and Bomb Disposal Military Engineers. In addition to the main employments, Specialist Qualifications (SQ) were introduced, linked to main ME employments: for example Overhead Linesman, Blacksmith and Approved Welder. It was particularly significant that there was no ME equivalent of the former Combat Engineer stream, which had dominated for so long; now there was to be a career link with the other trades, promotion being dependent on success in both.

Career Pattern

The career pattern for a soldier in the Royal Engineers is complicated and is described in detail in official publications.¹¹ In summary, the progression introduced following the REESR

project and birth of the Army Training Regiment system was as follows:

- After enlistment, all recruits other than apprentices were trained to a common standard as a soldier, dictated by the Common Military Syllabus. This was known as Phase 1 (All Arms Recruit) Training and took place at the Army Training Regiment at Bassingbourn, following the disbandment of 1 Training Regiment RE at Gibraltar Barracks, Minley.
- Phase 2 (Special-to-Arm Recruit) Training was the next stage and took place at the RSME. This entailed combat engineering at Class 3 level at Gibraltar Barracks, Minley, controlled by 3 RSME Regiment. It was followed by a Class 3 or 2 course, depending on the trade. The majority went to Chatham, but those allocated ME (C3 Systems) remained at Minley. Drivers went to Leconfield. Thereafter, the soldier was posted to a field unit for an initial tour to gain practical experience in skills and to prepare for promotion. During that initial tour, a Sapper was expected to qualify at Class 2 in combat engineering and also in the trade employment if they had left Chatham with a Class 3 qualification.
- Phase 3 (Career Employment) Training followed. This entailed attendance at a further RSME course. Successful completion meant that the soldier was now qualified to Class 1 level and was capable of providing technical supervision. There were variations for amphibious and bomb disposal.

In principle, all soldiers allocated to the General CEG were required to be trained as military engineers in two employments, one of which was the Corps foundation employment, ME (Combat), covering combat engineering skills. The second employment was a trade allocated from the career streams listed above for that CEG. Qualification in both employments at the respective level was necessary, but those soldiers whose employment was less likely to need combat engineering at Class 1 level, such as Plant Operator Mechanics, Drivers and C3 Systems, were exempt from that training.

Promotion to lance corporal was via the time-honoured JNCO cadre, with approved standard training objectives that all units were expected to follow. In order to be selected for substantive corporal a JNCO had to be appropriately qualified as a military engineer and have received recommendations in his annual appraisal. Thereafter the granting of substantive rank was dependent on the successful completion of the command courses designated for that rank. The Junior Command Course, delivered by Command Wing at Brompton Barracks, was introduced for all corporals selected for promotion, and this was followed by related career-specific training such as the Field Section Commanders Course held at Battlefield Engineering Wing. Similarly, at the next level there was the RE SNCOs Course for all, followed by the Field Sergeants Course for those who needed that qualification, again having been selected for promotion.

In 1998, the ME employments were mapped against National Vocational Qualifications (NVQ) Level 2 and 3. The Modern Apprenticeship was also considered for the most able students.

The momentum created by the above did not stop there. During the period 1997–2000 job analyses were completed on such diverse employments as clerks of works, bomb disposal, boat operations and those employed in resources. The facts identified would provide the foundation for a proper, auditable training design to take place with validation of the courses to follow. The systematic, cyclical approach was under way.

Junior Officer Training

With the end of the Cold War, the advent of the Capability Based Army and perceived changes in roles, it was considered timely in 1997 to review the employment of RE junior officers. REESR was already well under way with the crucial task of developing a suitable career structure and training framework for soldiers; now was the time to consider in detail the case for the junior officers, starting with troop commanders. For very many years the Young Officers' (YO) Course, by now known as the RE Troop Commanders' Course (RETCC), had been held at

Chatham. The duration and content had varied depending upon a variety of factors. However its reputation was variable, and many former course members commented later in their careers that it had not fitted them out to undertake effectively the challenges facing a field troop commander. Now that many of the officer entrants were already graduates and were therefore older and more mature than their forebears, they made their views plain. If the course had been a memorable experience, it had not necessarily been for all the correct reasons! The EinC was clear that this crucial building-block in the foundation of an RE officer's career should be entirely relevant and delivered in a fashion that would enable the troop commander to take on his or her responsibilities in a competent fashion from the outset. 'Career compression' was evident, and there was little time for a junior officer to learn the basics of his or her profession. Those selected to be commissioned into the Corps had been graded highly at RMA Sandhurst. It was clear that a relevant, well-designed course delivered in an interesting fashion would then optimise the potential available to the Corps. At that time, the Corps was investing in a course lasting 24 weeks; the return on that significant investment had to be maximised. On investigation by RETDT, it was apparent that no fundamental review had been undertaken since at least 1980 and probably earlier.

A full job analysis of the then current RE junior officer appointments was launched. It focused on the troop commander but considered others, including the squadron operations officer/battlegroup engineer, intelligence officer and the possibility of the introduction of a regimental signals officer. The revolution in communications resulting from the digitisation of the battlefield suggested that this would be timely. The roles and detailed responsibilities of the troop commander were identified and documented, which led in turn to a comprehensive view of what should be taught. Many other wider issues also emerged after careful scrutiny of the questionnaires and during the interview programme. These had involved the complete spectrum of the Corps and at different levels of command and

responsibility. Among troop commanders in particular there was a strong body of opinion that training should be delivered in a fashion that would provide a more holistic view of the role and be less compartmentalised, thus breaking down the long-standing divisions between combat and other aspects of engineering. Commanders recommended that a more flexible mindset was to be encouraged, which would facilitate lateral thinking, maximum use of improvisation, problem solving and risk taking. Intelligence and logistics issues needed to be addressed more effectively. During the redesign of the course by RSME there were difficult decisions to be made over the inclusion or exclusion of 'essential' topics and the perennial discussion over how much time should be spent on practical training. However, the facts delivered by the full, in-depth job analysis provided the evidence needed.¹²

The course was designed incorporating the new doctrine, developed by the Director General of Land Warfare at Upavon, which was now fully in use Army-wide. The structure was based on the Components of Capability. Where there were training gaps, the RE Training Aids Centre wrote illustrated handbooks, which were valuable sources for troop commanders to use as reference material. They covered intelligence and logistics issues in particular and were highly regarded as a model for the remainder of the Army.

Chartered Engineers

If the trends described earlier produced strains within the soldier trade structure, it was even more challenging for officer careers in the 'professional engineer' stream. The formation of the Military Works Force (MWF) has been described in Volume XI.¹³ This had now become the focal point for all professional expertise in the Corps where the design and planning of projects of any size was undertaken and from which officers and clerks of works would be attached to units as technical and professional advisers. The system worked well for the majority of projects undertaken by Sapper units. But the career was limited by the small size of the structure, headed by a brigadier who was not

always a professional engineer. Promotion prospects and soldierly employment were perceived by many to lie more in the command and staff side of the Corps. With a few exceptions, a 'double-hatted' career was simply not a practicable proposition. In theory, officers from both streams had equal chances of competing for the best jobs at squadron and regimental command; in practice lack of experience in an unfamiliar field reduced those chances significantly.

Inevitably it became harder to encourage officers to volunteer for the professional courses and apparently give up prospects for their military careers for the sake of indulging their ambitions as engineers, ambitions there often seemed little prospect of realising. The very role of the Corps in this area was sometimes questioned and comparisons were drawn with other national armies. For example, the German Bundeswehr Pioniere were limited to field engineering. In the United States the US Corps of Engineers, which held national responsibility for flood control, offered some guarantee of the knowledge, skills and experience demanded of chartered engineers. In addition the US Marines, US Navy and US Air Force all had their own engineers with different capabilities, most of which were required by RE units in support of the three UK Services. As the pages of this history illustrate, time and again engineering challenges in an operational environment would arise for the Corps, and the manner in which they were met acted as a constant reminder of the need to maintain an effective chartered engineer stream. As with the soldier tradesmen of the Corps, the marked difference in the character of service in BAOR and UK units meant that the professional engineering specialist was likely to be more UK-based than the command and staff counterpart. By 2000 there was a marked change of emphasis in the type of operation undertaken by the Corps. This demanded appropriately qualified officers and, indeed, the clerks of works to enable the Army to live, move and fight in very challenging conditions – from the hot deserts of Kuwait and Iraq to the mountainous terrain and hard winters of the Balkans. That challenge was met in full measure.

Mines Awareness Training

As the nature of military commitments altered through the 1990s to cover, for example, the wars in the Balkans, so the nature and variety of pre-operational-tour training widened. A particular case was mines awareness training. During the last decade of the century, the global proliferation of mines mentioned in the section on mine warfare above was placing an enhanced responsibility upon the Corps for preparing units and individuals before deployment. Training in mines awareness was essential. Not only did British units need this training for their own security on operations in the Balkans and elsewhere but the demand grew for an information and training source for civilian government and non-governmental organisations involved in the humanitarian demining programmes worldwide. Chapter 9 of this volume relates the main contribution of the Corps to these projects. The genesis for this had been in Field Engineer Wing (FEW), at Chattenden Barracks, in the autumn of 1990. The requirement had emerged at the outbreak of the first Gulf War when a team led by the Assistant Instructor Mines, supported by a team of QMSIs, had very quickly researched and published a handbook covering in detail all the types of mines that Saddam Hussein had probably purchased and thus might be encountered by the formations to be deployed. The first edition was ready for the initial reconnaissance party. This was followed in 1991 by a rudimentary mines database, which was an invaluable source of information when, for example, the first UN team deployed to Cambodia. FEW continued providing this support, and a comprehensive programme of briefings and demonstrations was developed.

In September 1997 the Secretary of State approved the appointment of a SO 1 Humanitarian Mine Action on the staff of the Director of Military Operations and the formation of the UK Mines Information and Training Centre (one captain, one warrant officer and one sergeant) in the Battlefield Engineering Wing of the Combat Engineer School, Minley. By 2000 this centre was taking a leading part in what was effectively an international mines information and action network. The main customers for Mines Awareness Training were Army units,

followed by the RAF, the Royal Navy and Royal Marines. All British UN military observers and various civilians went through the courses, which by early 2000 had included 15,332 individuals.

Host Nation Interoperability

During this period the concept of an army group counterstroke concentrated minds more than ever before on the need for better cooperation between the national armies forming the Northern Army Group (NORTHAG), leading wherever possible to better interoperability. As host nation, the Bundeswehr was the obvious common reference point, and for decades the Sappers of the German territorial Wehrbereichskommando (WBK) and district Verteidigungsbereichskommando (VBK) had cooperated in the operational planning and peacetime preparation of demolition targets and the provision of information on bridges and roads. The demolition boxes on bridges, 'measle-shafts' (manholes built into the roads) and 'cheeses' (tailor-made charges for emplacing in the measle-shafts) were a byproduct of this liaison.

Interoperability between Sappers in the Central Region came a step nearer with the setting up of the Euro Nato Engineering Centre (ENTEC). Ever since the 1950s, NORTHAG had run the annual Exercise *Makefast* aimed at improving commonality between the national Engineers. They were therefore able to give wholehearted support to the establishment proposed by Central Army Group (CENTAG) to provide courses and a focal point for interoperability policy, which came to fruition at the Pionierschule at Munich in 1977 and began to make itself fully felt in the early 1980s.

Rounding Off

Throughout the 1980s, equipment, organisation, training, and military philosophy were still strongly focused on the Cold War and the prospect of an armoured battle in Europe. This posture had seen the Corps safely through the hazards of the Falklands War, where equipment in service served most of the needs that arose, given the inevitable improvisation imposed by operational realities. Likewise, the Gulf War was fought in a environment and concept

of operations totally different from that for which it had been procured. The development of the actions in the Balkans in the mid-1990s (Chapter 7) was concentrating minds on yet another type of operation that, while it was to absorb the main effort of the British Army for the remainder of the century, was just one of the operational scenarios for which preparation had to be made.

As the prospect of armoured warfare in western Europe diminished, so greater emphasis was placed on construction engineering. A measure of this swing is that in the five years from 1980, some 57% of the articles on current operations and training published in the *Royal Engineers Journal* were on combat engineering topics; the equivalent for the five years from 1994 was only 31%. In the 1980s, construction tasks had to be positively sought out and programmed in order to ensure that the structure for providing professional engineering services remained in place and prepared for any emergency and that individual skills were maintained. By the 1990s construction tasks, particularly in the case of United Nations intervention in emergencies, proliferated to the extent that fears began to be felt that combat engineering experience, the main business of the Corps, might dwindle.

NOTES

- 1 *Sapper Telegraph* 6, February 1997, p.32.
- 2 *Corps History* Volume XI, pp. 44 (and endnote 7), 59.
- 3 Lieutenant Colonel J. F. Johnson, 'The Chieftain AVRE Project' in *REF*, 101/3, September 1987, p. 185.
- 4 Captain D. Clegg, 'The ChAVRE Story' in *REF*, 117/1, April 2003, p. 40.
- 5 *Corps History*, Volume XI, p. 41.
- 6 Hansard, 043/99, 23 February 1999.
- 7 Landmines Act 1998, Introduction, 1, (1), (a).
- 8 *Corps History*, Volume XI, p. 43.
- 9 Executive Summary of a Report on REESR, dated 28 March 1995.
- 10 REESR Implementation D/EinC(A)/A/REESR/3/2, dated 1 July 1997.
- 11 The Career Employment Structure for Regular and Territorial Officers and Soldiers of the Royal Engineers, Part 2, dated 1998.
- 12 Review of Royal Engineers' Junior Officer Employment and Training, dated June 1997.
- 13 *Corps History*, Volume XI, pp. 19-21.



Conflict of Ideologies

Fighting the Cold War

The Strategic Balance

The period between 1980 and 1990 proved to be the final decade of the Cold War, which had dominated British defence policy since the end of the Second World War. Previous volumes of this Corps history have told the story of the wars, emergencies and peace-keeping operations that broke out as surrogates of the threatened war that never happened but whose origins could be traced, some directly (such as Korea) and others by proxy or ideologically inspired (such as Malaya, Suez, Aden and Borneo) to the over-arching East-West confrontation. It was, however, through NATO, with its British contribution of BAOR and UK-based forces, that eventual victory was secured. It is therefore appropriate that this volume of the Corps history should treat the Cold War as a true operational commitment that came to an end in the middle of this period.

The Cold War was a shadow cast over the world arising from the unresolved differences between the victorious allies at the end of the Second World War. It split Europe into the camps of the two superpowers, America and Soviet Russia, taking the form of the NATO and Warsaw Pact (WP) alliances. Its two conflicting ideologies had a polarising effect worldwide, drawing in political movements in unstable regions where Cold War frequently became 'hot'. And it was responsible for the dangerous arms race that developed into a strategic nuclear confrontation.

While the superpower confrontation carried with it the threat of an ultimate catastrophic world war, with horrifying potential consequences to civilisation, it paradoxically created a period of stability and uniformity of military outlook. The Western Allies' defence posture had effectively crystallised into the single option of preparedness to resist a mass attack from the WP armies

through north-west Europe using nuclear and chemical weapons. By 1980 'deterrence' as a philosophy had moved from the simplistic idea of an exchange of strikes on the population centres of the nuclear powers to acceptance of the need to underpin this 'armageddon' concept with strong conventional forces (albeit with a tactical nuclear capability) to produce a 'graduated response' to any option the WP might adopt short of an all-out nuclear exchange. Mutually Assured Destruction, with the appropriate acronym MAD, seemed the best and only guarantee of stability.

Inevitably the cost of sustaining peace in this manner was high. By 1977 the NATO allies had set a target of a 3% real terms annual increase in their expenditure on defence in support of the Alliance. Britain's costs over the 1980s remained at roughly 4.0% of Gross Domestic Product (GDP), the fourth highest after the United States, Germany and France. Economic pressures began to tell on the WP – Russia in particular was estimated to be spending more than 25% of its GDP on defence – giving the West an edge in arms control negotiations. In particular, the Soviet Union's introduction of the intermediate-range SS20 launcher, to counterbalance which NATO was able to field the American ground-launched cruise missile, became a contentious issue. It took from 1983 to 1987 to reach an agreement and involved two summit meetings between Presidents Reagan and Gorbachev.

Operational Concepts

Britain's part in the Cold War was provided through the NATO military structure and included an independent strategic nuclear capability. The principal perceived threat from the WP was considered to be a massive armoured attack in the Central Region, using tactical nuclear weapons if necessary, with commensurate air support and backed by combined operations on the northern and southern flanks. For the Army this meant equipping the British Army of the Rhine (BAOR) with mobile, well-protected armoured forces supported by ever heavier and longer-range artillery, assigning the lighter-equipped and less well-protected strategic reserve to reinforce Europe-based NATO forces, particularly on the flanks of the area; and backing these

forces with a logistic support system based on resupply from the UK for any sustained operations. On going to war, Headquarters BAOR would disband; its principal operational element would be absorbed into Headquarters Northern Army Group, the Commander-in-Chief and Chief Engineer taking up equivalent posts. Simultaneously, the Chief of Staff HQ BAOR would become the Commander of British Logistic Support Command, which would form up and take over responsibility for the security and functions of the Rear Combat Zone through which all reinforcements would be moving.

Central Region

The main British combat element in NATO's Central Region ground forces was 1 British Corps, which in 1980 provided four stationed armoured divisions to Northern Army Group alongside the Allied corps from the Federal German Republic, Belgium and the Netherlands. In war, 1 British Corps was to be reinforced from the UK by Regular and TA units. These would be deployed largely by sea and arrive in their wartime locations through the port of Antwerp, collecting equipment and stores from depots on their way through the Rear Combat Zone. The British air element was found in the 2nd Allied Tactical Air Force, a multinational formation to which the units of RAF Germany were assigned, operating out of the airfields at Brüggen, Laarbruch and Wildenrath and, in the case of the Harriers, from the field. Engineer support in great diversity was provided throughout this long line of communication as well as in the Forward Combat Zone as described below.

The critical factor for a successful response would be warning time for mobilisation. The General Deployment Plan (GDP) was the means by which all NATO units in the Central Region would move out from their peacetime locations to their operational areas. The elaborate, precisely-timed programme, related to assumed early warning from the intelligence services, was designed on the hypothesis that a surprise attack could be averted by good preparation and rehearsal without provoking the WP by any premature move that, in a delicate situation, might

be interpreted either deliberately or otherwise as an intended threat to the communist bloc. Throughout the Cold War all units in SACEUR's command had to maintain a laid-down percentage strength that restricted the number of soldiers who could be away at any one time on courses, leave and other commitments. At unpredictable intervals, formations' readiness for war would be tested throughout the Central Region in a call-out procedure emanating from the Supreme Allied Command. On receipt of a particular codeword, without advance warning, units would move out of peacetime locations into pre-planned concentration areas and their operational capability in terms of men and materiel assessed by an inspecting officer.

In the early 1980s, Northern Army Group was responsible for the defence of the North German Plain from Hamburg in the north to south of the Harz Mountains. 1 British Corps' GDP area covered the Inner German Border along a line running from Hanover up to the Harz Mountains, with 1 Netherlands Corps and 1 German Corps on their left and 1 Belgian Corps on their right. In-theatre combat units would occupy the area roughly back to the River Weser. From there back to the Corps rear boundary (roughly Osnabrück to Paderborn), defence would depend on reinforcements from the UK. The Corps Rear Area contained the majority of the Corps' logistics, some in-theatre, some by reinforcement. Its defence depended largely on reinforcements, both Regular and TA. There was a strong Sapper element in this force, with responsibility for maintaining the infrastructure, supporting the Harrier force, constructing fuel supply points from the NATO pipeline, as well as for the provision of engineer logistics. Because of this, command within the area devolved on to the largely TA formation headquarters 30 (and later 29) Engineer Brigades.

The first challenge for all engineers in this deployment plan was to ensure that sufficient materiel such as mines, explosives and defence stores could be 'outloaded' from dumps and emplaced in time for combat units to be ready for battle. To allow for this, a theoretical assumption was made that three days' warning of an attack would be available, and Sapper unit plans



RAF Harrier hide.

were designed to this. Pre-prepared demolition chambers throughout the infrastructure were a feature of these plans. The 1 British Corps concept of operations particularly depended on an extensive obstacle plan requiring hundreds of thousands of anti-tank mines and many hundreds of demolitions to help counter the WP quantitative advantage in armour. (See Chapter 3 for the developments in doctrine).

Berlin

Also under BAOR, and geographically in the front line, was the Berlin garrison – effectively Berlin Infantry Brigade with its Sapper element, 38 (Berlin) Independent Field Squadron and the Area Works Office. Berlin was surrounded by WP units, and its defence depended on a well-thought-through and frequently exercised defensive plan, in which 38 Squadron played a crucial part. The Havel bridges all had to be demolished, and the live demolition stores were mounted on trailers, permanently ready for deployment. The ability to re-cross the rivers and lakes was then left to Heavy Ferry and assault boats. This was to be the last planned operational use of Heavy Ferry in the Corps.

The NATO Flanks

There was also a British contribution to the 'flanks' of NATO, the realms of the Commanders-in-Chief Northern and Southern Europe. These were met by 3 Commando Brigade and through the British contribution to the Allied Command Europe Mobile Force, the headquarters of which was at Heidelberg. This commitment continued throughout the period of this history, and its Cold War role was exercised regularly.

British Army of the Rhine, 1980 to 1994

In the 1980s the main focus of the Corps continued to be BAOR, and at the beginning of the decade there was no hint of the dramatic change in the Soviet Union's strategic stance that lay over the horizon. BAOR was the powerhouse of combat engineering, the place that had to be considered most likely for the application of mine warfare, bridging and all the staples of the combat trades. It was the only theatre in which experience could be obtained in the use of armour or amphibians. It was the first posting for nearly all soldiers emerging from the training organisation, whence they would return to the UK after two or three years with extra combat trades to add to their basic training. For officers it provided invaluable professional training that would serve them well in whatever career path they were to follow.

BAOR was also a distinctive way of life. It was an established family station with excellent facilities developed over the years, including schools, NAAFI clubs and shops. For both families and single soldiers, BAOR provided prolific sporting and recreational activities based in the various garrisons and in specially established outstations for major sports such as sailing and skiing. The Kiel Training Centre for offshore sailing continued as a Royal Engineer Unit. For many it was therefore a very popular posting, in which the financial 'perks' of duty-free cars, alcohol and motor fuel added to the attraction. Although there was a tendency for the garrison towns to develop into British ghettos, many soldiers enjoyed social contacts with the German community, often leading to marriage. These conditions of

service in Germany were designed to maintain morale among a military population serving away from home. For many, however, the most positive motivation came from the proximity of the Soviet and East German forces, an everyday experience to those serving in Berlin or visiting that divided city on the official train or by road through the 'corridor', involving procedures and some ceremonial that emphasised the delicacy of the situation. Those without that experience could, and often did, visit the Inner German Border and reflect on the significance of the miles of mines and barbed wire stretching north and south as far as the eye could see.

The head of the Corps in the Rhine Army was the Chief Engineer at HQ BAOR Rheindahlen, a major general until 1984 when the post was downgraded to one-star (brigadier) status. He was also Chief Engineer Northern Army Group, for which there was a small multi-national operational headquarters. The field force units (less the Berlin Field Squadron and 10 Field Squadron at Laarbruch and then Gütersloh in support of the Harrier Force) were all grouped under the Commander Corps Royal Engineers (CCRE) at Bielefeld. Thus the Chief Engineer in his Northern Army Group role had technical control over 1 British Corps engineer units. These overall arrangements remained until 1992, following the end of the Cold War.

Locations

The principal stations for Royal Engineer field units in the early 1980s were as shown in the table overleaf. (See Annex A for full details of units and squadrons.) While there were considerable movements within these locations arising from the establishment changes recorded in earlier chapters, they remained broadly the same throughout the 1980s.

1 British Corps

During the Cold War decade covered in this volume, several important changes took place within 1 British Corps in consequence both of economies imposed from the government and changes in operational doctrine. In 1981 it was decided to

reinstate the brigade headquarters that had been removed under the Army Restructure Plan and also to withdraw 2 (UK) Armoured Division back to the UK, leaving only three divisions stationed in Germany. The Engineer order of battle was reorganised to form five field regiments, three of which were to provide divisional support on a scale of one field squadron per brigade; the other two were Corps troops, giving the CCRE some flexibility that he lacked under the previous arrangements. It was at this stage that 29 Engineer Brigade took over the former war role of 30 Engineer Brigade in the Corps Rear Area. At the same time, every effort was being made to build up the armoured engineers that had almost been lost in the Army Restructure Plan.¹ A third armoured squadron was raised, completing the re-establishment of 32 Armoured Engineer Regiment 1980. Already, however, it was apparent that the three armoured squadrons were insufficient to meet the needs of the divisions that they supported.

As described in Chapter 3, the issue of how best to provide adequate engineer support to the armoured divisions dominated discussion and field trials in the 1980s and early 1990s.

Principal Stations for Royal Engineer Units, early 1980s

Rheindahlen	Chief Engineer
Willich	40 Army Engineer Regiment 522 STRE
Bielefeld	CCRE
Osnabrück	23 Engineer Regiment 25 Engineer Regiment
Iserlohn	26 Engineer Regiment
Hameln	35 Engineer Regiment 28 Amphibious Engineer Regiment
Nienburg	21 Engineer Regiment
Münsterlager	32 Armoured Engineer Regiment
Berlin	38 (Berlin) Field Squadron
Laarbruch/Gütersloh	10 Field Squadron

Organisationally, throughout the 1980s armoured engineers remained a breed apart, an asset centralised in accordance with the best principles of engineer command and control of assets, at Corps level, so that regrouping was always necessary before an exercise or operation. Better solutions were a matter of frequent debate, which found expression as early as 1983 in the *Royal Engineers Journal*.² Linked with these debates was the question of command and professional advice at the appropriate level. Ever since divisional CREs in the rank of colonel had been introduced in the 1960s, the workability of this arrangement had been questioned; the matter was finally resolved in the 1990s, with experience in the Gulf War, and the post was confirmed as essential.

A parallel issue was the inadequacy of the old Centurion AVRE and the dire need for upgrading to a Chieftain-based machine with enhanced capability. That the Chieftain AVRE entered service in 1987 was a triumph for the Corps, which had internally put forward the proposal and developed it within its own resources at Bovington and Willich.³ The whole episode was also a boost for Sappers' morale within Germany, where this manifestly worthwhile improvement to capability was in hand to rectify a shortfall that had been an embarrassment for many years. The Willich-produced AVRE survived for eight years until the Vickers production model came into service in 1994.

By the end of the decade, trials were under way to test the concept of the close-support squadron. The lessons of the Gulf war confirmed both the need for close-support squadrons in support of armoured battlegroups and for Sapper regiments to support brigades. This, together with training exercises at BATUS, led to the restructuring of the Corps' assets by the end of the period of this history.

BAOR Training for War

Training in BAOR followed a pattern that had changed little over the decades since the end of the Second World War. Training took place either on the official training areas, such as the major ones at Sennelager and Soltau and many smaller areas local to the

garrison towns; alternatively it could take place in the German countryside in so-called '443' areas (so named from the number of the Army form that laid down the conditions with landowners under which training could take place and compensation paid for damage).

The training cycle, its principal features, difficulties and opportunities are fully covered in Volume XI of this history, and the 1980s saw little change. The climax of the training year would normally be a major field training exercise (FTX) at brigade or divisional level taking place in the late autumn, when the harvest was in and before the winter weather might rule out cross-country movement. The indispensable lead-up to the FTXs would be the programme of command post exercises (CPX) to ensure that battle procedures, communications and movement were sufficiently up to standard to allow the FTXs to take full advantage of the opportunity for tactical training.

The problem for 1 British Corps engineers was how to fit individual training into this pattern. Soldiers arrived in their units from the training organisation throughout the year with the basic skills of their combat trades. These needed to be converted into BAOR practice. For example, enormous numbers of drivers had both to become accustomed to driving in local conditions and to add driving armoured personnel carriers (in the 1980s the AFV 432) to their skills. Soldiers posted to armoured and amphibious units had those specialisations to acquire. (See Chapter 3)

After the dismemberment of the Soviet Union, the reunification of Germany, the dissolution of the Warsaw Pact and the huge political upheavals that took place at the same time, the Cold War was over. As a united Berlin became the capital city of Germany, 38 (Berlin) Field Squadron was disbanded in March 1994. BAOR was officially disbanded on 28 October 1994 at a final parade taken by the HRH The Prince of Wales.

United Kingdom Land Forces 1980 to 1990

While in general the whole of Britain's armed forces in the UK were dedicated to the support of NATO throughout this period, in practice their major business lay largely outside the area, on

operations and exercises covered in later chapters. Certain units, however, had their specific-to-NATO roles that had to be rehearsed and trained for, and regiments were allocated to the support of brigades. The situation in 1980, in which brigades were still known as 'field forces' following the Army restructuring, can be summarised as shown in the table below.

The opportunities for training in the all-arms support role were scarce but appreciated when they came, as this contribution

United Kingdom RE Units 1980-1990

Unit	Location	Squadrons	Specific Nato role
22 Engr Regt	Tidworth	3 and 8 Fd Sqns, 52 Fd Sqn (Const), 6 Fd Sp Sqn	Home defence in support of 8th Field Force. Provision of ACE Mobile Force field troop
33 Engr Regt (EOD)	Chattenden	49EOD Sqn, 590 & 591 EOD Sqn (V)	Individual reinforcements as required
36 Engr Regt	Maidstone	20 Fd Sqn and 50 Fd Sqn (Const), 61 Fd Sp Sqn, 9 Para Sqn, (Aldershot)	Support of SACEUR's reserve
38 Engr Regt	Ripon	11 and 32 Fd Sqns, 51 Fd Sqn (Const), 15 Fd Sp Sqn	Harrier and ADR Support
39 Engr Regt	Waterbeach	34 and 48 Fd Sqns, 53 Fd Sqn (Const), 60 Fd Sp Sqn	Support to 7th Field Force (19th Infantry Brigade)
59 (Indep) Cdo Sqn	Plymouth		Support to 3 Cdo Bde
Military Works Force	Chilwell		Provision of 516 STRE (Bulk Petroleum) and Works for War

from the Commanding Officer of 39 Engineer Regiment, Lieutenant Colonel M. J. (Mike) Payne at the beginning of the 1980s testifies:

Its 'priority one' role was the support of 7 Field Force based in Colchester with five battalions, and armoured reconnaissance, artillery and engineer regiments; in 1981 it reverted to the more familiar title of 19th Infantry Brigade, losing two battalions in the process, and was commanded by a Sapper, Brigadier R. L. (Richard) Peck. The regiment had two field squadrons, 34 and 48, a construction squadron, 53, supporting RAF Gütersloh and a support squadron, 60. The Cold War was at its iciest with the Soviets having just invaded Afghanistan so that the priority allocated to Exercise Crusader 80 meant that 7 Field Force could concentrate at Rheinsahlen Camp on the edge of Soltau for six weeks training prior to participating in a Corps level FTX in extensive 443 areas in Niedersachsen; it would be rare to have such opportunities later. The regiment played to its strengths with the provision of Digging Teams, small packets of plant which moved round the battlefield digging in the non-armoured battalions; the 4-tonners from the field squadrons showed a surprisingly high mobility and mine carrying capacity across sandy fields, towing barminelayers to produce extensive minefields for the defence plan; the other capability displayed was the support squadron's capacity to dig anti-tank ditches. It was a high point in all arms training.⁴

The UK Engineer Chain of Command

In 1982 the Commander-in-Chief UKLF attempted to reduce the size of his Wilton Headquarters, and his reforming eye fell on the engineer staff as a suitable target for rustication. The situation is best described by the Engineer-in-Chief, Major General M. (Mike) Matthews, at the Corps AGM of 1983:

I now come to the part of the story where no happy ending is in sight. The pressure to reduce the size of UKLF and District Headquarters has led to the decision to reduce Engineer representation in peace to two Grade 2 Staff Officers integrated into G3/G4 Staff ... in the restructured HQ UKLF with no Engineer representation at normal District level. This is, in effect, the rustication of the Chief Engineer of which I gave warning last year. However it is recognised that the duties now performed by the Chief Engineer still need to be performed, and additional

command functions are needed for the ADR units about to be raised. Therefore by restructuring the Headquarters ESC and the units now at Barton Stacey (which is due to close in late 1984) and taking their manpower, and the balance of the staff of the Chief Engineer, two effectively new organisations are to be formed. A Headquarters, to be known as Headquarters Engineer Support is to be formed at Tidworth later this year. This Headquarters and its Commander will be available to C-in-C UKLF in peace to provide Engineer advice beyond the range of that given by the two RE staff officers integrated into the G3 & G4 Staff. In transition to war and in war, the Commander Engineer Support will to all intents and purposes function again as the admitted Chief Engineer. He will have some additional responsibilities:

- Command of 33 Engineer Regiment (EOD) in peace and its UK elements in war.
- Overall responsibility for the Central Engineer Park at Long Marston and other Engineer Parks in Great Britain, but not in Northern Ireland.
- Inspection of Engineer Equipment world wide on behalf of D Engr Svcs.
- Responsibility for project planning; technical supervision and advice on the tasking of UKLF Engineer units employed on exercises world wide.
- At District Commanders' request-the provision of advice and assistance on the technical aspects of Engineer Training for any Engineer units in UKLF.
- On request, advice to the Major General Royal Marines on Engineer support to the Commando Brigade.
- and to C-in-C Strike Command (RAF) on the Special Safety Organisation and Crashed Aircraft Recovery.

When you consider the ramifications of these tasks, and the way they can best be performed, you may well wonder if it was a wise decision to rusticate the Chief Engineer from the Headquarters of UKLF.⁵

Support to the Royal Air Force

Perhaps the most crucial contribution of the UK-based Corps to the Cold War was its support to the Royal Air Force. Volume XI of this history records how, by the end of the 1970s, the expertise in Airfield Damage Repair had been distributed between the regiments, and Harrier support had been transferred to the TA, apart from in Germany. Chapter 2 records the further evolution of this as it affected both the UK and Germany.

For the period up to 1985, the core of RE support to the RAF Harrier Force was 10 Field Squadron. This squadron formed the nucleus for support from the Royal Corps of Transport, the Royal Pioneer Corps and other elements to deploy the RAF Harrier Force on to three major and one minor deployments into the field each year. From 1985 this role passed to 38 Engineer Regiment with 10 Field Squadron under command.

Throughout the final decade of the Cold War the Corps continued to build on the foundations of support to the RAF that had been laid many years earlier, to produce a system that was more reliable in emergency and more in harmony with the needs of the RAF. In 1982 the post of Commander 12 Engineer Brigade (ADR) was established at Waterbeach. In the mid-1980s a further field squadron had been established by converting 48 Field Squadron (Construction), and ADR became the war role of 39 Engineer Regiment after the regiment itself had carried out trials of the system on exercise. The field squadrons (construction) were allocated firmly to their RAF stations (48 to Gütersloh, 50 to Laarbruch, 52 to Brüggen, 53 to Wildenrath); from November 1986 the BAOR peacetime establishment was increased by the addition of Forward Technical Teams plus plant and vehicles 'in mothballs' to be permanently stationed at each. The operational expertise was then enhanced by the permanent move of 52 Field Squadron (Construction) to Bruggen in 1989.

Throughout the period the squadrons had participation in the RAF stations' Tactical Evaluations (TACEVALs), full-scale testing of the airfields in their operational roles, as a significant commitment. These included a vital contribution by 10 Field Squadron, commanded by Major P. S. (Paul) Adams, to RAF Gütersloh winning the Commander Allied Air Forces Central Europe Scroll of Honour in 1982 for the exemplary TACEVAL deployment of their 36 Harriers in the field under extreme conditions that might be best described as 'agricultural'.

Out of Area Operations

The Corps also experienced some challenging joint training focused on 'Out of Area' (OOA) operations. After the Falklands

War (Chapter 5) the MOD set up a Permanent Planning Group (PPG) run by a colonel and a very small team of SO1s to plan a series of Joint exercises involving all three services. The allocated Joint Commander on these exercises varied according to the scenario. He was usually GOC South East District (then a three-star general), but an exercise in Galloway in the south-west of Scotland involving the Royal Navy, the RAF, 3 Commando Brigade and 5 Airborne Brigade was commanded by Commander in Chief FLEET during the amphibious launching and then on the ground by a two-star Royal Marine. The training was always interesting and realistic. For example a five-kilometre multi-fuel pipeline was built by 9 Parachute Squadron in 1986 with help from the MWF Bulk Petroleum STRE during the exercise in Galloway, after a parachute insertion. This pipeline pumped aviation fuel (AVGAS), petrol and diesel directly from Dracones flexible floating tubes, up to 90 metres long, in turn fed by tankers offshore, to the forward operating base (an airfield). Even the RAF were confident enough to use the AVGAS for their Harriers and Jaguars on the exercise!

36 Engineer Regiment supported all the overseas exercises, including one in Oman, Exercise *Saif Sareia 1*, in 1987. The Command and Control arrangement for this Joint Force training were soon exposed as inadequate, the PPG having to be heavily reinforced for the exercises and CO 36 Regiment double-hatted as both CO and SO1 Engr within the PPG Headquarters. The requirement for a more robust, Permanent Joint Headquarters (PJHQ) was reinforced by the Gulf War and the Balkans campaign. (Chapter 1 mentioned that PJHQ was set up in 1996.)

Operation Yelstead

In the UK the British public's views on the Cold War were influenced by the annual marches to the Aldermaston Atomic Weapons Establishment that started in 1950, and the women's peace camps at RAF Greenham Common, which were in full swing by the mid-1980s in opposition to the siting there of ground-launched cruise missiles. These activities polarised opinion in the country. In 1981 the disused and unfenced RAF

airfield at Molesworth in Cambridgeshire was also selected as a cruise-missile site – protest camps immediately appeared. The need to convert Molesworth to its operational role led to one of the most high-profile engineer tasks of the period.

In November 1984 the requirement for an emergency 'instant' fence was ordered by the Secretary of State for Defence. As the Commander Engineer Support (the old Chief Engineer Land), Brigadier J. B. (John) Wilks put it:

The need for security was paramount, because any disclosure of our intentions could allow disruption of the fencing operation. So only a very limited number of people, by name, were allowed to know what was happening. We were not allowed to recce the site and not to make any telephone calls relating to the operation.⁶

Unit commanders were brought into the planning on 19 December 1984. The field units, each to be responsible for one of three sectors, were to be 36 Engineer Regiment (Lieutenant Colonel R. A. (Richard) Oliver), 22 Engineer Regiment (Lieutenant Colonel A. F. S. (Andrew) Baines) and 39 Engineer Regiment (Major B. M. (Brian) Semple – in the absence on overseas exercise of Lieutenant Colonel D. M. (David) Adamson) with 24 Field Squadron under command. Resources and support of the whole force for the operation was in the hands of 61 Field Support Squadron. The regiments were able to undertake some night wiring training during January.

Eventual figures for Engineer Resources were that they outloaded 203 vehicles, both 8- and 16-tonne, and 40 generator trailers. The major items were 16 water towers, 132 lighting towers, 737 reels of barbed wire, 2,590 concertinas of wire, 3,209 reels of S tape and 14,788 angle-iron pickets.

By the end of January the plan could be prepared in detail. No activity was to be allowed on the ground until after the last television news of the day; work would not be able to start before midnight; the fence was to be complete by first light. The operation order was issued on 24 January 1985 – D-Day would be 5 February, and units would concentrate the previous day. On that day also the loading of the vehicles at Long Marston would take place.

A fence was in place by first light all round the main airfield site, this having been accomplished with little harassment. By the end of the day all tasks were complete and the site was handed over to the RAF site commander, leaving behind only 53 Squadron as a rear party to see in the contractor and deal with any residual snags. It was a thoroughly successful operation, fully reported in the media, and attracted the warm thanks of the Secretary of State for Defence, Michael Heseltine (whose father had been a major in RE Bomb Disposal during the Second World War):

I followed the events on a screen monitor in the MOD until 4.00am when I set off by helicopter for the base to congratulate the people concerned on a quite remarkable achievement. An accommodating wing commander took off his flak jacket and put it round my shoulders ... I hardly noticed ... But for the media, the flak jacket was the message. If there had been a single CND body lying in the way of that fence, it would have been a front-page story, but the factor of surprise and the meticulous organisation that led to securing that fence in a night was lost to sight, as the focus of attention was on the Secretary of State apparently masquerading as a soldier leading his troops.⁷

It was the largest Sapper operation to take place since the crossing of the Rhine and tested the RE logistics chain, as well as its command and control system in the UK more than it had been for years. It was one of the last operations of the Cold War.

NATO Infrastructure

The NATO infrastructure programme was fundamental to the Alliance's determination to be able to maintain the Cold War. Throughout the twenty years covered by this history, the Corps provided a substantial number of chartered engineers to fill the posts required for this purpose. In 1989, for example, there were twelve officers spread between SHAPE, AFNORTH, AFCENT, AFSOUTH, NORTHAG and SACLANT. Over the years a huge inventory of facilities built up including, at that time, 227 airfields, 2,380 ammunition storage magazines, 665 aircraft shelters, 11,000 kilometres of pipeline, 32 war HQs and 288 missile sites.

At SHAPE itself, Sapper Colonels, R. (Ron) Doyle, R. M. (Mike) Stancombe and R. G. (Rex) Osborn each took charge of the multinational construction team that over a six-year period built SACEUR's underground bunker, known as Project 85. The work included the provision of protection for SACEUR and his staff of around a hundred people (against blast effects and electromagnetic pulses) in the event of nuclear attack.

Exercises *Crusader* and *Lionheart*

Prior to 1980 the combined plans for the reinforcement of Germany had never been completely tested, but this was about to change. Exercise *Crusader* in 1980 and Exercise *Lionheart* in 1984 were two major exercises in western Germany that incorporated Regular and Territorial Army units plus Reservists from BAOR and the UK. With hindsight, these exercises signified the final flourish of the Cold War. They both incorporated a multiplicity of subordinate exercises that had been regularly mounted over the years to rehearse the various aspects of the grand plan for mobilisation and moving out to war. However, for the first time, these two exercises were a complete rehearsal of all the deployment plans combined into one event. Exercise *Crusader* was therefore described in *The Times* as 'the most comprehensive test for many years of Britain's contingency plans for mobilisation, reinforcement of BAOR and the defence of the UK'.

These were not just movement exercises, since the deployment of sea- and airborne units from the UK had to be closely coordinated. They had to marry up with their 'Pre-Stocked Equipment' holdings of vehicles and equipment, plus ammunition and combat supplies including maps, all of which were held in locations within both the Low Countries and Germany. The final assembly of units reinforcing 1 British Corps was at Sennelager, where all of these components were combined into a viable unit. Clearly this was a particularly testing phase for the Territorial Army Sapper units.

In order to achieve this goal, Exercise *Crusader* was spilt into three subordinate exercises, the first being a UKLF deployment exercise called Exercise *Square Leg*, in which some 10,000 Regular

and 20,000 Territorial reinforcements were deployed to the Continent. This then continued as an exercise for the remaining troops in all UK commands as a Home Defence setting in a nuclear scenario.

The deployment and equipping of reserves on the Continent was the subject of Exercise *Jogtrot*, in which HQ British Logistic Support Command based at Rheindahlen was able to establish the Continental Line of Communication through which the UK reinforcements had to pass and eventually be returned. It also provided logistic back-up for the forward units of 1 British Corps and conducted separate exercises in the Rear Combat Zone.

Finally, Exercise *Spearpoint* was the 1 British Corps field troops exercise, involving 63,000 troops including reinforcements from the UK. The Corps commander at this stage was Lieutenant General Sir Nigel Bagnall and the CCRE was Brigadier D. H. A. (David) Swinburn. Three armoured divisions – two up and one in reserve – were deployed, the enemy being provided by a German Panzerdivision and 2 (US) Armoured Division (Hell on Wheels) who deployed by Operation *Reforger*. Here they dropped into the combat area direct from bases in Texas and manned their vehicles held in-theatre for this express purpose. 3 Armoured Division (whose GDP role was entirely separate) provided umpire support along with thousands more who were also engaged in damage control and visitor management. Lieutenant Colonel J. J. J. (Joe) Thompson was CO 28 Amphibious Engineer Regiment, which built several bridges on most nights and carried token traffic in tactical settings. However, all of this effort was just a small cog in an enormous machine in which the main emphasis was on manoeuvre and logistics.

An important aspect of the exercise was the battle simulation tasks that were carried out by a composite group centred upon 20 Field Squadron commanded by Major C. P. R. (Chris) Bates. Theirs was probably the biggest deployment of battle simulation ever undertaken by the British Army, and the effects were successfully synchronised with various phases of the exercise battle, such as artillery support and minefield breaching. Inevitably the delivery of a number of these tasks had to be amended at the last minute,

but they were all successfully achieved without injury. Indeed, in this respect the exercise public relations staff had preparatory briefs to explain to the Press the expected major attrition of service personnel through accidents; in the event, this contingency was not required.

Four years later, Lieutenant General Sir Martin Farndale was Commander 1 British Corps for Exercise *Lionheart*, which was an even larger field troops exercise involved 131,000 British Regular, Territorial and Reservist troops deployed over an area of 3,700 square miles. For this exercise the divisional engineers were deployed with their divisions, with Lieutenant Colonel T. R. (Tom) Wright and 21 Engineer Regiment, Lieutenant Colonel S. (Scott) Grant and 26 Engineer Regiment and Lieutenant Colonel P. J. (Peter) Sheppard with 35 Engineer Regiment being the commanding officers at the time. However, the Corps troops, under Brigadier N. H. (Nick) Thompson, were also kept busy, with Lieutenant Colonel P. J. (Peter) Mackie commanding 32 Armoured Engineer Regiment, which was split up in support of the divisions. In addition Lieutenant Colonel J. M. (John) Lucken with 23 Engineer Regiment and Lieutenant Colonel A. D. (Tony) Pigott with 25 Engineer Regiment deployed on major tasks as Corps Support Regiments and Lieutenant Colonel J. C. M. (John) Taylor continued the role of 28 Amphibious Engineer Regiment with river crossings. 29 Engineer Brigade was also deployed under Brigadier J. M. (Jim) Greer for tasks in the rear areas. Meanwhile, 65 Corps Support Squadron commanded by Major A. H. (Allan) Steele had a massive task with the outloading of engineer stores, which had only been practised as a paper exercise before. Clearly, the logistic aspects of the exercise were probably one of the most valuable parts in preparing for war.

Individual Sapper Reservists were also well exercised during this phase when they came under the command of Captain (Quartermaster) A. F. (Alan) Skidmore at the Combat Engineer Training Centre. Sadly, their time in Germany was limited to just one week, but the skills of 120 of them were well tested in a variety of tasks including a low-flying deployment by Chinook and the tactical construction of a Heavy Girder Bridge. All of this

marked the success of Brigadier Thompson's vision of converting Reservists into an ad hoc field squadron.

Unfortunately, real 'Sapping' such as bridging and EOD tasks can often cause bottlenecks and delays that would have been unwelcome to the exercise planners. There were also lots of other lessons learnt, such as the lack of small quantities of a key supply item in the logistic chain that halved the lighting capacity of 873 Movement Light Squadron commanded by Major R. B. (Richard) Selby-Boothroyd. And it was discovered that many of the skills required to cross the rivers and canals in Germany had been lost, so they had to be learnt again later. These two exercises, intended to test BAOR's reinforcement plans, were the biggest to be held since the Second World War. All who took part came away with a clear understanding of how they might have to deploy if the threat from the East became real.

Cold War Aftermath

As the Iron Curtain came down in 1989–91 (see Chapter 1) there was widespread debate on the future of NATO and the British armed forces. There was also continued talk and hopes among politicians of savings from the 'peace dividend' – the need to spend less on defence. But at working level all this faded into the background as the fuze lit by Saddam Hussein's invasion of Kuwait exploded into the First Gulf War (see Chapter 6). In both BAOR and the UK units, all hands were 'put to the pump' in preparation for the first armoured war to be fought by Britain since 1945. At the same time, the arrangements for *Options for Change* were to be implemented, while there could be no let-up in the exertions to bring a settlement to the people of Northern Ireland (see Chapter 8). In case there should be any doubt about a role for the Army, 1992 also saw the beginnings of the Balkans' conflict, which was to expand into a major commitment in the years ahead.

Reorganisation of NATO

Though founded primarily to provide the security of the Western world against the Soviet threat, (or, more cynically, 'to keep the

Americans in, the Russians out' and the Germans down') NATO survived the Cold War and found a new role in peace-support operations, primarily in former Yugoslavia (See Chapter 7). Former Warsaw Pact nations lined up to join NATO, and it was to enlarge from fifteen nations to eighteen by the end of the century (sixteen then nineteen if one includes France, which was not part of the military forces but maintained a political presence). The new members were Poland, Hungary and the Czech Republic. Plans were put in place to bring in the Baltic States, Romania, and other ex-members of the Warsaw Pact.

The disbandment of BAOR and 1 British Corps saw the formation of the Allied Command Central Europe (ACE) Rapid Reaction Corps (the ARRC). This was to be a multinational HQ, for which Britain provided the framework. It formed up in Rheindahlen in the old Northern Army Group HQ buildings. Senior British officers were the Commander, Chief of Staff, Chief Engineer and Colonel J5 (Plans). The Americans, who wanted an operational say, provided the Brigadier General ACOS J3 (Operations), and the deputy commander was Italian. Staff officers came from all NATO nations, with the exception of the French. The first Chief of Staff was Major General A. D. (Tony) Pigott and Brigadier A. R. E. (Alwin) Hutchinson, the first Chief Engineer. Col A. E. (Albert) Whitley, was Colonel J5. British units assigned to the ARRC were to be 1 (UK) Armoured Division, based in Herford, and 3 (UK) Division, based in Bulford. Other divisions were earmarked from a variety of NATO countries as required or as available. (See Chapter 7 for the operational deployments of the ARRC).

With the change in the nature of the threat, the structure of NATO was also to change. NATO HQ remained in Brussels, and SHAPE at Mons in Belgium. However, two of the principal subordinate commands, AFNORTH in Stavanger, Norway, and AFNORTHWEST, in High Wycombe, were to close and merge with AFCENT in Brunssum, The Netherlands. AFCENT was renamed AFNORTH, and together with AFSOUTH in Naples became the remaining commands subordinate to SHAPE. AFNORTH command alternated between Britain and Germany,

while AFSOUTH was always commanded by an American admiral. The Corps was well represented in these HQs, with Brigadiers K. (Kevin) O'Donoghue and R. (Bob) Pridham holding key staff jobs in SHAPE and Brigadier A. A. (Alasdair) Wilson being responsible for the organisational changes and the accession of the new nations, Hungary, Poland and the Czech Republic, into AFNORTH.

NOTES

- 1 *Corps History*, Volume XI, p. 59.
- 2 Lieutenant Colonel P. J. Sheppard, 'Engineer Support in 1st British Corps or "Whither the Corps in the Corps"', in *REJ* 97/2 June 1983.
- 3 Lieutenant Colonel J. F. Johnson, 'The Chieftain AVRE Project', in *REJ*, 101/3, September 1987, p. 185, and *REJ*, 117/1, April 2003, p. 40. Captain D. Clegg, 'The ChAVRE Story'. (See Chapter 3.)
- 4 Letter to Colonel G. W. A. Napier from Lieutenant Colonel M. J. Payne, 5 July 2002, in RE Library Archives.
- 5 *REJ* 97/3 September 1983.
- 6 *REJ* 99/2 June 1985.
- 7 Heseltine, Michael, *Life in the Jungle: My Autobiography*, Hodder & Stoughton, London, 2000.

The Falklands War

The Part Played by the Royal Engineers in the Campaign in the South Atlantic in 1982 and the Aftermath

Foreword

by Major General J. Thompson, CB, CBE

As the Commander of 3 Commando Brigade in the Falklands War, I counted myself fortunate to have the support of 59 Independent Commando Squadron Royal Engineers commanded by Roddy Macdonald. For over a year before the war, we had worked together, and I came to rely on his wise advice. During this time he had introduced to my Brigade the concept of having Sapper reconnaissance well forward, sometimes at the very point of the sharp end. This paid off in the Falklands. I shall never forget standing with Roddy watching the reconnaissance teams going forward to marry up with commandos and battalions for the battle for Stanley. They were loaded with kit including satchel charges and Bangalore torpedoes. At this stage it was thought that some of the Argentinian positions included barbed-wire obstacles. Roddy turned to me and said, 'I have told my Sappers that their job is to get the Infantry through the obstacle. If all else fails, they are to throw themselves on the wire and allow the Infantry to run across their backs.' Knowing 59 Commando Squadron as I did, I had no doubt that they would do exactly that. I am sure that every Sapper down South would have done likewise.

What shines through in this Chapter is the devoted support provided by *all* Royal Engineers, from *every* sub-unit involved in the Falklands War. Royal Engineer ingenuity and resourcefulness were demonstrated countless times. The building of the Harrier Forward Operating Base at Port San Carlos by 11 Field Squadron after the sinking of *Atlantic Conveyor* with the loss of most of its equipment being one example of many; the repair of the Murrell

Bridge being another. We were truly privileged to fight alongside such brave and professional soldiers.

As always, after the fighting, the demand for Sappers did not abate. The old adage 'there are never enough Sappers' was as true in the Falklands as in most wars before and since.

Introduction

The Falklands Campaign (Operation *Corporate*) breached the contemporary principle of British defence policy whereby Britain, on her own, would never again undertake major warlike operations against a well-equipped enemy. There was no prepared plan and no joint training for this type of operation. As a result, the pace at which *Corporate* was launched was extremely brisk, and it called for a good deal of improvisation from all of those involved.

The Falkland Dependencies lie in the South Atlantic some 8,500 miles from the United Kingdom. Mostly barren, rocky Islands, they comprise South Georgia, the South Sandwich Islands and the largest, the more fertile Falkland Islands themselves. These are about two-thirds the size of Wales, lying some 400 miles off the east coast of Argentina. In 1982 they had a population of approximately 1,800 people of whom about 1,000 lived in the capital, Port Stanley, with the remainder scattered around the rugged coastline in sheep farming settlements. Although temperatures in the Falklands are roughly similar to those in Britain, with Port Stanley lying 51.5° South while London lies 51.5° North, the climate is far more changeable, and strong south-westerly winds blow for much of the time. The Falklands do not lie in the iceberg belt, but South Georgia and the South Sandwich Islands do, and consequently they have permanent glaciers and snow.

The only industry at the time of the Argentinian invasion was sheep rearing to produce wool, which was sold through the Falkland Islands Company. The Islands were short of cash for infrastructure, and work relied heavily on small grants from the British Government. Harbour facilities were extremely limited; the airport was capable of handling only short-range feeder

diplomatic pressure over the years by successive Argentinian governments for Britain to recognise their claims of sovereignty through historical right and geographical proximity. During all this time Britain recognised the practical benefits of maintaining a good working relationship between the Falkland Islands and Argentina. Indeed, up to 1982 air travel to Britain had always been via Argentina; some of the Islanders' children went there for their secondary schooling; and medical emergencies were routinely sent to the more readily-available, modern facilities there.

Given the emotion that 'Las Malvinas' have always generated within Argentinian hearts, it was natural for the military junta in power in Argentina in 1982 to use the long-running slight to national pride over the Islands to rally popular opinion behind it when deep divisions on internal matters were threatening its hold on power. By this time Britain was no longer the dominant colonial power that it had been in world affairs. Successive governments had re-focused national interest to divest the country of its burden of colonies and dependencies and to concentrate defence resources upon Europe and the NATO alliance. In the 1970s a procession of politicians had tried to encourage the Falklanders to see their future as part of Argentina, but they were implacably opposed by the Islanders – never more clearly than in 1979 when Nicholas Ridley, the representative of the newly elected Conservative government under Margaret Thatcher, was found to have proposed to the Junta a sovereignty lease-back arrangement (similar to the arrangement with China, which extended Hong Kong's status as a colony for 99 years) without reference to the Islanders. He was met with outright antagonism when he visited.

Although it knew the very clear feelings of the Islanders, the Junta was not slow to recognise that British determination to defend the Islands had been reducing ever since 1976 when a nuclear submarine had been deployed as a deterrent to Argentinian military overtures. One of the proposed measures resulting from the defence economies referred to in Chapter 1 of this volume was the withdrawal of the Royal Navy's ice patrol ship

HMS Endurance. This vessel and the detachment of 37 Royal Marines (Naval Party 8901), together with about 100 all ranks of the Falkland Islands Defence Force, had constituted a permanent military presence, which served as a deterrent to an Argentinian invasion. The stated intention to withdraw *Endurance* was interpreted by the Junta as a clear signal that a relatively benign invasion of the Falkland Islands and seizure of the remaining dependencies would be accepted by the British Government as a *fait accompli*. In Argentina the frustration of fruitless diplomatic wrangling gave way to military preparations.

It so happened that an Argentinian scrap-metal dealer, Constantino Davidoff, had secured a contract with the Scottish company Christian Salvesen to dismantle the decaying former whaling stations on the north coast of South Georgia. The problem of transporting his men and equipment across 1,400 miles of stormy seas from the mainland caused Davidoff to approach the Argentinian navy for assistance. His request was met with interest, and when he left Buenos Aires for his reconnaissance on 16 December 1981 on board the ice-breaker *Almirante Irizar*, he became a useful pawn in Admiral Anaya's already-conceived plan to invade the Falklands and its dependencies. British diplomatic feathers were ruffled when Davidoff flouted formalities by not requesting landing permission before setting up his operation at Leith. However, the increasingly tense exchange of diplomatic signals did not prevent the main body of Davidoff's workforce arriving on 20 March 1982, this time accompanied, openly, by Argentinian marines, who raised their national flag. The gauntlet thus laid down, the pace of events suddenly accelerated.

Despite intense diplomatic activity to restore the status quo ante, early in the morning of Friday 2 April 1982, after a preparatory bombardment of the Royal Marines' barracks at Moody Brook, Argentinian forces landed by helicopters and landing craft around Port Stanley. After putting up a spirited resistance for a time, the garrison was ordered by the Governor to lay down its weapons when he considered further resistance futile against the overwhelming Argentinian forces. There had

been no fatalities among the defenders, and the Governor, his family, some prominent Islanders and the Royal Marine garrison were evacuated from Port Stanley by air to Britain the same evening.

Reaction by H. M. Government

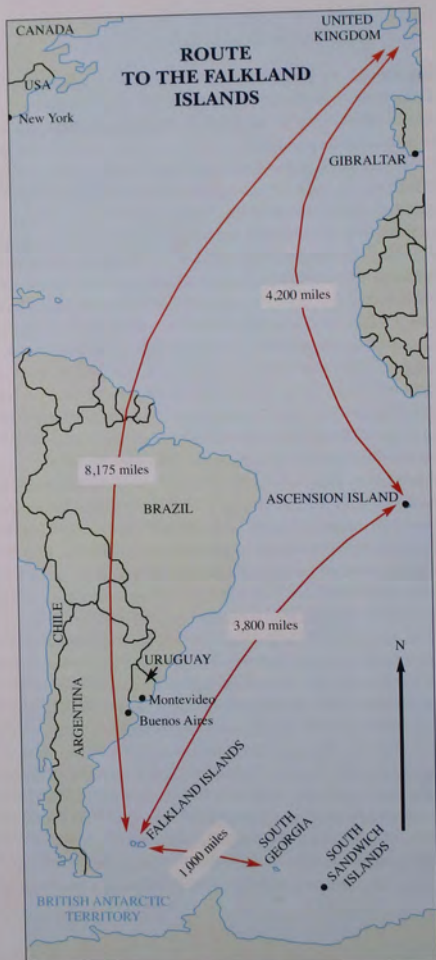
By the time Argentinian marines landed, urgent contingency planning had been going on for some days in the Ministry of Defence. In response to reports of extraordinary activity in Argentinian ports, of movement of troops by air within the country and of ships moving towards South Georgia, the British government had announced, on 24 March, that HMS *Endurance* would remain in the South Atlantic, and the naval supply ship *Fort Austin* was ordered to sail south to replenish it. The decision to send three nuclear-powered submarines south was taken on 29 March, by which time a variety of plans for reinforcing the Royal Marines detachment in Port Stanley had also been discussed. When the submarines were ordered south, the First Flotilla, commanded by Rear Admiral Woodward and at that time exercising at sea close to Gibraltar, was warned to prepare seven ships for deployment to the South Atlantic if required.

Despite all this, the actual invasion came as something of a surprise, but it triggered a rapid response. On Saturday 3 April 1982, in the first Saturday session of Parliament since Suez in 1956, the Prime Minister, Margaret Thatcher, announced that a task force would begin to sail for the South Atlantic on Monday 5 April, and a war cabinet was formed, chaired by the Prime Minister herself. The Ministry of Defence took its instructions from this cabinet through the Chief of the Defence Staff, Admiral of the Fleet Sir Terence Lewin. Detailed operational planning took place in, and orders were issued by, the headquarters of Commander in Chief Fleet, Admiral Sir John Fieldhouse, who was in overall command. His land forces deputy was the Major General Commando Forces, Major General Jeremy Moore, until he left to join the Task Force as Commander Land Forces (CLF, later amended to CLF Falkland Islands: CLFFI).

The aim of the British Government was to bring about the withdrawal of Argentinian forces from the Falkland Islands and its dependencies and to re-establish the British administration there as quickly as possible.

The preparation of ground forces began early on Friday 2 April 1982 with the alerting of 3 Commando Brigade (commanded by Brigadier J. H. A. Thompson). This comprised 40, 42 and 45 Commandos, with supporting arms and services, including 59 Independent Commando Squadron Royal Engineers commanded by Major R. (Roddy) Macdonald. Also alerted was 3rd Battalion the Parachute Regiment (3 Para). This was the in-role 'Spearhead' battalion and was therefore ready for worldwide contingency deployment. Its Engineer support was provided by 3 Troop, 9 Parachute Squadron, commanded by Lieutenant P. J. (Peter) McManners. The first land force units began to sail from Portsmouth on 6 April in requisitioned ships including the P&O cruise liner *Canberra*. (*Canberra* itself actually sailed on 9 April). There was insufficient space on the ship for the whole of the Spearhead Group including the Sapper Troop, and 3 Troop was left behind. This added to the potential operational support burden of 59 Squadron, which was the only RE Combat Engineer unit allocated to the Force at this time. Meanwhile, the RAF activated a forward base on Ascension Island and put in hand modifications to Vulcan, Nimrod and Hercules aircraft to enable them to carry out air-to-air refuelling operations.

As the embarked Task Force contained Harrier aircraft it had already been recognised that there might come a time when these would need to operate from land rather than from their parent aircraft carriers. 11 Field Squadron, commanded by Major R. B. (Bruce) Hawken, from 38 Engineer Regiment in Ripon, was an in-role Harrier Support Squadron, so it was warned for deployment on 19 April. No plans existed for an expeditionary force Forward Operating Base (FOB) so, working with a QMSI, an officer from Headquarters Engineer-in-Chief (HQ EinC) and the close cooperation of the staff of Central Engineer Park (CEP), Major Hawken designed an FOB – using in-service, pre-fabricated, aluminium planking – which included a landing pad,



a Short Take Off and Landing (STOL) airstrip and some dispersion, together with a refuelling facility using Emergency Fuel Handling Equipment (EFHE). The necessary stores were rapidly loaded on to *SS Atlantic Conveyor*. The hectic planning was then expanded to include contingencies for what might be faced in bringing Port Stanley and its airfield back to normal after their recapture. Working on educated guesswork, an impressive miscellany of stores for this was loaded on *SS Atlantic Causeway*. Also crammed on to this ship were plant machines and equipment from 61 Field Support Squadron. On 8 May, 11 Squadron departed RAF Brize Norton by air for Ascension Island via Dakar. There the Squadron embarked on LSL *Sir Bedivere* and sailed south on 13 May. The Squadron's helter-skelter deployment was reflected across the country as units hastily mobilised for as-yet-undefined operations.

On 27 April, 2 Para, with further supporting arms and services, sailed from Portsmouth on HMS *Intrepid*, RFA *Sir Tristram*, MV *Norland* and MV *Europic Ferry*. As 2 Troop, 9 Parachute Squadron, commanded by Captain D. R. (Robbie) Burns, was the affiliated troop for 2 Para, the CO, Lieutenant Colonel H. Jones, asked for *his* troop, and so it was 2 Troop and not the previously mobilised Spearhead troop that sailed with the battalion. Also included at this time was an element of 61 Field Support Squadron, which included two D6 dozers. 2 Para group's deployment completed the initial landing force order of battle, and all units involved headed for their first rendezvous at Ascension Island.

Ascension Island was a key factor throughout Operation *Corporate*. Situated some 4,200 miles from the United Kingdom and approximately midway between the United Kingdom and the Falklands, it was the all-important, forward mounting base and airhead for land-based aircraft. The Island's airfield, Wideawake, had been leased to the United States and was operated by Pan American, the American civil airline. Its facilities were totally inadequate to cope with the more than 800 additional officers and men who were soon based there to provide engineering, freight-handling, weapon-loading, admin-

istrative support and protection for the RAF aircraft permanently based there as well as for the transiting aircraft.

Meanwhile, on the diplomatic front, Britain had succeeded in obtaining United Nations support in calling for the immediate cessation of hostilities and the evacuation of Argentinian forces through the passing of Security Council Resolution 502. In the negotiations, the United States government found itself in a delicate position as it attempted to maintain friendly ties with the two protagonists. The Secretary of State, General Alexander Haig, undertook intensive efforts to mediate. Inevitably, the mission collapsed when it became clear that the Argentinians were unwilling to pull their forces out of the Falkland Islands, believing that British forces were incapable of ejecting them. Following this, sentiment in the United States moved steadily in favour of Britain, and on 30 April President Reagan announced that America would ally itself with the United Kingdom, making military supplies available to it while imposing economic sanctions against Argentina.

Royal Engineers Preparations for War

The first that HQ EinC knew of the Argentinian invasion of the Falkland Islands was at lunchtime on Friday 2 April 1982. The *Evening Standard* billboards trumpeted the news, but the longer-term implications were lost on the majority of people. During the afternoon, HQ EinC was contacted by OC 59 Squadron to say that his Squadron had been placed on standby for possible operations by 3 Commando Brigade in the South Atlantic and to ask for advice and assistance on stores and equipment that could be released for his Squadron. At the time there was no indication that further elements would follow the Task Force and a wide range of stores was released for loading on to MV *Stromness*. This included enough Harrier matting to provide a minimum operating strip, emergency fuel handling equipment (EFHE) with Towed Flexible Barges (TFB or Dracones), general stores (including timber) and cement packed in steel drums, to counter the damp conditions likely to be experienced. In addition, a number of specialist tradesmen and supervisors were

attached to the Squadron, which sailed on 6 April with the bulk of 3 Commando Brigade. Most of the Squadron sailed on RFA *Sir Galahad*, transferring to RFA *Sir Lancelot* and other ships at Ascension Island. Squadron HQ was on HMS *Fearless*, Condor Troop was with 45 Commando on *Sir Percival*, and 2 Troop 9 Para Squadron on the North Sea Ferry *St Edmund*, one of the many civilian Ships Taken Up From Trade (STUFT). As Major Macdonald said in his post-operation report:

The Staff at HQ EinC were magnificent, as were Long Marston. Major Hawkins and Colonel Mornement cobbled together an immediate engineer stores pack, including EFHE, and carried on loading PSA1 panels on to RFA *Stromness* right up to the moment she sailed. By the time the Squadron embarked on *Sir Galahad* and *Sir Percival* on 5 April, we had engineer, combat and consumable stores on RFA *Stromness*, *Sir Galahad*, *Sir Lancelot*, *Sir Percival*, *Hermes* and the first Ship Taken Up From Trade (STUFT) MV *Elk*, with two Combat Engineer Tractors (CET) and crews from Bovington.¹

It had been planned that the Squadron would sail on 5 April, but the RFA ships were not fully ready for departure, so many men had the bonus of another *final* run ashore and a lucky few another *last night* at home.

While operational command of the Task Force was exercised by Commander-in-Chief Fleet at Northwood, its administrative support was provided by the Ministry of Defence in Whitehall, where the Defence Situation Centre coordinated the work of the operational, staff duties, logistic and movements staffs. It was most fortuitous that HQ EinC was in Whitehall and had close links with the staffs of all three services as well as the Central Staff. Early in the crisis, HQ EinC switched to 24-hour manning to match the key operational staff branches and, with both Engineer Operations and Services staffs being represented, it was well placed to react quickly to unfolding events.

There was a dearth of physical and geographical information about the Falkland Islands. HQ EinC quickly put together a team to rectify this and took the lead in unearthing what information was available in the UK. Fortunately, a number of government

officials and other residents of the Falkland Islands, including the Governor himself, arrived in London a few days after the crisis erupted. Thus dossiers were produced on Port Stanley, the settlements, Stanley Airport and the outlying airstrips. Information was also gathered on the essential services, water, electricity and fuel systems existing in Port Stanley. It did not take long to appreciate that there were no roads outside the settlements and that the terrain was completely unsuitable for wheeled vehicles other than $\frac{3}{4}$ -tonne Land Rovers. This information caused a major reassessment of the shipping space needed when the Army's workhorse, the 4-tonner, was excluded. A *going* map was prepared, in conjunction with the Director of Military Survey, and copies were produced in time to be flown to the Task Force before it sailed south from Ascension Island. At almost the last minute it was realised that the gridlines (in blue) could not be seen under Royal Navy operational working lights, so the whole lot had to be reprinted – an immense effort by all involved.

On Ascension Island, an ad hoc unit, the British Forces Support Unit Ascension, was formed. Initially this was under the command of a captain RN, whose method of conserving scarce water and accommodation was to stand at the bottom of the steps of incoming aircraft and send home immediately anyone he felt to be unnecessary. In the meantime, the RAF build-up on the Island had reached a significant level, and the Army was also becoming heavily involved, providing support in terms of fuel, accommodation and rations. Urgent action was needed to convert Wideawake from its modest civil role to coping with the sudden demands of operations. Following advice from Major P. M. R. (Peter) Hill, a Sapper on QMG's staff, a field troop of 51 Field Squadron Construction, under Lieutenant M. (Martin) Tucker, was flown out with a detachment of 516 STRE. By the first week in May, he was able to hand over to an RAOC operating team a fully functioning aviation fuel supply system with a capacity of 300,000 gallons per day. The troop was employed on a multitude of other engineering tasks and rapidly became a most valued element of the Support Unit. Materials for all

Engineer work were provided from tri-service sources, with most coming from Engineer Resources at CEP Long Marston and forwarded to Ascension by air.

By mid-April it had been decided to deploy additional land forces in the form of 5 Infantry Brigade. As noted earlier, a Commander Land Forces (CLF, Major General Jeremy Moore) had been appointed and RHQ 36 Engineer Regiment joined his Force Headquarters with the Commanding Officer, Lieutenant Colonel G. W. (Geoff) Field, as CRE. Looking to the future, a CRE (Works), Lieutenant Colonel L. J. (Leslie) Kennedy, with a technical staff from the Military Works Force, was also included to deal with the major engineering works that would be needed once the war was over. 9 Parachute Squadron, commanded by Major C. M. (Chris) Davies, provided Sapper support for 5 Brigade, and a troop from 20 Field Squadron, commanded by Captain D. (David) Foxley, was placed under command of the Squadron to fill the gap left by the earlier deployment of 2 Troop with 2 Para Group. (Foxley's troop became '4 Troop 9 Para Squadron'.) In addition, the balance of 61 Field Support Squadron (OC Major R. C. (Robert, 'Taffy') Morgan), with Stores and Resources specialists, and 36 Engineer Regiment Workshops REME were added to the force. At this stage there had been no British landings on the Falkland Islands, but a good deal of contingency planning had been taking place. This had involved not only HQ EinC, including Director of Engineer Services (DES) and his staff, but also Headquarters Engineer Support, the Military Works Force (MWF) and Central Engineer Park (CEP) Long Marston among others. An extraordinary effort was made to learn as much as possible about the enemy, his weapons and equipment; the in-place resources on the Islands; and the *going* on the difficult terrain, to enhance the briefings given to all Engineer headquarters and units earmarked for possible operations in the South Atlantic. Inevitably, there were regrettable gaps in the information craved by the deploying units – for example, the first definite information they received about the nature of the mines laid by the Argentinians was when these were recovered from the enemy's minefields at great personal risk.

Recce Troop 59 Squadron, under Lieutenant C. (Clive) Livingstone, recovered a large quantity of anti-personnel mines in the aftermath of the Goose Green battle and, on a patrol after the breakout from the beachhead, Lance Corporal Jones (2 Troop 9 Para Squadron) dug up an anti-tank mine from under the noses of the enemy and crawled away with it tucked down his smock. It was only by such means that the true nature and extent of the mine problem began to be learned.

The final elements of the follow-on land forces left Southampton on 12 May on board RMS *Queen Elizabeth 2* (QE2). It was now essential that this force should join the 3 Commando Brigade force as soon as possible, and 5 Brigade was not allowed the luxury of a pause in its journey to reorganise stores and personnel at Ascension Island. It proceeded south with all haste. While the speed with which ships were loaded reflected a laudable effort by all concerned, the somewhat haphazard loading of stores was to cause much frustration later when non-urgent stores had to be unloaded before urgent items could be accessed in ships' holds. This not only caused delays but it also wasted the time of precious movement assets (helicopters and landing craft).

On 2 April, a team from CRE Airfields was training at RAF Wildenrath. Pilots quickly gathered round, asking if F4 Phantoms could land at Stanley airport. However, it was only soon after the leading elements of the Task Force had set sail that the Royal Air Force formally began asking HQ EinC detailed questions about the airfield. Colonel RAF Support in HQ EinC, Colonel B. O. (Bruce) Bown, obtained working drawings for Port Stanley Airport through the, then, Engineer and Railway Staff Corps TA,² one of whose members was senior partner of the firm of consulting engineers that had designed and overseen the building of the airport. It was established that the airport could accept light strike aircraft, such as the Argentinian Pucara, and transport aircraft such as the C130 Hercules. Additional complications arose on 1 May when the runway was damaged by a single crater from an attack by an RAF Vulcan bomber and when various low-level strafing attacks by Harriers resulted in

four other craters and extensive scabbing of the surface. The only practicable way to upgrade the airfield quickly for future use by RAF fast jets, such as Phantoms, and Nimrod Maritime Strike and Reconnaissance Aircraft (MSRA) would be to obtain a quantity of AM2 contingency airfield matting from the United States. After an exchange of high level signals, the US Marine Corps generously expedited the move of the necessary stocks from the west to the east coast of the USA to facilitate ease of transfer to a UK ship. The US could not have been more helpful. Colonel Bown, Major D. I. (David) Reid (OC 527 STRE (Construction) and Major J. R. (Jeremy) Harrison (OC 50 Field Squadron (Construction)) were despatched to Washington. Over a period of several days, they were given extensive briefings by engineers, logisticians and pilots with experience of constructing and operating AM2 airfields. No detail was left uncovered. The final cost exceeded £10 million, but the payment was sanctioned without delay and the whole package was shipped to Marchwood Military Port, where it was divided into two minimum operating strips (MOS) and each loaded into separate ships – the war was still in progress and the possibility of shipping losses could not be ignored.

Meanwhile, the initial elements of the Task Force spent two weeks off Ascension Island carrying out exhaustive repacking and cross-decking of equipment as well as training and rehearsals for the landings. By this time – the middle of May – it was becoming increasingly clear that a military conflict was inevitable and that an amphibious landing, possibly opposed, would be required. The last time British forces had undertaken such an operation (Suez, 1956) many of those present could call upon experience of similar operations from the Second World War. No such personal experience could be called upon this time, and Brigadier Thompson and the Staff of 3 Commando Brigade worked under intense pressure to bring the available landing force to a high state of readiness whilst retaining balance for the plethora of tactical options that had to be considered. OC 59 Squadron was a key member of the Commander's small planning team and was closely involved in the important decisions it made. At the same

time he had to prepare his Squadron for war and ensure that it was configured to provide the best possible Sapper support for the landing force. It was a hectic and demanding time but, as events were to show, both he and his Squadron rose magnificently to the occasion and were not found wanting.

Commanders at all levels in the Task Force at Ascension Island were subjected to a continuous deluge of political and strategic decisions being made in London. Updates and briefings were continuous. This was no less the case with Sappers – for example, Colonel A. (Tony) Mornement, accompanied by Major J. N. (Nick) Hawkins, from HQ EinC, flew to Ascension Island with copies of a bespoke overprinted *going* map of the Falkland Islands to update the Task Force before it sailed south on 30 April. The map, the up-to-date loading plans, the contingency plans for post-conflict works and the welter of other material that they also delivered were to be of inestimable value later. For the moment, though, it was war, and all minds focused on the challenges posed by getting a landing force established ashore with minimal losses of men and ships.

Two other branches of the Corps – Military Survey and Postal and Courier Services – had also been heavily involved in Operation *Corporate* since they were alerted on 1 April. It is appropriate, at this point, to include a summary of their contribution to the campaign.

Survey (see also Chapter 10)

Military Survey was immediately flooded with requests from the initial elements of the Task Force for maps and charts but was only able to respond with limited quantities. Hitherto the South Atlantic had been categorised as an area of lowest priority for maintaining operationally up-to-date mapping. However, a 24-hour operations room was quickly established in the Directorate and the reprinting of existing maps and charts by both 42 Survey Engineer Regiment and the Mapping and Charting Establishment Royal Engineers (MCE RE) at Feltham was started. By 3 April, units were able to collect their initial requirements in full from the Map and Air Chart Depot at Guildford and the War

Reserve Map Store at 42 Survey Engineer Regiment. Unfortunately, the Falkland Islands lay at the junction of a number of map sheets and also of two grid zones. After urgent consultations with Headquarters Commando Forces at Plymouth, on 5 April it was agreed to show both grids with warning notes, thus achieving compatibility between existing sheets and the new products then being issued. In addition, although planning was focused on the Falkland Islands at the time, maps and air charts of South Georgia and the British Antarctic Territories were also supplied. The production of a *going* map of the Falkland Islands has already been mentioned and this proved extremely popular. The first edition was published on 16 April, then a second edition on 26 April, containing even more information, and a further edition, entitled 'RE Briefing Map' was issued on 4 May. Military Survey was also called upon to produce en route and navigation charts for the RAF to and within the South Atlantic, as well as larger-scale air charts for operations over the Falkland Islands. In addition, moving map display filmstrips for Harriers were provided. During the early stages of the operation a Survey Warrant Officer was deployed to Ascension Island to handle and control the issue of the new map sheets to units of the Task Force as they staged through the area. He was withdrawn once the standard 'Wanta-map' system became fully effective. By the conclusion of Operation *Corporate* some 410 different products had been provided by Military Survey and more than 300,000 map sheets had been issued.

Postal and Courier

When alerted on 1 April, RE Postal and Courier Services immediately placed the Spearhead team of 2 Postal and Courier Regiment, comprising one officer (Major I. (Ian) Winfield) and nine other ranks, on standby for possible operations in the South Atlantic. On 17 April three Postal and Courier (PC) operators moved to Ascension Island and established a British Forces Post Office (BFPO) there. HMS *Hermes* was designated the mail coordinator for the initial elements of the Task Force, being responsible for recovering

mail drops in one-ton waterproof containers from the sea and for distributing mail by helicopter to other ships in the group. As more ships arrived at Ascension Island, the volume of mail doubled and then quadrupled, while the PC detachment, as the only distribution unit on Ascension Island, also became responsible for the distribution of maps, newspapers, videotapes and welfare goods for the Task Force. On 11 May a free aerogram service was introduced, and one-and-a-half million forms were issued to the Task Force. Two detachments of 20 PC Squadron were deployed to ships of the Task Force as they moved South from Ascension Island, one for 3 Commando Brigade units on *Canberra* and the other for 5 Infantry Brigade units on *QE2*. A coordinating cell was deployed on HMS *Fearless*, which also dealt with RN ships.

The breadth of the task facing the PC detachment may be appreciated from the geographical spread of its personnel. Quite apart from having cells based on RN ships as described above, once South Georgia had been recaptured a new dimension was added to the task of controlling and distributing mail. Ever flexible, the PC detachment responded by deploying cells to four postal zones. These were: South Georgia, the Temporary Repair and Logistic Area (TRALA – at sea), the Total Exclusion Zone (TEZ – also at sea) and the Island of Tristan da Cunha. Three ships were designated as mail carriers, and these operated shuttle services from Ascension Island to these four zones as well as to the Replenishment Group, in the shipping lane, for transfer by replenishment at sea (RAS) to other ships and the submarines. The seaborne shuttle service operated round trips of about three weeks, which were augmented where possible and appropriate with air-drops from long-range Hercules fitted with the newly devised, air-to-air refuelling facility.

After the ceasefire, the Postal and Courier effort was concentrated in Port Stanley where, because of damage to the runway, aircraft could not land, so mail had to be air-dropped. The first air-drop took place on 16 June, when most of the mail fell into a minefield. It was recovered by Sapper breaching parties – without premature opening! Air-drops were a daily feature until

24 June when the airfield was opened for Hercules aircraft traffic, and from then until 23 August mail was included on both of the twice-daily scheduled aircraft. Owing to foul weather, the latter only managed to land about 40% of the time, so most mail continued to arrive using the ship-based system described above at a rate of about 900–1,000 kilogrammes per day. When the airfield was closed on 14 August for the repairs described elsewhere in this chapter, mail was recovered from the Islands by 'snatch'. This involved a low-flying Hercules snatching up a mail bag from a line rigged between two poles using a grapnel hook trailing from the cargo bay of the aircraft. Once again, necessity proved to be 'the mother of invention'.

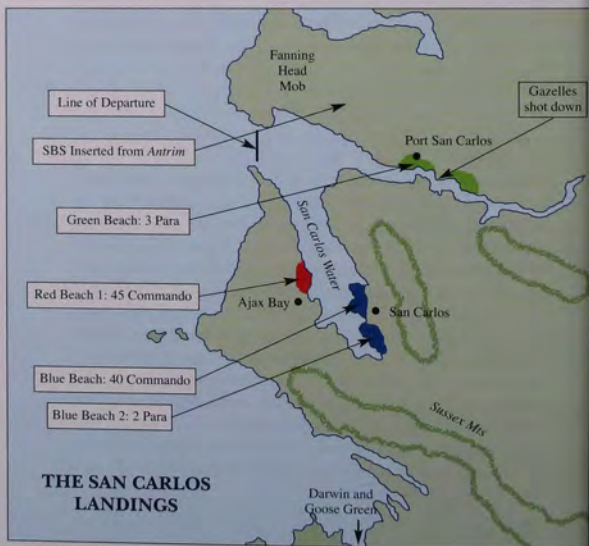
On 15 July, the following signal was received from the Commander of the Task Force, Rear Admiral Woodward, on HMS *Hermes*: 'Very many thanks for a superb service provided under extremely difficult circumstances. I believe that *Corporate* mail was one of the outstanding successes of the campaign. Well done!' No one would have disagreed. The 'Posties' had done a magnificent job.

Operations

The Landing of the Task Force

We return to the situation in early May before the outbreak of hostilities, by which time all elements of the initial Task Force and of the follow-up brigade had left the United Kingdom and were heading for the South Atlantic. At first there was a sense of unreality aboard the ships. It was generally felt that this would be an operation to threaten the Argentinians and that, in the end, with all the pressure from the United Nations and the United States, a truce would be declared and peace talks would take place. This sense of unreality soon gave way to determined pragmatism. Notwithstanding the political discussions and shuttle diplomacy, preparation for war continued apace. Intensive training was vigorously pursued by all units now heading South. Every inch of deck and any internal space on ships was full of men training. Subjects covered by RE units

included weapon handling (weapons were carried at all times), first aid – including the administration of morphine – navigation, air defence, target identification, control of air and artillery fire, survival, escape and evasion, mines and booby traps, all against a background of vigorous physical fitness training and stamina development. In addition, especially for command groups at all levels, there were intensive map studies, TEWTS and detailed planning for a bewildering variety of possible operational contingencies. (TEWTS, or Tactical Exercises Without Troops, were theoretical, map-based studies of likely own and enemy deployments/tasks/operations, etc., principally for commanders at all levels. These were a useful device for reviewing a whole range of tactical options before committing resources to perhaps nugatory deployments. For amusement these sometimes became NEWDS – Night Exercises Without Darkness!)



Command and control of operations raised a number of communication issues, not least of which were those presented to the follow-on units by a last minute replacement of their Larkspur radios for the newer Clansman range. It was yet another laudable initiative to give units taking part the most up-to-date equipment available, but unfamiliarity with the equipment probably exacerbated the poor battlefield communications that were to dog the campaign. An additional complication, certainly for the GLF and unit commanders on *QE2*, was that the communications 'fit' on *QE2* was neither secure nor adequate to allow effective contact with either the Task Force main body or with Northwood. Most information on developments in both the Political and Operational situations was only received via the BBC World Service broadcasts. This was not a happy situation for those who were now frenetically preparing for an increasingly inevitable land war.

On 2 May the Argentinian cruiser *General Belgrano* was sunk by the nuclear submarine *HMS Conqueror*. This was followed two days later by the destruction of *HMS Sheffield* by an Exocet missile fired from an Argentinian navy Super Étendard. These actions reinforced the sense of purpose felt by all heading south, for whom it demonstrated the British Government's determination to confront the Argentinian forces and to defeat them in combat.

Planning for the landings continued in earnest on board *HMS Fearless*. To provide information about possible landing beaches, reconnaissance parties of the Special Boat Service (SBS) and Special Air Service (SAS) were dropped by helicopter at preselected locations on the Falkland Islands from 1 May. The outcome of one such patrol was the SAS raid on Pebble Island, on the north coast of West Falkland, on 15 May, when a number of Argentinian Pucara ground-attack aircraft were destroyed. Quite apart from destroying aircraft that without doubt would have threatened the success of the coming landings, this successful raid provided a morale-boosting curtain-raiser for the whole Task Force.

The main landings started at dawn on 21 May in the San Carlos area. The site, on the opposite side of East Falkland from



Air attack, San Carlos Water ('Bomb Alley').

Port Stanley, had been selected some ten days earlier after careful consideration. It was generally free of Argentinian occupation and offered a deep anchorage. The surrounding hills offered protection from land attack (once the Commandos and Paras dominated them), and it was hoped they would offer some protection from air attack. Events were to show that the hills did not prevent air attack and, if anything, they hindered our use of anti-air weapons. The first wave, consisting of 40 Commando, supported by 2 Troop of 59 Squadron (Captain A. (Adrian) Hicks), and 2 Para, landed at *Blue Beaches One* and *Two* respectively at San Carlos settlement at 0715 Zulu (0315 Local)³ – three hours before first light. 2 Para immediately headed for their objective on Sussex Mountains to the south of the beachhead. The second wave, consisting of 3 Para, supported by 2 Troop of 9 Parachute Squadron (Captain D. R. (Robbie) Burns), landed on *Green Beach* at Port San Carlos, while 45 Commando, supported by Condor Troop of 59 Squadron (Captain J. (Jeff) Dunstone,) landed on *Red Beach* at Ajax Bay. The afloat reserve provided by 42 Commando in *Canberra* was landed later on D-Day. The only opposition at the beachhead consisted of an Argentinian rifle company, half of which was deployed on Fanning Head; this was removed by an SBS force supported by naval gunfire before the main landings took place. The

remainder of the enemy company, positioned in Port San Carlos, wisely withdrew to the east rather than engage 3 Para. Recce Troop 59 Squadron (Lieutenant C. Livingstone) was held in reserve on *Sir Lancelot* for possible operations with the SBS. As will be seen, this troop later caught up with 2 Para to provide the battalion with close support for its subsequent operation at Darwin and Goose Green. Major Macdonald wrote:

We quickly came to realise that one of the most vital pieces of equipment was the CET. It was tremendous in this role and worked flat out from the moment it hit the beach with the leading elements. I also felt a lot happier with it working under air attack than the Medium Wheeled Tractor ... There was a high velocity bullet strike on the side of the CET which testified to the value of an armoured tractor. Its amphibious capability was also put to good use and the Bovington crews were well up to the high standard that we all expect from the Armoured Engineers.⁴

Once the landings had taken place, San Carlos Water (soon to be dubbed 'Bomb Alley') became the focus of attacks by the Argentinian Air Force with waves of aircraft coming in very low against fierce anti-aircraft fire from missiles and guns. It was here that three machine-gun teams of 11 Field Squadron were credited with destroying a low-flying Mirage from the deck of the LSL *Sir*



The ubiquitous CET, San Carlos.

Bedivere. During the journey south the Squadron's Sergeant Major (Warrant Officer Class 2 'Chip' Wood) had made use of the ship's workshop to improvise four twin and two single anti-aircraft mounts for their LMGs, which were then fixed at key locations around the upper part of the vessel under his direction. 'Splashing' this particular *Mirage* was but one example of Sapper ingenuity and courage being exhibited all around the beachhead.

The fact that the aircraft came in so low turned out to be beneficial to the British ships as many of the bomb fuzes failed to arm, and a number of ships that would otherwise have been sunk were left with unexploded bombs on board. Two RE Bomb Disposal specialists from 33 Engineer Regiment EOD had been included in the Task Force. It was initially thought that they would disarm any unexploded bombs that might have fallen on Port Stanley Airport, once this had been recovered. Now these men, Warrant Officer Class 2 J. H. (John) Phillips and Staff Sergeant J. (Jim) Prescott, took on the vital task of disarming unexploded bombs on British ships. They disarmed bombs on board HMS *Argonaut* on 22 May. Next day, while they were tackling two more on board HMS *Antelope*, one exploded, killing Staff Sergeant Prescott and severely wounding WO 2 Phillips. The value placed on their work by the Royal Navy can be



Getting fuel ashore, Port San Carlos.

appreciated by the fact that Prescott was posthumously awarded the Conspicuous Gallantry Medal (CGM), a very rare Naval decoration instituted in 1855 and considered to rank just below the Victoria Cross in order of merit. This was the first time the CGM had been awarded to any non-Royal Navy individual. WO2 Phillips was awarded the Distinguished Service Cross, a highly-regarded Naval award for officers and warrant officers for acts of gallantry in the face of the enemy.

Once ashore, 59 Squadron was soon hard at work, improving the landing beaches and their exits, setting up water points on each beach, digging in command posts using the Combat Engineer Tractors, checking buildings for mines and booby-traps, carrying out area clearance and taking part in patrolling with the Infantry. (Lance Corporal Hare of 2 Troop 9 Squadron was seriously wounded in one such patrol with 3 Para.) The Squadron responded magnificently to the bewildering number of demands upon its manpower and resources. One particularly vital task was constructing the fuel pipeline (from 80,000 gallon Towed Flexible Barges (TFB), or Dracones, anchored offshore) to the fuel distribution point that the Squadron established above *Green Beach* using the unfamiliar (to them) Emergency Fuel Handling Equipment (EFHE). The diving team, led by Corporal Speak, laid moorings for the Dracones while 1 Troop (Lieutenant R. (Bob) Hendicott) laid out the flexible and Victaulic pipes, erected the pumps and prepared protective bunds to accept the 30,000 gallon pillow fuel storage tanks. All this was against a backdrop of enemy attack, soggy ground conditions and the logistic chaos induced by the difficulty of controlling the overstretched amphibious lift assets available. The latter was to be a problem throughout the campaign and led to a good deal of frustration within the anchorage as units competed for these assets to unload their essential supplies and personnel. For Sapper operations, this situation was eased a little once the Squadron's own Combat Support Boats (CSB) and assault boats had been unloaded from where they had been buried in ships' holds. The Commando Sappers of 59 Squadron have a reputation for grit, determination and endurance underpinned



Unloading stores, Blue Beach, San Carlos.

by unassailable good humour; they needed to dig deep into these qualities, but they triumphed. Their reputation, and that of the Corps as a whole, was further enhanced during those difficult days immediately after the landing.

For about a week after the landing the San Carlos anchorage was subjected to continuous air attack during daylight hours. This constantly disrupted the unloading of ships and forced many a change of plan on the part of commanders at all levels. Major Macdonald wrote:

On 24 May *Sir Lancelot*, my floating echelon and Recce Troop base for SBS ops, was hit by two 1,000lb bombs, one of which ended up in the Military office next to the Chief Clerk. Neither bomb exploded but, after *Antelope's* experience, everyone was ordered to abandon ship, which they did with their personal weapons and only what they were carrying at the time. I had lost my Squadron G1098 and most of my combat stores at a stroke.⁵

Unaware that *Sir Lancelot* had been evacuated, OC 59 arrived by helicopter planning to visit his echelon – then found himself completely alone on the ship for two anxious hours before his helicopter returned to collect him.

It took until 26 May to re-establish 59 Squadron echelon ashore, when it was co-located with 11 Squadron both to supply its own needs and to fill the void created for 11 Squadron by its equipment losses on *Atlantic Conveyor* the previous day. The unfolding actuality of life in the beachhead is further vividly portrayed in the following description by Captain S. (Steve) Shergold, Support Troop Commander, 59 Commando Squadron:

59 Sqn's Echelon had established a headquarters on *Sir Lancelot's* bridge with radios covering the Brigade, Squadron and the Air Defence nets. All the indicators were that we should expect aircraft imminently from the West, so when 3 Skyhawks came in from the East, the ship's guns and Blowpipe air defences were eagerly pointing the wrong way. Capt Dave Edmonds, the Sqn QM, came in from the starboard bridge wing and declared we had at least one bomb on board. When asked how he could be sure, he pointed to the bomb-sized hole in the side. Below decks the bomb had passed directly under the sleeping Lieutenant Kendal Carpenter RM, shattering the fire hydrant system and ended up four feet behind the Chief Clerk. Water was pouring across the decks and live electric cables dangling in the water were electrocuting the stand-by fire crews who had been trained to support the ship's predominantly Chinese crew. The ship's Chief Engineer had no choice but to shut down most of the electrics, turning the ship into a hulk waiting for the bomb to go off and no means of dealing with it if it had. We called the landing craft on their net and five minutes later had one on either side taking off embarked troops to port and ship's crew to starboard. One night on Red Beach with the Hospital was enough to establish that there was no room for an Engineer echelon and no way of supporting anyone from there. We hitched a ride out to RFA *Sir Tristram* along with a large pile of anything useful we had managed to grab on the way out of *Sir Lancelot*. This appeared to give us more flexibility; however at about 2100hrs we learnt that *Sir Tristram* was being ordered to sea to join the main fleet to the East of the Islands. No amount of pleading with the Captain to be given time to get off would sway his enthusiasm for getting underway. As the anchor was coming up we managed to call up a Mexifloat[®] to the stern doors. We just managed to off-load our pile of stores and all our people before the ship sailed away, leaving us perched on an open raft in the middle of San Carlos Water. We moved to Green Beach to join up with 1 Troop and, eventually, 11 Squadron, spread between the

beach and the EFHE site, and over the following week managed to recover a great deal of the Squadron's stores from *Sir Lancelot* as and when we could persuade landing craft crew to help us.⁷

The Amphibious Task Group Commander's top priority for the Sappers was the construction of a forward operating base (FOB) for Harriers so that aircraft could be put ashore each day at dawn while the carriers withdrew to the east, out of range of shore-based enemy aircraft. The reconnaissance was carried out by OC 59 Squadron on D-Day plus one, and the site he selected was based upon the landing strip used by the Islander aircraft of the Falkland Islands Government Air Service (FIGAS), just outside of the Port San Carlos settlement, above *Green Beach*.

11 Squadron was tasked with the construction of the FOB and had landed on 24 May ready to receive the full package of Harrier FOB stores and the Squadron's G1098 stores and vehicles from *Atlantic Conveyor* on 26 May. However, in a concerted attack by the Argentinian Air Force against the largest ships in the fleet on 25 May, she was struck by an Exocet missile and sank. This was a very serious blow to the whole operation, as *Atlantic Conveyor* had been carrying four Chinook (heavy lift) and six Wessex Mark V helicopters. Only one Chinook survived. This



The Commando Logistics Dump and Field Hospital, Ajax Bay.

considerably reduced the Task Force's available lift capacity and was to have a significant effect upon subsequent operations. Also on the ship was a considerable quantity of Engineer stores and equipment. Apart from the main Harrier FOB stores and EFHE equipment, the ship was carrying a large amount of trackway, tents sufficient for 10,000 men, 40 lighting kits and ten 27.5 kVA generators, assorted tractors and engineer construction plant, combat support boats, water supply equipment and construction materials. Her loss was to cause major problems for the accommodation of the Force and, inevitably, necessitate additional commitments for Sappers when the war finished.

From the Sapper viewpoint, the situation caused by the loss of *Atlantic Conveyor* could hardly have been worse. For OC 11 Squadron it bordered on catastrophic, given his most important task – the construction of the FOB. His men had their individual weapons and the personal kit with which they had landed, but all the Squadron's tools, equipment, plant and vehicles had been loaded, separately from them, on a ship that no longer existed. However, this was not a time for despair. As described earlier, some aircraft support stores (including matting and EFHE) had been loaded on the *MV Stromness*. When loaded, the intention for these stores had been to provide 59 Squadron with a bomb-damage repair capability at Port Stanley Airport and for the construction of short-take-off and vertical landing (STOVL) pads once this airport has been recaptured. However, with *Atlantic Conveyor* gone, these stores were available, they were needed urgently, and so they were pressed into service. They were brought ashore at *Green Beach* and hauled to the site by 2 Troop 9 Parachute Squadron using local civilian tractors and trailers. Then, in the most arduous of conditions, 11 Squadron worked non-stop to prepare a hastily-redesigned FOB. Unfortunately, no sooner had the strip been laid than it was overturned by the downdraught of a helicopter. It had to be lifted and re-laid. Helicopters landing for refuelling caused this to happen a number of times. Each time, in the absence of repair panels, 11 Squadron had to strip back to the damaged area and re-lay the runway: a heroic, but unsung, performance given the severe



Harrier FOB, Port San Carlos.

conditions of low temperature, wind, rain and mud prevailing at the time. Despite everything, the FOB was completed on 28 May and, after essential inspection and proving by the RAF, it was opened for Harrier operations on 3 June. Each morning until the end of hostilities two GR3 Harriers and two Sea Harriers came ashore from the carrier battle group at first light and operated from the FOB throughout the day. Being shore-based gave the aircraft greatly improved response times and endurance, and the FOB was of great significance in winning the air battle. In addition to refuelling the shore-based Harriers, the co-located EFHE also dealt with innumerable helicopters and at times was delivering more than 40,000 gallons of AVCAT each day. It was an RAOC responsibility to man EFHE installations once they had been constructed, but there was only one team available in 3 Commando Brigade. This team based itself at Port San Carlos and readily substituted for the RAF's Tactical Supply Wing team, whose job it was to refuel Harriers but which did not arrive. At Port San Carlos and at the other EFHE sites (for example at *Blue Beach* and later at Fitzroy) Sappers happily volunteered assistance and, in fact, members of 11 Squadron manned all of the EFHE facilities constructed throughout the campaign.

Of course, completion of the FOB did not mean the end of the 11 Squadron's difficulties. On 8 June a Harrier crash-landed

on the strip. This caused a major problem, since aircraft coming in to refuel then had to land on ships that were not designed to take them. The repair of the runway took three and a half hours and used every single man available, including cooks and administrative staff. (The Harrier pilot, Wing Commander P. Squire, was unhurt and undeterred; some years later he was to become Chief of the Air Staff!)

Throughout the week of consolidation ashore the Argentinian Air Force attacked relentlessly. During most days low-flying aircraft concentrated upon bombing and strafing the ships in the San Carlos Water anchorage. Then, in a change of tactics on 27 May, a surprise attack by four Skyhawks was aimed at units ashore. One of the targets was HQ 3 Commando Brigade, but the bombs fell short. Sadly, Sapper Gandhi of 59 Squadron and Marine McAndrews were killed by one of these bombs, and three sappers of 2 Troop 59 Squadron were wounded.

The Breakout

The build-up within the landing beach area had continued with all speed, and by 27 May, six days after the landings had taken place, it was considered time to move out and confront the



Battlefield burial, Sapper Gandhi, San Carlos.

Argentinian forces. The reinforcing brigade (5 Infantry Brigade) with the Force Headquarters and supporting troops was due to land in a few days' time, and this would cause great congestion if the leading elements had not left by then. These considerations, with pressure from London, caused Commander 3 Commando Brigade to issue orders for the breakout. Unfortunately, the loss of three out of the four Chinook and all six Wessex helicopters on *Atlantic Conveyor* forced a fundamental reappraisal of his plans for this and led to the majority of his troops moving on foot and carrying very heavy loads, particularly the Sappers, who each carried items of tools, stores and explosives. This method of movement while carrying heavy loads was known to the Royal Marines as 'Yomping', and the term caught the public imagination in the United Kingdom.

For the breakout from the beachhead the initial affiliations of the Sappers and their tactical objectives were as shown in the table.

The Breakout: RE Affiliations

3 PARA	Teal Inlet	2 Troop 9 Parachute Squadron
42 Commando	Mount Kent	2 Troop 59 Independent Commando Squadron
45 Commando	Douglas Settlement	Condor Troop 59 Independent Commando Squadron
2 PARA	Darwin and Goose Green	Reconnaissance Troop 59 Independent Commando Squadron

The Darwin/Goose Green operation, which turned out to involve the only daylight assaults on defended enemy positions, was also the most dramatic and costly in casualties of the whole land campaign. Recce Troop, 59 Squadron, grouped a four-man section commanded by an officer or senior NCO with each of the companies of 2 Para. Lieutenant C. (Clive) Livingstone recalled:

On 26 May the troop deployed by helicopter to 2 Para's assembly area in the Sussex Mountains. Many Sappers deployed with

borrowed equipment, as much was still on board the bombed *Sir Lancelot* and half the troop had been up all the previous night off-loading shipping. We arrived just in time to move out at 2045hrs to the planned laying up point (LUP) near Camilla House. The distance was 17 kilometres over boggy, rocky ground with many water obstacles. We arrived, exhausted, at about 0700hrs on 27 May and established a defensive position. During the day we were forced to move a couple of times to avoid detection by the enemy. Each time we dug in furiously and camouflaged against the air threat ... all the time we were trying to avoid the by now uncomfortable rate of indirect enemy fire about us. Rain began to pour down, adding to our discomfort.⁸

The role of the Recce Troop section with each infantry company was to clear any mines and other hazards encountered and to fight as infantry when opportunities presented themselves throughout the operation. The attack to capture the small settlement of Darwin and the airfield and larger settlement at Goose Green began before dawn on 28 May. Lieutenant Livingstone continued:

As the companies moved over the high ground above Darwin and began the descent into the Goose Green plain a terrifying combination of artillery, mortar, machine gun and anti-aircraft airburst (in the ground role) fire was directed onto the advancing troops. Little or no cover was available and it was hard to believe that this weight of fire could be maintained for long, but it was. Incurring casualties, but not as many as one would have expected, the companies attempted to extricate their wounded and manoeuvre into an area affording some protection. About this time, (just before last light) 13D⁹ I and 13B had a fortunate escape from mass injury. During one of several Pucara attacks that afternoon rocket fire narrowly missed 13D then again napalm was dropped very close to them. 13B involved in massed small arms air defence measures were all drenched with aviation fuel by a stricken Pucara which crashed 30 metres behind them, but luckily the fuel did not ignite. 13C had Sapper Plant shaking for some time after a round passed through his combat smock somehow failing to wound him. Two Pucara aircraft were shot down by small arms fire.

13D actually wandered into another minefield, using holes which they took as shell holes to shelter in for the night. These holes were in fact caused by detonated anti-personnel mines set

off by cows. Realisation came at daybreak on 29th when trip wires were found and many lucky escapes observed. Little progress had been made by last light on the 28th. Enemy progress had been greatly suppressed by late Harrier strikes and the deployment of Milan ATGWs against strong points and buildings proved very effective. That night fortunately saw little more action as men were exhausted. Some Sappers had not slept for three nights. The next day (29 May) an ultimatum was issued through prisoners under a white flag to the Argentinian commander. The surrender to 2 Para came at about 1330 hours. Meanwhile, 13A and 13C were joined on A Company position by our OC, Major Macdonald, and QMSI Ellis. This helped to bring events back into proportion and the OC led us into to Darwin where we started clearing the settlement ... using hand grenades where necessary and we took a few prisoners.¹⁰

Regrettably, Corporal M. Melia of Recce Troop was killed by machine-gun fire early in the operation when closing with the enemy. Unbowed, the troop's men performed outstandingly in the grim, bloody, close-quarter slogging match that characterised each company's advance in this first and most convincing victory of the campaign. As 2 Para occupied Goose Green, Recce Troop's men immediately began to clear mines and other obstacles. In doing so they provided the first hard intelligence on the Argentinian mines, which were to cause so many problems later, both during the remaining land forces' attacks and for some years after the ceasefire. Lieutenant Livingstone again:

13D were the first Sappers into Goose Green followed by 13B. Without further orders SSgt Collins began to extract from the many prisoners those he required to give him information on mines in the area; this was carried out amidst considerable confusion. By the time the OC and QMSI Ellis arrived in Goose Green 13D and 13B were already picking up the minefields.¹¹

The Arrival of 5 Infantry Brigade

With deployment of 3 Commando Brigade's principal units away from the beachhead, the way was now clear for 5 Infantry Brigade, with the Force Headquarters and supporting Troops, to land at San Carlos. Some 200 miles before *QE2* reached South

Georgia, the CLF, the Commander 5 Brigade (Brigadier M. A. (Tony) Wilson) and key members of their staffs, including the CRE (Lieutenant Colonel G. W. (Geoff) Field) and OC 9 Parachute Squadron (Major C. M. (Chris) Davies) transferred to the already battle-scarred HMS *Antrim* for a fast run in to San Carlos Water ahead of the main force in order to catch up with the rapidly developing situation on land. Shortly before reaching the Falklands they were transferred to HMS *Fearless*, which became the command ship for the operation, and they entered San Carlos Water in the early hours of 30 May. Major General Moore (CLF) then assumed command of all land forces, and the CRE assumed command of all Sappers except the Postal and Courier detachments, which continued to act independently.

The CLF's concept of operations was to permit 3 Commando Brigade to continue developing its advance towards Port Stanley from the north. 5 Infantry Brigade, once established ashore, would approach from the south, through Fitzroy and Bluff Cove, eventually linking up with 3 Commando Brigade in the area south of Mount Challenger. 2 Para, having suffered significant losses in the battle for Goose Green, including the death of their CO (Lieutenant Colonel H. Jones, later awarded a posthumous Victoria Cross), was to revert to under command 5 Infantry Brigade.

Initially, the CRE's concept of operations envisaged 9 Squadron (at full strength since the pre-embarkation addition of Captain Foxley's troop from 20 Squadron) in support and under command for movement of 5 Infantry Brigade, while leaving 59 Commando Squadron (retaining the reinforcement of 2 Troop 9 Para Squadron) in support of 3 Commando Brigade. RHQ 36 Engineer Regiment, 11 Squadron, 61 Field Support Squadron and the Regimental Workshops REME would be designated as Force troops. HQRE was to remain embarked on *Fearless* with the CRE exercising command through RHQ 36 Engineer Regiment, established ashore. In the event, CLF allowed the brigades to operate independently within his broad directive, and this meant that the RE squadrons had, effectively, to be placed under command of their respective brigades. In any case, com-

munications problems meant that the CRE would have found it difficult to command the squadrons. The Force Troops, including the small CRE (Works) element (under Lieutenant Colonel L. J. Kennedy) remained grouped ashore close to *Blue Beach* (San Carlos) under the CRE's command. To provide context for the Royal Engineer command and control arrangements, it is appropriate, at this point, to explain how these evolved as operations progressed.

Royal Engineer Command and Control

It has to be admitted that the RE command and control arrangements for the expanded land force proved to be less than ideal as the campaign developed. Indeed, they were not satisfactorily resolved until after the end of hostilities when Major General D. (David) Thorne arrived as the first peacetime CLF together with his CRE, Colonel D. (Derek) Brownson.

In peacetime 36 Engineer Regiment was part of 5 Infantry Brigade, having assumed this role only in January 1982 as a substitute for 22 Engineer Regiment. When the decision was made to deploy 5 Brigade, an ad hoc Engineer force structure was conceived. 11 Field Squadron and 59 Independent Commando Squadron, which by then had already deployed, would come under command of 36 Regiment when the latter arrived in theatre. RHQ 36 Regiment, 9 Parachute Squadron, 61 Field Support Squadron and the REME Workshop deployed as part of the Regiment. Other RE elements, for example, the Military Works Force, would be answerable to the CO of 36 Regiment, though it is probable that in the haste which accompanied all aspects of this deployment this was never formally promulgated. Despite the latter, in practice, all RE units and personnel in theatre deferred to Lieutenant Colonel Field as their de facto overall Royal Engineer commander.

Because Lieutenant Colonel Field had previously served in Commando Forces (as OC 59 Squadron) it was agreed, between the Engineer-in-Chief (Major General G. B. (Gus) Sinclair) and Major General Jeremy Moore, that he, Field, should act as CRE, whilst remaining in command of his Regiment. This had as much

to do with the fact that Moore and Field had previously served together in 3 Commando Brigade as it did with any perceived economy of manpower saving. This arrangement did not work well in practice. Field remained with the CLF throughout the campaign, either embarked in HMS *Fearless* or, later, in the Tac HQ ashore at Fitzroy. Communications were tenuous, especially when embarked, and personal liaison was severely restricted by the practical difficulties of ship movements and helicopter availability. HQRE consisted of the CRE (Field) and one RE Staff officer, Major R. I. (Robbie) Reive. This was barely adequate when the CRE was embarked but woefully inadequate when he deployed ashore. The disparity in rank between the CRE and the principal CLF staff officers also, on occasions, led to Sapper requirements not being given adequate priority. Had there been a need for a concentration of Sapper resources to meet higher-tempo or large-scale engineer operations during the campaign, it is almost certain that such difficulties would have been significant. In the event, the two 'front line' squadrons, 9 and 59, remained in effect under command of their respective brigades, and both squadron commanders made this arrangement work well, despite the predilection of Operations Staffs for considering only the needs of Infantry battalions/RM Commandos and Artillery batteries when the allocation of movement assets and resupply resources were made. The de facto delegation of the command of 36 Regiment to the second-in-command, Major P. (Peter) Heier also worked well because, once again, all involved were concerned to make it work. This said, the importance of having a suitable manning structure, with effective means of communication and control, was an important RE Command lesson that was learned for subsequent operations.

The Development of Operations after the Arrival of 5 Infantry Brigade

The main body of 5 Infantry Brigade and Force Troops arrived in San Carlos Water before dawn on 2 June, and the transfer of troops ashore, via the San Carlos settlement jetty and *Blue Beach*, began without delay. (The Force HQ did not disembark. It

remained on HMS *Fearless* throughout, except for the Commander's Tactical HQ, which deployed to Fitzroy on 9 June.) The landing craft and helicopters, which had been employed exclusively by 3 Commando Brigade for its unloading, now had to be shared between the two brigades. This shortage of lift capacity was to expose immense difficulties as a result of the brigades' conflicting priorities. Such problems were exacerbated by the difficulty in locating urgent stores and vehicles in ships that had been loaded in haste in the United Kingdom and, subsequently, there being no opportunity to identify or 'cross deck' stores during the voyage. There were countless instances of essential items having been loaded behind other, less-essential freight, which then had to be offloaded first to allow access to urgently required vehicles, equipment and stores. This in turn led to delay, to a good deal of frustration and to a wholesale waste of precious movement assets. It was one regrettable aspect of the whole operation, but it provided valuable lessons for the future. The OC 61 Field Support Squadron, Major R. C. (Robert) Morgan, recalled:

Eight support helicopters had to spend a whole day offloading dannert wire to the BMA, simply to gain access to the urgently-needed rations which lay buried below ... When 9 Parachute Squadron asked for explosives for their work in clearing mines I recall a hectic hitch-hike around the fleet, getting fuze from one ship, PE from another, primers from a third and being told to get No. 33 detonators from the Commando Logistic unit across the bay. That was where I met their ammunition storeman (he was actually a butcher by trade!). He confirmed they did have No. 33 detonators. When I inspected them they were made of brass, about six inches in diameter and designed to go on the end of a torpedo! I spent another day at sea finding the proper ones.¹²

The insertion of 5 Infantry Brigade into the beachhead inevitably led to competition for space. The rain and low cloud mercifully lessened the risk of air attack while the Brigade sorted itself out, but the mud and heavy personal loads meant that all movement was at a frustratingly slow pace. The Welsh Guards moved south to occupy the Sussex Mountains position overlooking the

anchorage recently vacated by 2 Para; the Scots Guards and the Gurkhas relieved an overstretched 40 Commando who had been defending the beachhead since the other units of 3 Commando Brigade had departed on 27 May. The Sappers dug in then went to work. 9 Squadron took over the running of some of the water-supply points erected by 59 Squadron the previous week, repaired tracks that were becoming quagmires and laid trackway to improve beach exits that were becoming impassable. 61 Squadron established the RE echelon and wrestled with the immensely frustrating unloading of ships. Major Morgan wrote:

The Squadron immediately set to, digging slit trenches and erecting overhead cover where they were to spend the next two weeks: a period during which each member was to experience fully the fog and confusion of war. Information was sparse, advance warning of requirements a rarity and communications extremely difficult. Following the loss of all but one of the Chinooks on *Atlantic Conveyor*, helicopter lift capacity was extremely limited and any pre-conceived concept of offloading ships had to be abandoned. When engineer stores were required ashore LCU/LYP resources were allocated strictly on an overall priority basis. This frequently led to frustration for the troops on the ground. Matters eased after a few days in San Carlos when the Squadron managed to offload a couple of Combat Support Boats. These provided an independent Sapper means of communication around San Carlos Water and, also, a small stores carrying capability.¹³

In the crowded bridgehead, troops not yet required for operations sought to survive the worsening weather conditions, and frequent 'Air Raid Warning Red' alerts with characteristic phlegm, ingenuity and good humour. Major S. A. (Sam) Brown, of CRE Works, recalled:

Even with parka jackets the cold at night literally set our teeth chattering. Our GE, Major Harry Caulfield, and I went to see 9 Squadron's QM, in barns at the bottom of our field. There he had brand new, boxed kerosene heaters stacked to the roof. 'They're no good to you,' he said, 'we've got no fuel for them.' 'If we can get some fuel, can we have some heaters?' we replied. 'Of course,' was the answer, so we went off to see the Fleet Air Arm. 'Are you cold

at night in your tents?' we asked. 'Not half,' they said. 'If we get you some heaters will you give us some kerosene?' we ventured. (They were surrounded with 200 litre drums of aviation fuel.) Deal done! We, who had started out with no heaters or fuel, ended up with adequate supplies of both!¹⁴

The Final Phase

Meanwhile, the momentum of the advance towards Port Stanley was gathering pace. 3 Para now occupied Teal Inlet, 42 Commando was on Mount Kent, 45 Commando occupied Douglas settlement and, in an audacious move by helicopter, 2 Para had leaped forward on the southern flank from Goose Green to Fitzroy and Bluff Cove. 1/7 Gurkha Rifles replaced 2 Para at Goose Green, and a troop of 11 Squadron deployed there on 3 June to continue the task of clearing mines and booby-traps in the village and of marking minefields that had been identified from information supplied by Argentinian prisoners. As Major Hawken pithily commented, 'This was a hairy task – started by Recce Troop 59 but quickly handed on. Goose Green was a mess at the time.'¹⁵

On the only track between Fitzroy and Bluff Cove, a timber bridge, about 150 metres in length, crossed the windswept, cold, black water of the western neck of Port Fitzroy inlet. The



The Fitzroy Bridge after repair by 1 Troop 9 Para Squadron.

retreating Argentinian forces demolished one pier and created a gap of some 22 metres at the Bluff Cove end. They also laid mines in the rubble of the landing pier and approaches. The OC 9 Parachute Squadron was the first Sapper to arrive at the demolition (2 June), and he personally cleared the mines, booby-traps and remaining firing circuits from the wreckage. The following day, using an ad hoc party of his own three signallers, some Assault Pioneers from 2 Para and local men, he constructed a temporary footbridge across the gap using tools and timber from civilian resources at Fitzroy. It was a vital link on the route forward to Bluff Cove, and a company from 1/7 GR were grateful for it shortly afterwards. Swimming the gap was not an option, and the alternative was a 20-kilometre detour around the head of the creek. A few days later (6 June) 1 Troop 9 Squadron, under Captain R. (Richard) Willett, was brought forward from San Carlos to Fitzroy on *Sir Tristram* and then transferred to site by a landing craft co-opted by Willett in the harbour. (Formal tasking of these craft had all but broken down at this time, and coxswains were prepared to respond to the most convincing direct requests.) The bridge was repaired over the following two days using locally acquired timber and RSJs scavenged from a ship in San Carlos after a personal, exhaustive search by OC 61 Squadron, Major Morgan.¹⁶ Despite appalling weather, and the deck being some five metres above the water, the troop replaced the demolished pier with a wooden trestle, welded the RSJs together in situ to make the required road-bearer length and cantilever-launched this across the gap using a derrick and tackle system that Alexander the Great might have recognised. It was a remarkable feat of improvised bridging under the most arduous conditions.

On the nights of 5, 6 and 7 June, 5 Infantry Brigade moved up to Fitzroy and Bluff Cove on the LSLs *Sir Galahad* and *Sir Tristram*. Although the air threat appeared to have diminished markedly, a tragedy occurred when, on the final day of the move (8 June), both LSLs were attacked by Argentinian Skyhawk and Mirage aircraft. Both ships were set ablaze and those on board resorted to the ships' boats to escape to the shore a few hundred



Sir Galahad ablaze, Fitzroy.

metres away. As it happened, the command post of 9 Squadron was established on the high ground of Fitzroy settlement, adjacent to the previously-designated Helicopter Landing Site (HLS). It was also close to the settlement's Community Centre, which had already been requisitioned by 2 Para as their Medical Reception Station (MRS). Some helicopters, already operating in the area, switched immediately to the dangerous task of casualty evacuation from the burning decks. These casualties were dumped, unceremoniously, on to the HLS where OC 9 Squadron immediately improvised a casualty handling system, using men of the Squadron's HQ and Support element who, fortuitously, had arrived the day before. Major Davies wrote:

The first man we took off the helicopter was Chinese. He was crying with pain and his burned flesh hung off him. I assumed the bomb must have hit the galley. Then another helicopter appeared with more suffering crewmen. The third helicopter brought

blackened and singed men in Army uniforms ... I lost count of the men we took from the helicopters to the medical centre, which rapidly filled to overflowing. We had to take screaming, bleeding, badly-burned men off stretchers and put them on the floor to free stretchers for yet more wounded. The sights, the sounds and the smell of burning flesh were horrific. Thankfully the brain can delay the realisation of such horror and we ran with our smouldering burdens, doused them with water and fitted them with intravenous drips with a vague oblivion ...¹⁷

Fifty-one men were killed including Corporal A. G. (Andrew) McIlvenny and Sapper W. D. (Wayne) Tarbard of 4 Troop 9 Squadron (the attached Troop from 20 Squadron.) A further eight other members of the Troop were wounded.¹⁸ The grim task of dealing with the casualties, then despatching them by helicopter back to the temporary Field Hospital, established at *Red Beach*, went on until nightfall, interrupted only by a further low-level bombing raid, which provided a welcome opportunity for hitting back. At least one aircraft was hit by the weight of small arms fire that the four attackers met over the Fitzroy inlet, and a good deal of this fire was from Sappers – some small compensation for the overall tragedy of the day. After the conflict *Sir Galahad* was towed out to sea and sunk as a war grave. *Sir Tristram* was eventually returned to the United Kingdom and repaired.

Meanwhile, the war could not be stopped for such set-backs, and the Force became imbued with a renewed determination to end it as quickly as possible. Apart from anything inflicted by the enemy, it was winter in South Atlantic, and the weather demanded as rapid a conclusion as possible before it began to take its own toll.

Now that 5 Infantry Brigade was forward the scene was set for the final assault on the remaining Argentinian forces in and around Port Stanley. 3 Commando Brigade was ready to strike first, and it had already carried out extensive patrolling in the area of Two Sisters, Mount Harriet and Mount Longdon, with Sappers playing a key role identifying unmarked minefields and breaching lanes through them. This was undoubtedly the most important RE task in the final phase of the conflict, most of those

involved being junior NCOs and Sappers. Sergeant S. Halkett, of Condor Troop 59 Squadron, wrote:

I was warned off to be ready to move at last light. The patrol consisted of an officer and men of recce troop 45 Commando plus me, Corporal Fairbairn, Sapper Jones and Sapper Dallas. We were to move forward to Two Sisters, approximately 10 kilometres away, and find out the enemy strength and positions and bring back any news on minefields in the area ... after about three and a half hours we reached a small feature just north of Murrel bridge ... we could see Two Sisters plainly ... we moved off up the track; once again the REs were to lead with Recce Troop a respectful distance behind ... the going was extremely difficult, our feet were continuously submerged ... we came across a single low strand of wire: it was an enemy minefield. Recce Troop went firm while Cpl Fairburn and I tried to establish the size of the minefield. As we were doing this we saw fires burning on the lower slopes of the hill 200–300 metres away. These were quite plainly the enemy. However, my job went on. We traced the wire to the end. We then went into the minefield to try to find out the density and type of mines, using our bayonets as prodders ... Recce Troop did a further small patrol to see if an approach could be made from the rear of Two Sisters; Cpl Fairburn went on this as engineer advisor. On their return an hour and a half later we all started the long walk back to Bluff Cove Peak. We arrived back as daylight was breaking, extremely tired and wet ... Total length of patrol 20 kilometres and 16 hours.¹⁹

Similar patrols, most including Sappers, were being conducted across the area in front of 3 Commando Brigade and 5 Infantry Brigade. Major Davies recalled:

3 Troop were now fully integrated with the Scots Guards and were included in all of their patrols. The Infantry had become very mines-aware and would go nowhere without a Sapper leading the way. One such patrol was tasked with finding out if there was an enemy position in the area of Pony Pass. Cpl Caswell and a couple of men were sent to accompany this. As it was quite a long way from Bluff Cove and there seemed to be a vast area of no man's land, they decided to go part of the way by vehicle. Tim Doby,²⁰ as ever, agreed to drive them in his Landrover. They had only gone a few kilometres when a mine blew off one of the front wheels. Fortunately there were no casualties and Cpl Caswell led the party out of the minefield without loss. Sgt Brewerton (4 Tp) was sent

with a patrol from the Welsh Guards to try to determine whether this had been an isolated mine or whether, in fact, there was a minefield across our (5 Brigade's) proposed path. What he found was not laid to a regular pattern but seemed to be a large area in which there were random groups of mines. We could have breached this and were asked to be prepared to do so by the Commander. However, when I explained that it would take 3 Troop a whole night to complete this task and that they could not do it with the Infantry standing on their heels, he was receptive to a change of plan. It was this more than anything that led to the decision to abandon the right hook and to go for a follow-through from the ground gained by the Commandos.²¹

The Commando Brigade's night attack began on 11 June, supported by five batteries of artillery and naval gunfire from four ships. It was an unqualified success. By shortly after first light on 12 June, 3 Para had secured Mount Longdon, 45 Commando had secured Two Sisters and 42 Commando had secured Mount Harriet and Goat Ridge. Sadly Corporal S. (Scott) Wilson of 9 Squadron and Sapper C. A. (Chris) Jones of 59 Squadron lost their lives in separate incidents during this fighting. As with many other Commando and Parachute Sappers that night, they were well to the fore, fighting with their Infantry colleagues.

It took some hours to consolidate these gains, and there was insufficient daylight left for 5 Brigade's units to get forward to see the ground over which they were to attack. In any case, the artillery was not close enough to reach 5 Brigade's anticipated limit of exploitation, and there was very little ammunition left on the gun lines after the Commando Brigade's attack. It took a full twenty-four hours to move the guns closer to the forward troops and to replenish them with sufficient ammunition for the coming attacks. Captain A. J. (Adrian) Hicks wrote:

After the taking of Mount Harriet I tasked my troop to begin investigating the minefields between Mount Wall and Mount Harriet. During this time I became convinced that extensive anti-tank and personnel minefields existed to the north and south of the road. At one stage a despatch rider of the Welsh Guards was severely injured when his quad-bike ran over an anti-tank mine

approximately 50m from us south of the road. At that point we were lifting anti-personnel mines to the north of the road. Whilst under enemy shell and mortar fire Lance Corporals Gillon and Maher breached their way to the casualty and gave first aid, but, sadly, the despatch rider later died. Information concerning spacing, type, marking and location of the minefields was passed to 42 Commando and Squadron HQ for onward transmission to 1 Troop with 1 Welsh Guards. During that night a Scorpion of the Blues and Royals was destroyed by an anti-tank mine on a crater to the southeast of Mount Harriet. My troop continued lifting mines at Mount Wall while my radio operator, Lance Corporal Reddick, and I answered a request by the CVRT commander to clear an area for them to recover their kit. I took two Assault Engineer marines with me and lifted 55 C3B mines from the area surrounding the crater ...²²

As the Commando Brigade logistic elements moved forward on 13 June, the Murrel Bridge collapsed under the weight of a Samson Recovery Vehicle. The bridge was on the vital logistic support route for the Brigade, and a repair was urgently required. A 12.8-metre length of Air Portable Bridge (APB) had been brought to Fitzroy by *Sir Tristram*. 1 Troop 9 Squadron, now returned to Fitzroy from its successful repair of the Fitzroy bridge, was tasked to construct this on the ground at Fitzroy. It was then delivered some fifteen miles to Sappers of 59 Squadron on the Murrel Bridge site underslung from the one and only, precious Chinook helicopter. The APB had not been cleared for underslinging from a Chinook, and the pilot expressed his reservations. However, Staff Sergeant Strickleton had spent a couple of years at the Joint Air Transport Establishment (JATE), and he managed to convince the pilot it would 'be alright, if you take it steady'. He did, and it arrived safely. Corporal D. A. Bell, of Condor Troop 59 Squadron, recalled:

We decided to destroy the far bank supports which mainly consisted of a hollow steel pipe approx 200mm in diameter. Cpl Bradley's section stripped out the road surface chesses so that we could have access to the supports. We used explosives to collapse the whole of the wreckage of the bridge into the river. On arrival the Chinook lowered the bridge about 200m from the site. It then flew across and lifted the Samson out of the river. We realised that

the bridge was too short for the gap by about half a metre. So we decided to land one end securely on Cpl Bradley's side and the other onto an existing concrete pier which was about 2 metres from my side. We could not lengthen the bridge so we decided to construct new abutments. For this we used the chesses that were stripped off the old bridge's surface. We obtained a screw jack from the Samson and raised the bridge in lifts, securing the chesses as it was raised. To finish off the task we backfilled between the old and new abutments with rocks and soil, compacting it as we went along. The final job was to slew the bridge about half a metre to square it up with the existing track. This was done by raising the bridge to the fullest extent of the screw jack and the troop pulled the bridge on to its new axis. All that remained was to tidy up the site and head back up to the Two Sisters feature where we gathered up our kit and prepared to move out.²³

This was yet another outstanding example of the problem-solving and inter-unit cooperation that was in evidence across the Force throughout the campaign. The victory would be underpinned by total commitment and the will to win on the part of all elements of the Force.

As darkness descended on 13 June, the 5 Infantry Brigade attack on Mount Tumbledown and Mount William began. A battalion of Argentinian marines, in very well prepared and dominating positions, held the Brigade's objectives. To assist the main attack from Goat Ridge, 2SG decided to put in a diversionary attack against an enemy position on the southern approach to Mount Tumbledown. Corporal J. (John) Foran and Lance Corporal J. (John) Pashley of 3 Troop 9 Squadron were tasked with leading the fighting patrol through mined areas and obstacles on the approach to the objective – a well-entrenched Infantry platoon. In the assault Lance Corporal Pashley and a Scots Guards' Warrant Officer were killed by enemy machine-gun fire. Having completed its mission, the patrol retired under heavy fire with its casualties. In the darkness and heat of the moment, some guardsmen entered a mined area and further casualties occurred. Under intense direct and indirect fire, Corporal Foran cleared the way to the casualties, administered first aid and led the guardsmen out of the danger area. He was to repeat this in other mined areas on the way back to the patrol rendezvous with

the light tanks of the Blues and Royals, which had provided covering fire for this task. (One of these lost a track on an anti-tank mine during the operation [see above, Hicks].) The Commanding Officer 2SG (Lieutenant Colonel M. Scott) was fulsome in his praise for this patrol's assault and for the Sapper NCOs' part in it. He was in no doubt as to the valuable role it played in the battalion's successful main attack later that night. Corporal Foran was subsequently awarded the Military Medal for his gallantry.

The main attack by 2SG started at 0100 hours on 14 June with the same level of fire support as 3 Commando Brigade had enjoyed two nights before. By first light, after determined and often hand-to-hand fighting, the enemy was dislodged and Mount Tumbledown captured. This allowed 1/7 GR to pass through to secure the western end of Mount William as first light dawned. As the battle for Tumbledown proceeded, 3 Troop 9 Squadron provided close support for 2SG and a section of the Troop, under Corporal S. D. ('Adg') Iles, was detached to clear a path through known mined areas to facilitate the approach of the Gurkhas to their start line. In the dark, freezing and snowy conditions that prevailed, it was not an enviable task, but so successful was he that at one stage he became aware that he had advanced well forward of the Scots Guards – he could see the lights of Port Stanley in the distance. Wisely, he withdrew, but his work ensured that the Gurkhas passed through without incident or casualties. As Corporal Iles was engaged in his task, Sergeant R. (Ron) Wrega of 1 Troop 9 Squadron, the Recce Sergeant attached to 1/7GR, was performing similar work elsewhere on the mountain to shepherd the Gurkhas to their objective. Both NCOs played a key part in preventing casualties and in aiding 1/7GR in their task. They were later rewarded for their gallantry, Sergeant Wrega with the Military Medal and Corporal Iles with a Mention in Despatches.

The *Sir Galahad* tragedy on 8 June had deprived 1 WG of two of its own companies and of its in-support Sapper troop (4 Troop, 9 Para Squadron). So, when the battalion was moved forward to be the reserve for 42 Commando's attack on Mount Harriet on 11

June, it was reinforced by two companies of 40 Commando, and 1 Troop 59 Independent Commando Squadron (commanded by Lieutenant R. C. (Bob) Hendicott) was allocated to the battalion to provide it with combat engineer support. The troop remained with the battalion when it became the reserve for 5 Brigade's assaults on Mount Tumbledown and Mount William (13/14 June) and for the subsequent exploitation to Sapper Hill. The following extracts from Lieutenant Hendicott's post-operation report serve to provide a flavour of the gritty business of close support Sappers across the battlefield during those final days of the campaign – in the open, exposed to the wet, cold and windy winter elements, while constantly under direct and indirect fire.

Our mission (11 June) was to provide obstacle clearance support. All sections were equipped with satchel charges and Bangalore torpedoes as well as normal mine clearance equipment. Apart from having to cross many horrific stone runs, the move forward was uneventful until 0030 (12 June) when the bombardment of Harriet began. By now we were close to our forming up point (FUP) south of Mt Harriet and by the time we reached it we had witnessed the most amazing spectacle of being very close to the receiving end of a very heavy barrage; often we were within five hundred metres of friendly shell fire. 42 Commando was pinned down by a heavy machine gun high on the mountain's eastern shoulder, so the Guards used one of their Milan sections to obliterate it. [MILAN was the man-portable, infantry medium anti-tank missile system.] This alerted the enemy to our position and soon shells and mortars began to land amongst us. As the still-uncommitted reserve it was a prudent move to withdraw the battalion into better cover some four hundred metres to the rear. It was during this move that we saw the land-based Exocet fired against a RN frigate and hit, in spite of a missile being fired to try to shoot down the Exocet. We heard later that the target had been HMS *Glamorgan*. Eventually the battle subsided as 42 Commando over-ran the Argentine positions and we spent a second night in the same lay-up position since the expected follow-on attack by 5 Brigade did not materialise and was postponed for 24 hours ... After most of the day (13 June) lying low, orders were given at 1700. This time the battalion was to act as reserve for the assault on Mt William and Mt Tumbledown. If we were not committed then we were to continue the advance towards Sapper Hill.

Intelligence reports suggested that there were three enemy company positions directly on our path to the East so patrols were sent to each location to report on the strength and dispositions of the enemy. As usual, I sent a JNCO with each patrol and these left at 2000, three hours before the main body. Orders for my troop were to deal with obstacles as required and to maintain detachments with each infantry company for this. I kept a section with me as my reserve close to Bn HQ. Having listened to 59 Sqn's HF net during the day I knew of likely minefields to the south of Mt Harriet and I briefed CO IWG accordingly. He agreed to avoid these areas. By 0200 (14 June) we had only moved about three kilometres when a small explosion – an anti-personnel mine – was heard ahead. The column stopped moving and we heard a light helicopter flying nearby. I never knew if it was friendly or enemy but soon after that we were shelled very accurately. After that another small explosion was heard and *Holdfast*²⁴ was desperately called for. By now most men knew what had happened and they were reluctant to move to allow me room to pass. It was with more than a little trepidation that I edged my way forward, past about two hundred Guardsmen and Commandos. I have never seen so many men remain so still and quiet for so long and it was then I realised the faith they all had in me and my troop: we were their main hope of getting them out of this predicament – an entire battalion group in a minefield! I finally reached the casualties and was surprised to find that I was not at the head of the column but it was pleasing to discover that Cpl Smith had already started his section breaching towards the troops ahead. A casevac flight landed almost on top of us and enemy shells once again homed in on us for another fifteen minutes. Being shelled in a minefield did not appeal so I and my troop kept breaching forward until we could find no further evidence of mines. I decided we were now safe and the battalion moved on towards Mt William.²⁵

While the battle for Mount Tumbledown was in progress, to the north, 2 Para, with Sergeants N. (Nick) Corck and G. ('Geordie') Lovely of 9 Squadron under command, and supported by the Recce Troop of 59 Squadron, attacked Wireless Ridge. The objective was secured by first light, and the way was open to the western end of Port Stanley. The route was downhill all the way from here, and 2 Para and the 42 Commando lost no time in pursuing the enemy to the outskirts of the town. Major Macdonald recalled:

At first light I flew to 2 PARA's mortar line and went forward on foot to join Lt Livingstone as a regimental fire mission was coming down on the fleeing Argentinians. The leading company of 2 PARA passed through Moody Brook Camp and as it did so the word came through that the Argentinians had surrendered. We continued into Stanley behind the leading company to become the first commandos into the town. During this time elements of Brigade HQ had driven into a minefield near Murrel Bridge and CO RA's vehicle had been blown up by an anti-tank mine, injuring Major Armitage RA. Condor Troop deployed to breach them out and during this operation SSgt Thorpe most unfortunately lost a foot.²⁶

The loss of Wireless Ridge, then a short time later Mount Tumbledown, provoked a crisis for the Argentinian forces in and around Port Stanley. As 1/7 GR prepared to assault the main position on Mount William, they cracked. Soldiers left their trenches, discarded their weapons and streamed back towards Port Stanley. At first they did this under the continuing artillery and naval gunfire that had supported the attack so well throughout the long night. Soon, however, it became clear that the Argentinians had ceased to offer resistance, and the guns were halted. An eerie silence descended upon the snow-covered, frosty hillsides. It was reported that white flags were beginning to appear. Whether this was actually true or not was difficult to confirm, but it was clear that the battle for Port Stanley was over. In San Carlos, shouts of 'Endex' ('End of Exercise') were heard from 40 Commando, to wry amusement.

A wave of relief and euphoria swept through the entire Task Force. Senior commanders had been preparing for, but dreading, a battle through the streets of Port Stanley. Civilian casualties and the destruction of many buildings would have been unavoidable. Now all that was necessary was the signing by the Argentinians of a formal surrender document. This took place without ceremony in the Secretariat building in Port Stanley at 2100 hours on 14 June 1982. The British team consisted of the CLF, Major General Jeremy Moore, the Deputy Commander 3 Commando Brigade, Colonel T. Seccombe, RM, the CRA, Colonel B. A. Pennicot, the CRE, Lieutenant Colonel G. W. Field, Commanding Officer 22 SAS, Lieutenant Colonel

M. Rose, and the Spanish interpreter, Captain R. Bell, RM, together with CO 22 SAS's Corporal signaller.

Royal Engineer Post-War Operations²⁷

The end of hostilities presaged what was to become a herculean Sapper effort to restore Port Stanley, its airfield and the outlying settlements to normal. Indeed, *restoration* amounted to a good deal more than merely returning the Islands to *normal*. There was war damage to repair; the presence of British troops on the Islands multiplied the population by a factor of four or five; and the British Government renewed its determination to deter Argentina from ever again invading the Islands. Life for the Islanders was about to change forever, and there was no time to lose in getting started. Most urgent of all was making Port Stanley a safe place to be. It was littered with ordnance of all descriptions, booby-traps had been left in some houses, and the whole town was surrounded by a plethora of Argentinian mines, some in minefields – some indiscriminately laid. Major Macdonald wrote:

By the morning of 15 June I had linked up selected Argentinian army and marine engineers with my Recce Troop. With the



Port Stanley was full of POWs and rubbish.

Argentine minefield data obtained the troop commander and QMSI were able to make a plan to send out recce sections with Argentinian engineers to mark minefields in preparation for field troops to lift them. This was a difficult time in Stanley as all utilities and order had broken down. Despite this we managed to regroup most of the Squadron and, thanks to the QM, Major Edmonds, and the SSM, WO2 Jones, Argentine vehicles and civilian accommodation were obtained for men who hadn't washed properly, changed their clothes or been warm for nearly four weeks.²⁸

The specialist tradesmen of 61 Field Support Squadron were in great demand, and the OC, Major Morgan, was called forward to Stanley. He recorded that:

On 15 June the OC, SSM and a team of electricians flew to Stanley where CRE Works was beginning to assess the immediate task of battle damage repair. Plumbers and carpenters followed the next day. Under the direction of the Professionally Qualified Engineers [PQE – later known as Chartered Engineers] of CRE Works they immediately set to work repairing overhead lines, water mains, windows and so on. Cpl Robson did a particularly fine job. He spent two weeks brazing broken cast iron pipes in the water pumping station and putting the huge water tank back into its proper place.²⁹ An Argentine vehicle was liberated by the OC and SSM only, 20 minutes later, to be driven over anti-personnel mine. The occupants were unhurt. The vehicle required a new wheel.³⁰

Major R. A. (Richard) Nicholas, CRE Works, was the Electrical and Mechanical specialist. He recalled his hectic arrival in Stanley:

It was 15 June 1982, at 1430Z, less than twenty four hours since the first white flag had fluttered over Stanley and less than twelve hours since the Argentinian surrender. Given 25 minutes to get our act together, SSgt Walker and I, as 'E & M experts' were despatched to Stanley to get the power and water back on. Thankfully we had in our hands dossiers we had sweated over in Barton Stacey. We knew the systems like the backs of our hands – in theory!³¹

When Operation *Corporate* was being mounted, a stroke of foresight and positive thinking in HQ EinC (A) led to the CRE

Airfields (Lieutenant Colonel L. J. (Leslie) Kennedy) being nominated as CRE Works Falkland Islands to plan airfield development after the Islands were recaptured. He deployed with 5 Brigade with his technical team and some reinforcements from the Military Works Force. Their role was to act as an advance party for coping with the major engineering works that it was envisaged would be necessary once the war was over. Up to this point the CRE Works and his team had remained at San Carlos patiently surviving the bombing and the elements, awaiting the call for their specialist skills. Lieutenant Colonel Kennedy remembered that it was not long after the Argentinian surrender in Port Stanley that this call came:

Late on 14 June CRE Works received a signal from the CRE by hand asking him to travel to Stanley the next morning by helicopter to meet him (the CRE) and the Argentinian Engineer Commander in the Secretariat building. In the event, the Argentinian officer had been detained by the Military Police and, instead, I met the senior staff of the PWD and found out at first-hand about the parlous state of the essential services for the town.

Initially, the CRE directed 59 Commando Squadron to deal with the clearing of mines, ordnance and booby-traps within and around Stanley; he moved 11 Squadron from Port San Carlos to Stanley airfield to begin the work of making this operational; he made 9 Squadron responsible for restoring the outlying settlements to normal; moved 61 Squadron and RHQ 36 Regiment to Stanley; and directed the CRE Works to get the town's mains water and electricity supplies working without delay. With barely pause for breath, Sappers laid aside their weapons and began what was to become probably the largest Corps corporate effort since the Second World War.

Overnight, a town that had previously been home to about 1,000 people suddenly had some 5,000 weary British troops longing for shelter, a shave and a flushing lavatory. In addition, there were some 10,000 Argentinian prisoners of war most of whom had been herded to the airfield, where they erected ad hoc cover from the elements (and incidentally destroyed the only

rock-crushing plant in the Islands). Most of the overhead mains electricity cables were down, so the town was in darkness and the town's main water pumping station was out of action. Major Nicholas again:

The major problem was the town's water supply. Cpl Robson's famous words on walking into the treatment plant at Moody Brook were, 'It looks as though a bomb's hit this place.' Wrong! A 105mm shell had, though! The plant was already 30 years old and was due for replacement before the war. It was only designed to provide water for a population of 1,200. The offending shell had blasted a hole in the wall, shattered the roof, physically lifted a 5-ton filter three inches sideways, smashed pipework and riddled tanks with shrapnel holes. As if this were not enough, the defeated Argentinians set fire to the plumbers shop the night after the surrender, burning or otherwise ruining all the spares and equipment needed to get the plant back on line again. Furthermore, they knew how low the water reserves were, so they withdrew leaving hydrants open and taps running. The town ran out of water in 24 hours.³²

One of the first jobs for 59 Squadron was to erect water points at strategic points around the town. Where freshwater streams flowed (for example at Moody Brook) these were conventional water points; at other places (for example the public jetty on the edge of the harbour) the supply of water relied upon hauling water 'Dracones' from the Fleet's water tanker, *Fort Toronto*. Again, the Combat Support Boats (CSB) proved to be priceless. Fresh water was pumped into a 2,500-gallon tank on an improvised tower from which water bowsers were filled, and this system continued in use for several weeks. Just one example of the difficulties experienced at this time involved seals that were urgently required for the water system. These were flown to Port Stanley by Hercules but could not be found. It was later discovered that they had been brought by the very first Hercules to land at Port Stanley but had been airdropped before the aircraft had landed. The package was eventually located in a minefield. Some finesse with a helicopter was needed to recover it – along with what was considered by most people to be more vital: unit mail!

As the repair work on the damaged pipes and tanks proceeded, the weather turned even colder and the whole plant froze. Corporal S. D. ('Adg') Iles' section from 9 Squadron repaired the hole in the roof, while a section from 61 Squadron repaired pipe fractures under Stanley's roads. After a fortnight's immense effort, the town had mains water.

While this was going on Sappers were fully committed to other high priority tasks. Major Macdonald:

Whilst 2 Troop (59 Squadron) set up water points, 2 Troop 9 Squadron was clearing the town of Improvised Explosive Devices (IEDs) and 1 Troop³³ deployed to assist with the repair of the airfield. The rest of the Squadron was out lifting mines. By 18 June, when Cpl Morgan lost his foot, I had come to realise that the problem presented by the mass of minefields, often indiscriminately laid, around Stanley was much larger than first appreciated. By the time LCpl Mollison lost his foot on 21 June I knew that the situation could not be solved by us alone.³⁴

Work on lifting the minefields was halted, except where essential access was required (for example, to allow Islanders access to their peat fuel stocks and at York Point, where fuel pipelines had to be laid to offshore 'Dracones' to supply the airfield). To



Part of the weapons disposal challenge.

prevent further unnecessary casualties it was decided to limit the mine-clearing effort to recording, fencing and marking all mined areas until there were sufficient resources to tackle the problem comprehensively. Major Davies:

Very soon after the ceasefire, the OC of 59 Squadron had, sensibly, extracted thirty five prisoners who had been involved in the mine laying and began to compile minefield records. When it became clear that the task was to become ours I appointed Lieutenant Jon Mullin as my minefields officer and sent him to Stanley (on 18 June) to begin the debriefing of the Commando Squadron. It was a most important and dangerous task. My remit to him was to locate and, if possible, to fence off, all the minefields in the area of Stanley. Mines and boobytraps were only to be lifted if they prevented essential access or if, by their position, they were a danger to anyone. In any event, I insisted that no clearance was to be undertaken unless he had radio communications with Squadron HQ, and only then if there was a helicopter available for casualty evacuation. Lieutenant Mullin also took on responsibility for the prisoners who were helping with this task. To help him he had Warrant Officer Class One Canessa, a Gibraltar and Spanish speaker. His normal job was Superintendent Clerk in HQ EinC. I have no idea how he got from there to the Falklands but Jon was to value his services as an interpreter very much. Regrettably one of the prisoners stepped on a mine one day and lost his leg to the knee. Jon Mullin ran almost a mile to radio for a helicopter and the man was being operated on within fifteen minutes. The POW dubbed Jon as the 'little man with the big heart' and readily stated that, had roles been reversed, British POW would not have been treated anything like as well by Argentinian captors.³⁵

To reduce the pressure on accommodation, especially in Port Stanley, it made sense to reduce the number of British troops on the Islands as soon as possible. On 21 June the Commando Brigade (including 2 Para, 3 Para and 59 Squadron) began to leave by ship for home. This relieved overall pressure of numbers, but it actually increased the overstretch for the remaining Sappers. Repairing craters and scab damage in the runway, extending the airfield, laying a Harrier landing strip, providing fuel and a mountain of associated tasks were fully occupying 11 Squadron and a troop of 9 Squadron at the airfield,



Crater repaired
with AM2 by I Troop
59 Independent
Commando
Squadron.



while, as described earlier, the clearance of mines, provision of water and a plethora of other tasks were thoroughly stretching Sapper resources in Port Stanley and the outlying settlements.

Stanley Airport was given the highest priority as it was the only point of entry for aircraft from the UK. The single runway had been cratered by bombs from the Vulcan sortie and also from Harrier attacks. Five craters,³⁶ had been backfilled by the Argentinians who continued to use the airfield for C-130 sorties each night. (They had, however, marked out a dummy crater before dawn each day to give the impression that the airfield was unusable.) The pressure now was for more permanent repairs and dispersal areas to enable the airfield to be used by heavily loaded RAF C-130s. Works were designed and managed by Major D. I. (David) Reid, OC of the Airfield Team, with CRE Works. Major Reid's first sight of the airfield was on 17 June, when it was still a POW holding area. The wind was at full gale strength, it was raining, and the whole area was a complete mess. Initially 1 Troop 59 Squadron began work on repairing the most important of the craters. This troop was quickly augmented, and then replaced, by 11 Squadron and 1 Troop 9 Squadron, working in atrocious conditions of low temperatures, high winds and a veritable sea of mud. In one memorable piece of improvisation perhaps the most expensive culvert in the world was built. Major Hawkins remembered with a smile that:

It consisted of two Exocet tubes in the stream bottom, covered with sand and with sandbag walls, it looked a picture. The Navy wanted to return the tubes to the UK as they were worth quite a bit but it was too difficult to recover them once they were in place.³⁷

The rockets had been dragged out of the tubes by OC 61 Field Support Squadron; they had not been fired.

Apart from the craters, there were more than 1,000 scabs³⁸ to be dealt with. These were repaired by cleaning out the hole and filling with the in-service, rapid-hardening, magnesium phosphate cement/fine aggregate mixture (Bostik 276) that had been included in the Engineer Stores for just this purpose. Troops from 9, 59 and 11 Squadrons were employed in the scab repair.

Another major task on the runway was the clearance of debris. The runway was littered with soil, mud, tarmac, stones and all manner of foreign objects which had to be swept away. The Argentinian POWs were keen to help here because they believed that if they cleared the strip an aeroplane would come and take them home. Sadly, they were disappointed, but their enthusiasm was a welcome asset in a task that could only be done by hand and with brooms, since there were no mechanical sweepers.

As luck would have it, there was an airstrip for light aircraft between the main Stanley Airport and Port Stanley. It had been built by an Argentinian contractor a few years before and, fortuitously, the surface consisted of AM2 matting of an earlier, but similar, sort as that which was then on the high seas heading for the forthcoming extension of Stanley airfield. There was more of the matting already on Stanley airfield itself. The Argentinians had used some to try to extend the length of the runway, and 1 Troop 59 Commando Squadron used this for capping their crater repair. 11 Squadron lost no time in lifting the light aircraft strip

and putting the AM2 to good use. As described above, the craters on the runway were cleared of Argentinian filling material (including empty 200 litre drums), refilled, cut square using compressor tools (*proffed*³⁹ by Lieutenant Hendicott from the town cemetery) and then capped with the AM2, which was set flush with the runway surface and pinned down with Harrier mat pins.⁴⁰ This work was begun by 1 Troop 59 Commando Squadron, then taken over by 11 Squadron when 59 Squadron departed for home.



Lance Corporal Cooper and Sapper Leibrick, 9 Para Squadron, clearing mines, Yorke Bay.



Typical working conditions at Stanley Airport, July 1982.

11 Field Squadron also constructed a Harrier FOB on the north side of the runway, with taxiways and dispersals for up to thirteen aircraft as well as Rubb, Spandrel and inflatable aircraft weather shelters. At the same time, an EFHE was constructed using a beached 'Dracone', a pump on the beach, 730 metres of Victaulic pipeline and six 30,000-gallon flexible tanks. Major Brown recalled:

In CRE Works we were privileged to have with us Sgt B. Worthington, a petroleum specialist with real Northern stoicism and indefatigable humour. During the war, he flew out to RFA tankers by day to arrange shipments of fuel ashore, in towed rubber dracones. Each night, under cover of darkness and clad in his diving suit, he waded out from the beaches in rough seas to bring in the dracone from the tow vessel and connect it to piping, so as to pump the fuel into pillow tanks ashore. His work continued apace in a similar way after hostilities ended, often in the most atrocious weather. He was awarded a well-deserved BEM in the subsequent Honours List.⁴¹

The route of the pipeline ran through a minefield. A breach was made in this by 1 Troop 9 Squadron, using only prodders and bare hands – mine detectors being no use against the non-metallic mines. Then, in freezing conditions and high winds, an

attempt was made to lift the mixed anti-tank/anti-personnel minefield. The movement of the tide and the sand caused some mines to drift, and a D6 Dozer and a CET were damaged by mines in the breach, despite it already having been traversed by the feet of countless busy Sappers. Undaunted and, happily, without injury to those involved, the task was completed, and the EFHE operated successfully for some months afterwards.

To enable the Harriers to be brought ashore, a Short Take Off and Vertical Landing strip and a Landing Pad were constructed alongside the runway being repaired. This was a short-term expediency, which allowed HMS *Hermes* to be released and sent home. Sadly, one day, the accidental release of a Sidewinder missile from an aircraft using the STOVL severely injured soldiers from the Welsh Guards and a Sapper from 11 Squadron. Major Hawkins: 'The surgeon said his leg was saved by good first aid by the troop Regimental Medical Assistant, Spr Robinson.'⁴²

At last, and despite all obstacles – including a storm that wrecked a Dracone, destroyed a Rubb shelter and damaged a Harrier – the Airport was ready for use. Only the northern half of the runway (half the width) was repaired, but it was operational, and on 24 June the first C-130 Hercules landed to



A welcome Hercules arrives alongside an in-progress Harrier strip, Stanley Airfield, 24 June 1982.

rapturous applause from weary and windswept Sappers. It had been a magnificent achievement in only ten days since the ending of hostilities.⁴³

Meanwhile, in the outlying settlements on East and West Falkland, sections of 9 Squadron were manning water points, repairing tracks, constructing field latrines and ablutions (for 5 Brigade units and POWs), removing IEDs and mines from settlements and carrying out a variety of other tasks to enable the population to resume normal living and farming.

Restoring mains electrical power to the town was another important task in the weeks immediately after the ceasefire. As already described, the overhead power lines had been destroyed in a number of places. Major Nicholas:

The Argentinians had tried to burn down the power station, as well as the plumbers' store. Thankfully they failed with the power station; only the stores being lost. Of the three generators, though, two were inoperative and the third was going on 'a wing and a prayer'. In short, it was almost total destruction. The rehabilitation of the power station was left to the civilian staff, and a team of four electricians from 61 Squadron set to with SSgt Walker to attack the problem of repairing the overhead lines. In often atrocious weather, strong winds, driving rain and snow, they worked all hours to restore power to the town which, amazingly, they managed to do within fourteen days.⁴⁴

But the repair to the town's power station was only a temporary fix and it quickly became clear that it would not cope for long under the strain. Quite apart from this, one of the substations was so heavily overloaded that it was blowing fuses constantly and the transformers were too hot to touch. Major Nicholas again:

As luck would have it, some kind person in the UK had authorised the loading of four containerised Dale 250kVA generators on to the Atlantic Causeway. Just what we needed! After a lot of effort in snowy weather, up steep, slippery roads, 4 Troop 9 Squadron managed to get two sets installed to make up the 'Stanley Military Power Station'. Fortunately we had been able to pre-locate another set on the roadside a few days before so, when the last fuse blew in the substation, we were able to restore emergency supplies within

12 hours.⁴⁵ [This Military Power Station supplemented the town's mains supply for well over a year.]

During the months following the ceasefire it was common to hear new arrivals in Port Stanley say, 'What a mess!' Those Sappers who had fought in the war and then moved straight into the enormous challenges of restoration could only respond wearily, 'You have seen nothing!' Major Davies:

From then [the move into Stanley] until we left, the pressure of work did not drop. It seemed that all we did was work, eat and sleep.⁴⁶

Within hours of the ceasefire, the CRE had begun to re-locate all the Sapper resources under his command in order to begin the huge task before them. Initial dispositions of units are outlined above, but once the Commando Brigade departed this plan was amended to concentrate all RE units in Port Stanley, only small detachments remaining with units in settlements on both East and West Falkland. The CRE established his own headquarters with HQ CLFFI (the CLF had become CLFFI by now) in Port Stanley's new boarding school building, which at the time was empty. The CRE (Works) organisation was also established nearby in the offices of the Public Works Department. Gradually, out of the chaos came a semblance of order and communications were easier than they had been on the battlefield. However, the wide spectrum of Sapper tasks meant that the CRE had to be extremely nimble to keep his finger on the pulse of ongoing Engineer work at the same time as planning the strategy for the essential tasks that were looming. In addition to everything else, there was still an Argentinian threat to consider. Although a surrender had been signed by the Argentinian commander in the Falklands, a peace treaty had not been signed by the Argentinian government. British forces were kept on an active service basis, and it became increasingly clear that Sapper support would be needed in full measure to enable increasing numbers of land-based aircraft to operate effectively, and for early-warning radar sites, communications rebroadcast sites and defensive positions to be constructed in outlying areas. It was a command task that almost defied description. Its demands certainly exceeded the

resources of what was, in effect, only the RHQ of 36 Engineer Regiment, two field squadrons and a field support squadron.

There was an urgent need to plan for the future, and, at the CRE's request, a visit by Director Engineer Services (Brigadier F. G. (Bill) Barton) to assess the situation was arranged. He arrived at icebound Port Stanley Airport on Monday 5 July 1982, by C-130. At that time, most of the units that had fought the war were still on the Islands, and the new post-war units had not started arriving; neither had the stores and equipment for the post-war construction projects. When he left the Islands five days later, Brigadier Barton, who was the first senior visitor to the Falklands after the war, had visited all the RE units as well as the locations of possible camps, radar sites and the airfield and public utilities. He had also spoken to all senior commanders. His visit provided an excellent basis upon which to plan and support the many RE projects in the Falklands over the next two or more years. It also became clear that a colonel would be needed to command Sappers in the Falklands, which were likely to include, at any one time, a regiment with its own commanding officer, a CRE (Works) and a range of other RE units including, for instance, Explosive Ordnance Disposal (EOD – formerly 'Bomb Disposal'), Survey and engineer support units. In addition, the CRE would have to be able to represent RE interests fully, and at the correct level, to CLFFI and his senior staff officers.

By the beginning of July, the first post-war CLFFI, Major General D. Thorne, had been nominated, and within a week of Brigadier Barton's visit he was in post with a new chief of staff and CRE, Colonel D. (Derek) Brownson:

We arrived on 17 July and were met by Major General Jeremy Moore and Lieutenant Colonel Geoff Field. Much has been written about the conditions in the Islands when the war ended, but no amount of TV coverage or MOD briefings could have prepared us for the squalor, chaos and horror of what we saw during our takeover period. The Royal Engineers, of course, had launched, immediately the war ended, on a succession of emergency tasks and when the new team arrived Hercules were landing on the patched runway, electricity and water had been restored to much

of the population, 9, 11 and 59 Squadrons had bravely started on the minefield clearance, taken casualties and stopped. However, the tasks were of such enormity, both in scale and scope, that, many months later, newcomers would still wonder when someone was going to sort out the mess!¹⁷

Reinforcement RE squadrons arrived on board SS *Rangatira* on 4 July in the form of 3 Field Squadron (OC Major M. H. H. (Mike) Brooke) and 50 Field Squadron (Construction) (OC Major J. R. (Jeremy) Harrison), and the units that had fought the war began to be replaced. As mentioned earlier, 59 Squadron had begun to depart on 21 June. 2 Troop 9 Squadron departed on 4 July, and most of the rest of 9 Parachute Squadron departed on *St Edmund* on 17 July. The pressure on Sapper resources and lack of suitable shipping space forced the retention of RHQ 36 Regiment, 11 Squadron and 61 Squadron until September. Some individuals from CRE (Works) were not relieved until November.

Apart from the immediate post-war repair and recovery tasks undertaken by the wartime RE units, new units had been earmarked and stores and plant shipped for the following major projects:

- The operation of a Military Works Area providing engineer support for all three services.
- The extension and strengthening of Port Stanley Airport to handle Phantom air defence fighters, C-130 Hercules transports and Nimrod maritime reconnaissance aircraft.
- A master radar site on the summit of Mount Kent and two radar sites on West Falkland.
- Self-contained, hutted camps, each with its own power station, water supply and sewerage systems, at eight locations spread throughout East and West Falkland.
- Extension and enhancement of the power station, water supply system and hospital in Port Stanley to cope with the additional military population.

As on so many previous occasions in its history, the Corps was working for all three services and this time without assistance from the Property Services Agency. Fortunately, this type of

operation had been foreseen, and procedures were available. A Military Works Area (MWA) was established by the Quartermaster General (QMG), who assumed responsibility for the construction and maintenance of accommodation and other facilities for all three services and allocated funds accordingly. His agent for this was the Director of Engineer Services (DES), who received requests for work from the CRE at HQ BFFI who had allocated priorities. These were then costed and submitted to the Director of Quatering (Army), who maintained the budget and agreed them on the QMG's behalf. This procedure had been used operationally once before, during the final stages in the withdrawal from Aden in 1967, but then only for a period of a few weeks and, essentially, only to maintain existing services.

Given that it was winter and that most of the Expeditionary Camp Stores intended for the Task Force had sunk with *Atlantic Conveyor*, accommodation remained an issue. By the beginning of July, much of the accommodation for units in Port Stanley was on ships of the Task Force lying in the inner harbour where, incidentally, the Corps provided an invaluable taxi service between ships and the shore using the newly introduced combat support boats (CSB). A CSB was even provided for the use of the RN Queen's Harbour Master. This gesture certainly helped when Sappers needed ship movements to be amended to accord with their priorities.

One way of alleviating the accommodation problem a little was to evacuate all Argentinian prisoners of war, and these left on *St Edmund* on 8 July. One regret here was that POWs who had assisted with marking and clearing their own minefields were also repatriated at this time. However, though they had been volunteers to a man, allowing POWs to work in this way is not permitted under the Geneva Convention, so their release was not prevented. As indicated earlier, the Corps was left with the problem of dealing with the vast quantity of mines, both marked and unmarked, and casualties continued to occur as efforts to identify, fence and mark them proceeded in the immediate aftermath of the war. A selection of the mines found was sent back to HQ EinC, in the charge of Warrant Officer Class 2 P. (Peter)

Ellis, on the first C-130 to leave after Port Stanley Airport was reopened. Post-war efforts to deal with the problem are covered later in this chapter.

The New Team

Major General Thorne arrived at Port Stanley on 17 July 1982 with his new team. His appointment was Commander Land Forces Falkland Islands (CLFFI) with overall command still being exercised by the Flag Officer 3rd Flotilla, Rear Admiral Reffell. This was to remain the position until RAF Phantoms had arrived and taken responsibility for the air defence of the Falklands, thus releasing HMS *Invincible* and her Harriers when CLFFI assumed the role of Commander British Forces Falkland Islands (CBFFI). The release of *Invincible* depended, of course, on the extension and strengthening of the runway at RAF Port Stanley and the establishment of a radar control system. These tasks were therefore accorded top priority, and the necessary equipment and stores, together with appropriately trained Sapper units, were already in transit.



Conditions at Port Stanley Airport, July 1982.

General Thorne's immediate task was to prepare a concept of operations for the forces under his command and to propose long-term force levels. It was on these that the CRE was to base his accommodation plan for the Force. Accommodation stores were already in transit, based on an estimated requirement for 3,000 men in two 800-man and seven 200-man self-contained, Portakabin-type camps, for which financial approval had already been given. The cancellation of a civilian contract elsewhere meant that these equipments were available at short notice.

Stores and equipment began arriving at Port Stanley in mid-July 1982. Disembarking was slow and laborious, with ships having to stand offshore in the inner and outer harbours while the stores were ferried ashore by a variety of ferries, rafts and helicopters. Major Morgan:

Immediate priority was to offload Harrier stores and to deliver these to the airfield. There was also a requirement for general stores to assist in the restoration of the town. Whilst this was going on 3 Commando Brigade units were in a rush to offload the ships which were to take them home. Priorities were frequently confused. Stores arrived in the wrong sequence at the wrong slipway. The beach area quickly became overcrowded. Poor traffic control led to the road breaking up and yet more work for the Squadron. Meanwhile, Plant Troop was fully occupied supporting 11 Squadron at the airport. Sapper Sulley had a very narrow escape when he drove his D6 dozer over an Argentinian anti-tank mine, and we had to build a stronger slipway in Stanley to offload the heavy construction plant that was due to arrive shortly in ships already approaching the Islands ... it was an interesting and demanding experience.⁴⁸

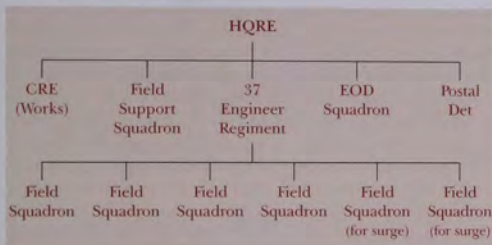
The only available landing became 'B Slip', over which the majority of the stores came. Mexifloats crewed by the RCT⁴⁹ ferried the stores from ship to shore, and Medium Wheeled Tractors (MWT) with forks then moved these to dumps ashore. Inevitably in the desire to empty ships as quickly as possible, some chaos ensued, and damage to goods was significant. Those awaiting urgent stores frequently felt compelled to search through piles of boxes and containers in order to attempt to find what they needed. Many supplies found their way to the wrong

project, and an attitude of 'finder's keepers' prevailed. If a unit found something it needed, it was theirs. This was commonly referred to as *razzing*.⁵⁰ It would take a considerable time before *razzing* was eliminated and efficient stores reception and control was firmly established. With hindsight, much time and waste could have been saved by providing a proper harbour with adequate handling facilities earlier in the post-war phase.

A high priority was accorded to the establishment of a quarry. The offloading of two Goodwin Barsby Goliath crushing plants and their movement to a rocky outcrop on the north side of the airfield runway proved to be a major undertaking. Despite many difficulties, by early December more than 100,000 tons of crushed rock had been produced and distributed to projects throughout the Islands. One of the keys to the production of rock was the decision to procure two large, track-mounted drilling rigs. This was done on the advice of an expert from the Engineer and Railway Staff Corps⁵¹ whose company also trained teams from 50 Field Squadron. The drill bits wore out very quickly because of the extreme hardness of the quartzite and urgent replacements frequently had to be delivered by air. To emphasise the priority he placed on this operation, Major General Thorne visited the drilling teams every night. With typical soldier humour, the relentless and exhausting work at the quarry was dubbed 'Rock around the clock', evoking thoughts of much happier nocturnal activity.

With the arrival of squadrons, stores and plant, the CRE, Colonel Brownson, reorganised his manpower resources to tackle the major tasks that lay ahead. On his arrival there had been four field squadrons (9, 11, plus 3 and 50 recently arrived) and a field support squadron (61) commanded through RHQ 36 Engineer Regiment. The reconstituted⁵² RHQ 37 Engineer Regiment replaced RHQ 36 Engineer Regiment at the end of August as the long-term, resident RHQ. The personnel of this RHQ and the field squadrons were subsequently rotated on a six-month-tour basis. HQ EinC also decided that, during the Falklands summer, when the weather was at its most reasonable, the RE order of battle should be increased by two 'surge' squadrons.

By December 1982 the new RE organisation was broadly as shown in the diagram. This organisation was held until 1984, when the system was able to revert to the CO 37 Engineer Regiment also combining the role of CRE until the Regiment was finally disbanded in 1985.



The QMG had declared the Falkland Islands to be a Military Works Area in June 1982, but money had not been included in MOD estimates for its operation and had to be released from the Government's contingency funds. The total amount needed was open-ended and depended on the attitude of the Government at the time which, in the case of the Falklands campaign, was totally supportive for about two years after the actual war had ended. Thereafter the Treasury gradually gained control and normal procedures were applied. This coincided with the ending of the Military Works Area and the assumption by the Property Services Agency (PSA) of responsibility for military works in the Falkland Islands.

Within the Falkland Islands, the CRE (Works) organisation consisted of a headquarters, which contained a Survey section, a drawing office, estimating and Resources staff and a coordinating element, an STRE (Works), an Airfield team and a Garrison Engineer responsible for works in Port Stanley. The organisation was the CRE's technical branch and, as indicated earlier, was commanded by Lieutenant Colonel L. J. (Leslie) Kennedy, who, with his staff, had arrived in the Falklands with Lieutenant

Colonel Field via *QE2* soon after the initial landings. He was succeeded in October 1982 by Lieutenant Colonel J. W. R. (John) Mizen.

Extending Port Stanley Airport⁵³

As we have seen, the need to develop the runway, foreseen at the start of the war, had led to a major purchase of AM2 airfield matting and ancillary stores from the United States. The requirement was to extend the runway from 4,100 feet to 6,100 feet and to increase its load specification. There were to be three rotary hydraulic arrester gears (RHAG)⁵⁴ at intervals along it, an apron five times as large as the original one and three aircraft dispersals, one for Harriers and two for Phantoms, together with 'Rubb'-type hangars. There was also to be an engineering complex with five Spandrel-type hangars, dispersed fuel storage with a ship-to-shore underwater pipeline, a perimeter road around the airfield and adequate electrical power for runway lighting and other facilities. The development was planned in three stages:

- Phase 1. Repair and strengthening with AM2 of existing runway to permit repeated use by loaded C-130 aircraft.
- Phase 2. Provision of RHAG to permit emergency Phantom operations from a minimum operating strip in the event of hostilities recurring.
- Phase 3. Extension of runway to full length of 6,100 feet with enlarged apron and one dispersal with two 'Rubb' shelters, permitting full operation with Phantoms.

In May 1982, 50 Field Squadron (Construction) had received orders in the UK to construct an expeditionary airfield at Port Stanley and had been involved in the planning of the operation throughout. When the squadron arrived at Port Stanley on 4 July, airstrip apart, the airfield was still a sea of mud and the weather was appalling, with sleet, snow and high winds. After the airfield stores and plant had been offloaded from the ships and preparatory work had been carried out, the airfield was closed

on the evening of 15 August 1982 to permit Phase 1 work to begin. It was not all plain sailing, as Major Jeremy Harrison, OC 50 Field Squadron (Construction), recalled:

The AM2 panel has a green wearing surface on one side with a silver underside. Which side do you think goes uppermost? Day One, night build, Corps history being made, Major Harrison (not too loud) in charge. Two Gurkhas in the first row to be laid, struggling with a panel silver side up. 'Oi!' I stepped in. 'Look, it is green side up.' Gurkhas keep struggling. 'GREEN SIDE UP, UP, UP!' No reaction, just more sweat, incredible determination; they had got the thing almost in! Dreadful, Corps History will record, 'Initially one side of Port Stanley Airport was built upside down.' PR&A [Plant, Roads and Airfield branch RSME] experts never mentioned this could happen. Into the gloom walks a Gurkha officer; after a quick explanation to him and a translation to the over-heated Gurkhas, the panel was turned over and slipped in. Smiles and much gabbling in the dark and all was well. I had never worked with Gurkhas before, but their energy and resolution is quite fantastic.⁵⁵

By 0500 hours 16 August, the earlier bomb crater repairs had been reinstated to accept the AM2 over-slabbing, except for the large Vulcan-produced crater, which was not on the runway. By 19 August, preliminary work on the ends of the runway had been completed and AM2 laying commenced. Trials with AM2 in the UK had shown that the optimum length of time a laying party could work was three hours, after which it would need six hours' rest. This was extended to nine hours to include travelling time. Using this as a basis, eight mixed troops each of a commander, 26 Sappers and a works party from either HMS *Illustrious* or the Queens Own Highlanders were deployed to permit continuous working by two troops at a time. Setting out and electrical parties were formed to keep just ahead of the laying parties and, although 30 hours of laying time were lost due to weather, Phase I was completed and the airfield was reopened for C-130s on 28 August. In the event, the difficulties encountered in digging out and re-grading the western end of the runway were more time-consuming than the actual laying of the AM2. The time spent on training and rehearsal had been well spent.

Phases 2 and 3 (the RHAG installation and the extension of the runway, provision of an enlarged apron and one dispersal area) were concurrent operations. The centreline for the 2,000ft westerly extension of the runway was predominantly over peat and sand with a high water table and standing surface water. In addition there were two Vulcan bomb craters on the line of the extension and the insertion of a drainage system proved essential for any ground works to be effective. To add to the difficulties there were few access tracks, and the shortage of plant and crushed rock inhibited the construction of further tracks and haulage roads. Trackway or corduroy track alternatives were simply not options. Provision of aggregate, particularly for the extension pavement and for the RHAG anchorages, now became a critical factor and two issues became a matter for the daily briefing of CBFFI by the CRE: the health of the crushers and the output of the quarry. It would be difficult to overstate the immensity of the effort put in by all the Sappers involved in this project over the critical weeks of the project. Suffice to say that after more than two months of working in mud, snow, sleet, high winds and freezing temperatures, the garrison witnessed the arrival of the first Phantom on 18 October. In the Corps' glorious history, there can be few occasions when success can have felt sweeter. The airfield was gradually extended and improved over the next year or so and remained operational for three years.⁵⁶

Additional fuel storage was also provided on the airfield supplied through a submerged 1,900-foot ship-to-shore pipeline. The stores for the pipeline had been added to a shipping list at an early stage and were of a heavy, obsolescent type. They had been retained by CEP Long Marston, turning a deaf ear to a recommendation made in a report by the then Vice Quartermaster General some years earlier that the equipment was not worth storing and should be discarded – another case of Engineer Resources saving the Army's bacon by thinking ahead.

Outside Stanley, extensive Sapper effort by 34 Field Squadron was commenced in December 1982 with Operation *Zeus*, in which the Falkland Islands Air Defence Ground Environment (FIADGE) radar site on Mount Kent, East Falkland, was created.

However, notwithstanding this improvement, there was still a requirement for the Royal Navy to provide two Air Defence frigates on permanent radar picket duty off to the north-west and south-west of West Falkland. This very expensive RN commitment could only be replaced by the temporary site at Cape Orford and the permanent radar sites being built on the tops of two mountains on the western edge of West Falkland (on Byron Heights to the north (Operation *Shepherd*) and Mount Alice (Operation *Tantara*) to the south).

To meet this requirement, the components of the two sites (comprising radomes and their radars, technical accommodation and domestic accommodation, mostly housed in more than 300 MODUS container units) were designed and assembled in the UK for shipment to the Falklands on two separate ships. These ships, each of some thirty thousand tons and fitted with a heli-deck, were anchored off their chosen sites and their loads of more than 700 containers flown up by Chinook, since both sites were inaccessible by ground vehicles. Major J. R. (Richard) Pawson and 3 Field Squadron were initially tasked to plan and build both sites in the period September 1983 to April the following year, but a



Mount Kent radar site.

late decision gave Operation *Tantara* to Major W. J. R. (Bill) Hughes and 73 Field Squadron.

Both sites were extremely barren and windswept, similar in many ways to the top of Mount Snowdon in Wales. The initial plan was for the works parties to live permanently close to their sites in tented camps. However, an early Antarctic storm destroyed most of the tentage. So 'Plan B' was quickly adopted. As twenty ISO containers were emptied of their resources on the task site, each one was hastily adapted to accommodate kitchen/dining/ ablutions/sleeping facilities (ten men per container). To the immense credit of all concerned, and despite the primeval living conditions, both radar sites were successfully completed on time.

Inevitably, with hindsight it may be viewed that some decisions taken during these hectic months were not the most cost-effective, but it would be harsh to accuse anyone of not having done his best in the unique circumstances prevailing at the time. Major Brown wrote:

An RAF officer came to CRE Works one day, announcing that he was planning a radar station for Mount Kent. I suggested putting minimum facilities on the top, with a main camp at the bottom of the mountain. 'Generate power at the foot, at high voltage (11kV) and use overhead lines to take up sufficient power for the installation' was my advice as a PQE (E&M) officer. Then, in the appalling Falklands weather, a couple of operators at the top could survive in their cabins, to be relieved whenever the weather lifted. What did they do? I came back a year later to take over command of 34 Field Squadron to find that it was close to the end of building a huge camp for dozens of men on the peak. All the materials and men had been airlifted by Chinook helicopter at huge cost. A number of generating sets were in place, each connected to a series of cabins. Each operated all day, at part load, not only inefficiently, but, inevitably, causing damage to the engines. What a complete waste!⁵⁷

Accommodation⁵⁸

A requirement for hutted accommodation was foreseen by HQ EinC early in Operation *Corporate*, but, until the loss of *Atlantic Conveyor*, the QMG's staff were not prepared to sanction its

procurement. In May 1982, Director Engineer Services (DES) was able to task the Military Works Force (MWF) with designing accommodation for 3,000 men based on two camps for 800 men each and seven camps for 200 men each. Eight-man huts were to be provided, with hot water and showers, internal lighting and waterborne sewage. Water would be produced at fifteen litres per head per day, and cooking would be by American M59 petroleum stoves. Later additional features such as lecture-rooms were added within laid down scales.

The main focus for this work was at the Canache, an area that was close to the east of Stanley but allowed a clear separation of military personnel from the civilians in the town. Of particular interest here were the logistic aspects, including the installation of a Double Storey Heavy Girder Bridge, a 300-metre access road to the Falkland Intermediate Port & Storage System (FIPASS), as well as the key installations of a NAAFI and a bakery. In addition to all of this there was a commitment to supporting accommodation needs in South Georgia.

The aim was to procure and ship all hutting stores by 10 August 1982, in order to give Sappers in the Falklands time to meet CBFFI's completion date for accommodation by April 1983. Fortunately, the MWF had completely rewritten and published a key document in 1981, *Accommodation in the Field*, which was very detailed and provided the basis for the design process, which also involved discussions with manufacturers. The end product was a detailed set of stores lists and advice on construction methods. The hutting selected included Portakabin, Wyseplan, Pakaway and Portaloo products, while Dale 250kVA and Hawker Siddeley 150 kVA generating sets were also selected. Electrical distribution was to be by underground cable at low voltage for the 200-man camps but at 11,000 volts for the 800-man camps. (Regrettably, it took some time for the specification of these electrical systems to be deemed safe for domestic use.) Water supply systems included Hydroglas sedimentation and storage tanks with pumps and filters to match, while sewage ejector stations were selected to enable sewage to be pumped from camps into the sea through layflat hose. Many of those in

the MWF who had been involved in the design of camps in the UK volunteered to go to the Falklands and were involved in the construction of the camps.

Once likely sites had been identified, the Defence Land Agent negotiated for the sites with the landowners concerned. Site plans and camp layouts were then produced by CRE (Works) staff for approval by the G4 staff, who then convened and ran acceptance meetings attended by all involved, including unit and environmental health representatives.

When final approval had been given for a camp, stores were released to the squadron that was to build it and the Clerk of Works who had designed the camp remained on site throughout



Coastel 2 at FIPASS, late 1983.

the construction. Before completion of construction, logistics staff would hold a meeting on site at which the actual number to occupy the camp would be announced together with any final changes to the design. Commissioning equipment and checking buildings for electrical safety were the responsibility of CRE (Works) before camps were taken over by units. In the event, seven camps were completed and occupied by units before the end of April 1983: an outstanding achievement.

Soon after the end of the war it became clear that the garrison in the Falkland Islands would have to be greater than the 3,000 figure on which accommodation planning had been based, with the largest concentration in the Port Stanley area. Already MS *Rangitira* was being used as an accommodation ship in the Port Stanley inner harbour. It was at this stage that the Swedish shipping line, Stena, offered the MOD a lease on one of its accommodation barges, *Safe Dominia*, which had been used by the oil industry in the Caribbean. Known as a 'Coastel', it was a completely self-contained vessel, providing accommodation for 930 men, designed to be moored at the waterside with a walkway ashore and requiring only fuel oil for operation. In essence, it was a collection of ISO containers on a barge hull (100 metres by 30) providing bedrooms, recreation and dining rooms as well as kitchens and toilets. Power, fresh water, heating, cooking, sewage disposal and laundry facilities were all provided on board. After considerable study and discussion in the MOD, the lease was signed and a site selected at an inlet adjacent to the Port Stanley airfield. Sappers were then faced with constructing a 1.7-kilometre approach road across low-lying, peaty terrain with a 500-metre access road at the site and a berthing face for the vessel capable of withstanding a horizontal force of 300 tonnes. Six mooring bollards were also required, of which four had to withstand a force of 100 tonnes and two of 50 tonnes. This work had to be completed within seven weeks.

Major problems were encountered and overcome, particularly in providing the berthing face and bollard anchorages. Bedrock was encountered close to the surface at the berthing site, thus

preventing the use of vertical piles. In the event, three groynes consisting of horizontal piles supported on dug-in vertical baulks were used, with the vertical face covered with shuttering behind which mass concrete was placed. In the case of the bollard anchorages, ISO containers were buried and then filled with reinforced concrete. The bollards, which had been supplied by the MOD, were then bolted on top, providing a neat and effective solution.

Later, two further Coastels were provided, one of which was specifically constructed by a British company for use in the Falklands. Anchoring Coastels 2 and 3 presented problems similar to those encountered with Coastel 1, but instead of containers and bollards the sea anchors provided were dug into the shore. By the time of the arrival of the third Coastel (*Safe Esperia*) Sapper patience with providing excellent accommodation for other units while they themselves remained in much less commodious, temporary billets was running thin. 7 Field Squadron effected a coup de main with *Safe Esperia*, claimed 'ownership rights' and refused to let any other corps or regiment on board. It became the 'Sapper Hilton' and was regarded as the best accommodation on the Island. Once the three Coastels were in place, it was possible to release MS *Rangitira* and the other vessels that had been used as seaborne accommodation. (Ironically, when it returned to the UK, *Safe Esperia* was earmarked as a prison ship but condemned by the Home Office as not being fit to house criminals!)

Battle Area Clearance⁵⁹

As described earlier, with the conclusion of hostilities, battle area clearance became a major undertaking for all three services, as the Islands were littered with unexploded missiles, bombs and ammunition as well as minefields – many unmarked and unrecorded – containing anti-tank and anti-personnel mines. Deadly hazards were, literally, everywhere. Major General E. (Eddie) Fursdon wrote: 'The day after the surrender, the CRE, Lieutenant Colonel G. W. Field, personally neutralized a command-detonated device consisting of three anti-tank mines coupled with two large propane gas cylinders.'⁶⁰

Port Stanley itself resembled a vast ammunition dump, with garages full of unexploded ordnance, Exocet and Roland missiles lying in ditches, and mines scattered in many areas. Many of the settlements were in a similar state, with mines stored in sheep-shearing sheds at Port Howard and Fox Bay, and there was an ammunition ship aground at Fox Bay East.

Reference has already been made to the Sapper effort devoted to clearing Port Stanley and the airfield. Before air operations began at the airfield, an RAF EOD team also carried out surface clearance there. RN divers worked on underwater hazards. A number of fishing trawlers were used by the Royal Navy to check areas for sea mines, but, although a barge-full was found, fortunately none seemed to have been laid. RAOC officers and technicians dealt with a wide variety of boxed ammunition, while bomb disposal officers and engineers from 49 EOD Squadron, together with teams from other RE units and, in some cases, infantry battalions, began battle area clearance.

As we have seen, initially the CRE made OC 9 Parachute Squadron responsible for coordinating EOD and mine clearance. In the four weeks after the end of the war, 9 Squadron's principal task was to deal with booby-traps, mines and unexploded ordnance in the area of Port Stanley and in the main settlements, i.e., Darwin, Goose Green, Fox Bay (East and West), Pebble Island and Port Howard. However, when the Squadron returned to the UK in the middle of July, a Joint Service EOD Operations Centre was set up to record the clearance of areas and to provide EOD advice, initially to the operations staff at HQ BFFI and later to the CRE.

The weather was harsh in August 1982 when the reinforced, EOD-coordinated team (commanded by Major G. (Guy) Lucas), assumed responsibility for clearance operations in Port Stanley and the settlements. The value of the primary search training all Sappers receive was quickly appreciated, and a sense of achievement was clearly evident as Port Stanley and areas such as Goose Green, Fox Bay East, Port Howard, Dunnose Head and Pebble Island were confirmed clear by the end of August. For his outstandingly successful work in the

uniquely difficult conditions that prevailed, Major Lucas was appointed MBE.

Next, the clearance of areas essential for a variety of military and civilian activities was begun. This included clearing access to farms and areas immediately around settlements so that restrictions to movement, imposed immediately after the war, could be lifted. However, minefields presented particular problems. Once hostilities had ceased, casualties were no longer acceptable, and very high levels of assurance were required for those working on clearance operations and for those using the areas once clearance had taken place. With the wet and peaty nature of the soil in the Falklands and the limited clearance equipment available, politicians in the UK decided that, after a number of casualties had been suffered by teams working on clearance operations, minefields should be identified, recorded, fenced and marked pending the development of improved clearance equipment. 69 Gurkha Independent Field Squadron was given this task, and its men spent their tour working, first on the minefields around Port Stanley and later moving west to the minefields that had been scattered around the main Argentinian defensive positions in the hills. It was during these operations that Corporal Krishna Kumar Rai was mortally wounded on 11 November. Inevitably, the nature of the soil and the way the mines had been liberally scattered in the first place meant that the risk of accidental casualties remained for many years after the conflict. One such was Captain G. E. (Geoff) Ward, who had the lower part of his leg blown off by an AP mine that had strayed outside a minefield fence. Happily, he survived and, with a prosthesis, he continued to serve in the Corps until 1997.

Mount Pleasant Airfield

Once the war was over, the British Government decided that a strategic airfield should be built in the Falklands, and the Royal Engineers were commissioned to examine the possible sites and make recommendations on the best for development. It was generally recognised that if there had been a strategic airfield in



The Prime Minister visits Rooney Bay minefield with CRE,
Colonel Black, 7 January 1983.

the Falklands before the war an Argentinian invasion would not have been successful, as it would have been possible to reinforce the garrison within 24 hours of the first indications that something was afoot.

Two reports by Lord Shackleton, in 1976 and 1982, had recommended the provision of an airfield capable of handling medium- and long-haul aircraft. A team with Sapper representation had already carried out a reconnaissance, and one possible site had been identified. The new study soon identified two options: to extend the existing airfield at Port Stanley or to build a new airfield on a greenfield site near Mare Harbour called Mount Pleasant. Initially the Cabinet foresaw the construction of the airfield being carried out by the Royal Engineers. However, after examining the implications for the Corps of building a major airport 8,000 miles from the UK, on a 4-month roulement basis for the workforce, the EinC had to recommend against such a course. The training and reorganisation needed to meet the commitment would have denuded the rest of the Army and the other services of Sapper support for a number of years. In

addition, it had to be admitted that the Corps was no longer trained or organised to carry out major projects of this type. Moreover, civilian contractors were likely to complete the task in half the time. The Chief and Vice Chief of the General Staff had to be won over to the EinC's view by means of a full-scale presentation before the Cabinet was finally persuaded to put the project out to civilian contract. In September 1982 the PSA was instructed to take over responsibility for the project, and after the due processes of design and tendering the contract began in October 1983.

Summary of Post-War Engineer Work

It would be difficult to overemphasise the achievements of the Corps in putting the Falkland Islands community back on its feet and providing for its future security. First in the field were the units who had fought in the war; for them life was as hectic, and often as dangerous, as it had been before the armistice. In the immediate aftermath in particular, 9, 11, 59 and 61 Squadrons, relying upon the expertise of the staff of CRE Works, worked tirelessly after entering Port Stanley to open, and keep open, the airport while also constructing the Harrier facility and a complete tented city in preparation for the arrival of the RAF and aircraft-associated units. Those who came after them worked with immense credit to complete what was a breathtaking array of tasks in conditions of physical danger and uncommonly foul weather. Altogether, it was a heroic effort. Colonel J. E. (John) Kitching, CRE August 1983 to February 1984, wrote:

between the end of the war and the opening of the new airfield and barracks at Mount Pleasant, [there was] a period of intense work for the Sapper units involved. During this period the Corps had up to 1,200 Sappers from seven squadrons working in the Islands. Apart from accommodation, they were involved in running a major quarry, installing three remote mountain-top radar stations, building road links, bakeries, moorings for coastals and floating jetties, improving electricity and water supply to all the population, installing an Island-wide telephone

system in the Port Stanley area, continuing battlefield EOD clearance and also providing support to the RAF in upgrading and maintaining Port Stanley airfield. One major concern of the troops stationed on the Islands was receiving mail from home. The need, roughly every six weeks, to close the airfield runway so that the AM2 matting could be lifted, straightened and re-laid to prevent its welds bursting under the constant battering from aircraft landing, always caused great gloom. Hence there was always pressure on the Sappers doing the work to achieve faster and faster relaying times. That what had once been a 36-hour task was down to 18 hours by the end of 18 months shows what could be done.⁶¹

Later, Operation *Bender*, as the lifting and re-laying of AM2 became known, was undertaken on a regular basis and the time was further reduced to twelve hours, which meant that it could be done in darkness overnight. RAF junior ranks were drafted in to help and were very surprised to be fed and watered during the operation. 'We never get looked after like this with our lot' were the comments. Inevitably, one of the consequences of re-laying the planks was that the rather nice, straight, white lines painted down the middle and edges of the first laid strip ended up all over the place as the matting did not go back to where it had started. Eventually it was commonly remarked that the runway resembled an exhibit in the Tate National – the white stripes were all over the place.

The 'can do' attitude of all units in overcoming the myriad difficulties encountered led to considerable initiative being developed by all ranks. Reference was made earlier to the habit of *razzing* across the Force. However, the code developed within the Sapper units that they would not to *razz* from each other. This courtesy was not commonly extended to other units. On one occasion, for example, a Sapper corporal's vehicle was stopped by a newly arrived and enthusiastic Royal Military Police (RMP) patrol, because his vehicle's rear light optics were not working. The corporal was quickly on his way after fixing the problem. The RMP left feeling pleased with themselves, not noticing that they now had no rear light optics. *Quo fas et gloria ducunt!*

In summary, a schedule of the sub-units that were assigned to 37 Engineer Regiment is listed below.

37 Engineer Regiment Subunits

1 Field Squadron	July to Nov 1984	32 Field Squadron	May to Sept 1983
3 Field Squadron	Aug to Nov 1982 and Oct 1983 to April 1984	34 Field Squadron	Dec 1982 to May 1983
5 Field Squadron	Nov 1984 to March 1985	39 Field Squadron	Dec 1983 to April 1984
6 Field Support Squadron	July to Nov 1983	42 Field Squadron	Oct 1983 to March 1984
7 Field Squadron	Feb to July 1983	48 Field Squadron (Construction)	May to Sept 1983
8 Field Squadron	Nov 1982 to April 1983	50 Field Squadron (Construction)	Aug 1982 to Nov 1982 and Jan to May 1984
9 Parachute Squadron	Jan to March 1985	51 Field Squadron (Construction)	Nov 1982 to April 1983
11 Field Squadron	Sept 1984 to Jan 1985	52 Field Squadron (Construction)	Jan to June 1983
15 Field Support Squadron	Feb to July 1983 and June to Nov 1984	53 Field Squadron (Construction)	Dec 1983 to April 1984
20 Field Squadron	Sept 1983 to Jan 1984	59 Independent Commando Squadron	May 1984 to Sept 1984
24 Field Squadron	Nov 1982 to April 1983	60 Field Support Squadron	August 1982 to January 1983 March 1984 to June 1984
25 Field Squadron	July to Nov 1983	61 Field Support Squadron	October 1983 to March 1984
29 Field Squadron	March to June 1984	69 Gurkha Independent Field Squadron	August 1982 to January 1983
30 Field Squadron	Aug 1982 to Jan 1983 and March to June 1984	73 Field Squadron	October 1983 to April 1984

RE Involvement after the opening of Mount Pleasant Airport

Once the new airport, with its rapid reinforcement capability, had been completed, it was possible to consider reducing the strength of the garrison in the Falklands and a second contract was let by PSA for the construction of additional accommodation at Mount Pleasant for most of the reduced garrison. The main operational role of the garrison, which was mostly concentrated at the Mount Pleasant complex, became one of securing Mount Pleasant Airport for rapid reinforcement from the UK by wide-bodied jets in the event of an emergency. For the Corps it was one of rapid runway repair and maintenance to ensure that reinforcement could still take place even if the airport suffered a surprise attack. On 14 March 1985, 37 Engineer Regiment was disbanded and replaced by the Falkland Islands Field Squadron, a role filled by a UK squadron on a four-month roulement basis.

With the opening of the new airport and the closure of RAF Stanley, the military centre of gravity moved to Mount Pleasant. Lookout Camp and the EOD detachment were to be retained in Port Stanley, but everything else was to go. There remained a large number of stores dumps dotted around the area, and Stanley remained in a mess. An initial assessment from theatre HQ concluded that all the military detritus should be collected up and dumped at sea. This included the AM2 matting. EinC disagreed with the simplicity of this finding, and a detailed Sapper study was carried out. The conclusion of this was that a considerable amount of valuable stores could be recovered to CEP Long Marston. Operation *Flogger* ensued: 25 Engineer Regiment, under command of Lieutenant Colonel K. (Kevin) O'Donoghue, spent four months in 1985 recovering stores and clearing away the evidence of three year's worth of military presence in and around the town. Most of the hutted camps were vacated and the hutting sold. The AM2 matting, which had proved so effective, was also removed and returned to CEP Long Marston for renovation and storage. The decision to save the AM2 matting was to pay dividends when it was used extensively for a variety of purposes during the Bosnia and Kosovo operations and also during the first Gulf War. Meanwhile, the

Corps was kept fully occupied training for its operational role and also improving living conditions for all ranks by, for instance, constructing a heated, 33-metre indoor swimming pool at Mount Pleasant.

The intensity of the work in the immediate post-war period was a triumphal testimony to the professional skills of the Corps and to the leadership in units that frequently had to work around the clock to achieve their targets. The confident approach of PQEs, GEs, E & MOs, Plant officers, MPFs and Clerks of Works owed much to the far-sighted Corps policy of maintaining a 'hard core' of professional engineers and technicians and providing them with sufficient experience to meet the challenge of such an emergency as the Falklands. That the Corps was able to draw so effectively upon such expertise owed much to the recent experience obtained on high-quality work in Saudi Arabia and on attachments to the PSA, the Hong Kong government and other agencies. (See also Chapter 9.) Once again, it was demonstrated that, with its wide range of units and skills, underpinned by professional competence, the Corps was capable of performing any task asked of it. *Ubique!*



Falklands Campaign (Cuneo).

NOTES

- 1 Macdonald, Major R., Post operation report, 59 Independent Commando Squadron Royal Engineers.
- 2 Subsequently renamed Engineer and Logistic Staff Corps (TA). Members are Chartered Engineers, usually practising as such in civilian companies, and who hold a commission in the Territorial Army.
- 3 It was common for the RN and RAF to operate on Zulu time, i.e., Greenwich Mean Time, later called Universal Standard Time. This was four hours ahead of Falklands local time. All units adopted Zulu as the reference for operations, but the time difference was to cause confusion throughout the campaign.
- 4 Macdonald, op. cit.
- 5 Ibid.
- 6 MESE Float, a purpose-built raft consisting of interlocking metal pontoons and powered by two engines, used for transferring stores/personnel to and from ships at anchor.
- 7 Shergold, Captain S., OC Support Troop, 59 Commando Squadron Royal Engineers.
- 8 Livingstone, Lieutenant Clive, *The Attack on Goose Green and Darwin*, RE Corps Library.
- 9 It was common practice to refer to units and subunits by their radio call signs. In this case the sub-sections (usually four men commanded by an officer or NCO) were referred to as '13D', '13B' and '13C'.
- 10 Livingstone, op. cit.
- 11 Ibid.



Memorial on Sapper Hill, 1983.

- 12 Morgan, Major R. C., OC 61 Field Support Squadron Post Operation Report.
- 13 Ibid.
- 14 Brown, Major S. A., ACRE, CRE Works Falklands
- 15 Hawken, Major R. B., OC 11 Field Squadron.
- 16 Major Morgan recalled later: 'At a very late meeting in HQ EinC, when we planned the loading of *Atlantic Causeway*, towards the end Brig Barton said "there might be another 50 tons available so what would you like?" My response was a "selection of nails, bolts, screws and all those items that I would nip down to Jewsons for ... and some cement in sealed drums ... and a few RSJs. I don't know what for, but they might be useful somewhere". [They were.] When I got home from the MOD around midnight I received a 'phone call from Long Marston asking how many of each size of nail and screw I wanted and what size should the RSJs be!'
- 17 Davies, Major C. M., Memoir, 9 Parachute Squadron Royal Engineers in the Falklands Campaign, 1982.
- 18 Captain Foxley and the survivors of his troop were keen to stay in Fitzroy and get on with the war, but they were now without weapons, rations or equipment. They were returned to San Carlos, where they became HMS *Intrepid's* Sappers and did excellent work (for example, the following week on West Falkland when that ship was given the task of opening up the settlements there). Subsequently, the troop's artisans were essential to the reconstruction work in Port Stanley, notably the emplacement of the military power station.
- 19 Halkett, Sergeant S., Condor Troop 59 Independent Commando Squadron, 59 Squadron Post Operation Report, RE Library.
- 20 Tim Dobyn was a civilian who lived at Bluff Cove. He frequently volunteered his vehicles, his services and mugs of tea by his warm Aga stove to anyone in a British uniform: he was priceless.
- 21 Davies, op. cit.
- 22 Hicks, Captain Adrian, *The Mount Harriet Operation*, RE Corps Library.
- 23 Bell, Corporal D. A., Condor Troop 59 Independent Commando Squadron Royal Engineers
- 24 *Holdfast* - 'radio-speak' for Royal Engineer.
- 25 Hendicott, Lieutenant R. C., Troop Commander, 1 Troop, 59 Commando Squadron Royal Engineers
- 26 Macdonald, op. cit.
- 27 See also Fursdon, Major General (ret'd) E., *Falklands Aftermath - Picking up the Pieces*, London, 1988.
- 28 Macdonald, op. cit.
- 29 Corporal Robson did not, of course, work alone. His laudable endeavours were directed by Major Nicholas, and the sand filter had to be emptied of its sand by a platoon of Welsh Guardsmen before it could be moved.
- 30 Morgan, op. cit.
- 31 Nicholas, Major R. A., Chief Electrical and Mechanical PQE, CRE Works Falklands.
- 32 Nicholas, Major R. A., Chief Electrical and Mechanical PQE, CRE Works Falklands
- 33 1 Troop 59 Commando Squadron immediately set about cleaning out,

refilling and capping the craters on the airfield runway. For the latter they used Argentinian AM2 planks, of which there was a ready supply near at hand on the airfield. It was these repairs that allowed the first landing of a British Hercules C-130 on 24 June. Having stayed to witness the success of their work, 1 Troop only just managed to get to *Canberra* in the nick of time for their journey home. The anchor was being raised as they scrambled aboard!

34 Macdonald, *op. cit.*

35 Davies, *op. cit.*

36 One, near the western end of the runway, was the result of a Vulcan attack, while the others were made by Harriers. One of these, on the southern half of the runway near the middle, was a particular obstacle, and it was this that 1 Troop 59 Squadron tackled first, using fill from the Maryhill quarry, the quarry used by the contractors who had built the airfield.

37 Hawken, Major R. B., OC 11 Field Squadron.

38 Scabs were damage to the airfield surface made by cannon, missiles and shrapnel; they varied in size from two or three centimetres up to 60 centimetres.

39 *Profited*: a corruption of 'profited', a euphemism for 'borrowing', usually without the owner's permission, which was common parlance in the Task Force. It had become the accepted way of meeting needs that were not being met through normal channels of supply.

40 See also *REF*, 97/1.

41 Brown, Major S. A., ACRE, CRE Works Falklands.

42 Hawken, Major R. B., OC 11 Field Squadron.

43 For details of the work on the airfield see Reid, Major D. I., 'Stanley Airfield - Airfield Damage Repair', in *REF*, 97/1.

44 Nicholas, Major RA, Chief Electrical and Mechanical PQE, CRE Works Falklands.

45 Nicholas, Major RA, Chief Electrical and Mechanical PQE, CRE Works Falklands.

46 Davies, *op. cit.*

47 Brownson, Colonel D. See also 'The Beginning of Rehabilitation' for details of RE ORBAT, tasks overview, Airfield extension and re-surfacing, Accommodation issues and Battle Area Clearance in *REF*, 97/2.

48 Morgan, *op. cit.*

49 RCT - The Royal Corps of Transport, later absorbed into the Royal Logistic Corps.

50 *Razzing* was a derivation of Resupply at Sea (RAS), the RN process for ship-to-ship stores transfers whilst underway. In this context *razz* was used interchangeably with *prof* as a military colloquialism.

51 See note 2 above.

52 In the past, 37 Regiment had been the 'Railway' Regiment at Longmoor. Reformed as a Field Regiment in 1967, it had been disbanded in 1974. It was re-formed to serve as the 'Falkland Islands Regiment' in 1982 and disbanded once again in 1985.

53 For more detailed description of the design and work involved see Ievers Colonel P. R., 'The Airfield' in *REF*, 97/2.

54 Two RHAGs were on the (normal) westerly approach and one on the easterly approach (to cater for changes of wind direction).

55 Major J. R. (Jeremy) Harrison. See *REJ* Dec 1983 for a complete description of this operation.

56 See also *REJ*, 97/2 and Reid, op. cit.

57 Brown, Major S. A., ACRE, CRE Works Falklands

58 See also *REJ*, 97/2.

59 *REJ*, 97/2.

60 Fursdon, op. cit.

61 Provided by Colonel J. E. Kitching, CRE Falklands, August 1983 to February 1984.

The First Gulf War

1990–1991

Foreword

by Frederick M. Franks Jr., General US Army,
Commander US VII Corps, First Gulf War

United in the desert by a common mission for the first time since the early 1940s, US and British forces combined in VII Corps to conduct a lightning-swift 89-hour attack in 1991 that liberated Kuwait as part of the Coalition. From our very first notice that UK First Armoured Division would become part of our attack and my first meetings with Lieutenant General Peter de la Billière and then General Officer Commanding 1 UK Armoured Division, Major General Rupert Smith, to visiting British commanders and soldiers in preparation in live fire training, I and all my fellow Americans were profoundly grateful to have our British allies part of our now powerful combined armored formation. Training directly with the US 1st Infantry Division and with US 142 Field Artillery Brigade reinforcing artillery fires, General Smith and his commanders and soldiers became quickly part of our combined VII Corps team. As told in this excellent and thoroughly researched account, 1 UK Armoured Division, with the Desert Rats of 4 and 7 Brigades, and their Royal Engineers support conducted an early movement through a minefield breach, then a rapid and relentless attack north and east through Iraqi forces to finish across Highway 8 north of Kuwait City early on 28 February 1991. Mission success of liberating Kuwait as part of the Coalition would not have been possible for VII Corps without 1 UK Armored Division with their superb Royal Engineer support. VII Corps fought as a US-UK combined armored team with skill, courage, teamwork, and toughness. Having had the



opportunity following 1991 to speak in the UK personally on numerous occasions and to visit and present awards to soldiers who had served, I value professionally the opportunity to have served with our British allies of 1 UK Armoured Division, as does all of VII Corps. I continue across the years to deeply admire and professionally respect the valor, sacrifice, and skill of our British allies of VII Corps, as we will always remember and honor those who did not return and their families.

The Political and Military Situation

The Iraqi invasion of Kuwait on 1 August 1990 marked a turning-point in international relations in the Middle East. During the eight years of the Iran-Iraq War, Iraq had received the support of many Western nations in building up its conventional war fighting capacity and, more clandestinely, in developing a programme for weapons of mass destruction. The attack on Kuwait was the product of historic grievances, which were last aired in the wake of British recognition of Kuwait's independence in 1961, and more recent post-war economic stress. Saddam Hussein, the Iraqi dictator, explained the contrast between the prospering economy of Kuwait and that of Iraq as being rooted in the stealing of oil from the Rumaila field on the border between the two countries. This was the pretext for invasion on 2 August 1990, which was quick, successful and ruthless in its dealings with the Kuwaiti establishment.¹ Oil wealth had in turn made the Kuwaiti leaders key figures of the international economy, so condemnation, economic sanctions and diplomatic pressure were immediate and intense.

Iraq possessed the third largest tank fleet in the world; many of its troops were battle-hardened in the Iran-Iraq war; it had a fledgling programme for chemical and biological weapons and the rocket technology to exploit this. Its military infrastructure was formidable, and its compact, family, ruthless leadership made any diplomatic solution or compromise unlikely. There was evidence to suggest a more than adequate military capability to expand farther down the Gulf into Saudi Arabia, causing the United States to deploy aircraft and naval forces at the invitation

of the Saudi Arabian Government. British Prime Minister Thatcher, meeting with President Bush at Aspen, Colorado, agreed joint action, and Britain deployed F3 Tornados of the Royal Air Force to Dhahran in Saudi Arabia on 14 August 1990, followed by Jaguars and GR1 Tornados to Muharraaq, in Bahrain. The Royal Navy was already present with the Armilla Patrol, which since 1980 had been providing reassurance and protection for British merchant shipping in the Gulf.

The Military Response – Planning the Land Forces

While diplomatic activity and the rapid deployment of air and naval forces reduced the immediate threat to Saudi Arabia, the United States moved immediately to back this deterrence with ground forces from both the Army and the Marines. Economic sanctions were imposed, but it soon became clear that these measures would not induce Iraq to withdraw from Kuwait. In September, Britain, France and a number of Arab nations agreed to commit ground forces as members of a Coalition, the eventual membership of which comprised 29 countries: Argentina, Australia, Bahrain, Bangladesh, Belgium, Canada, Czechoslovakia, Denmark, Egypt, France, Germany, Greece, Italy, Kuwait, Morocco, Netherlands, New Zealand, Niger, Norway, Oman, Pakistan, Qatar, Saudi Arabia, Senegal, Spain, Syria, UAE, UK and USA.

The nature of the British response was not easy to formulate. Three levels of forces were examined: a reconnaissance battle group, an artillery group and an armoured brigade. 1 (UK) Armoured Division in Germany was included in this process, since a planned series of divisional study days was redirected to examine the implications and challenges of each force level. The immediate requirement for Royal Engineers to support the Royal Air Force was not in doubt, however, and early reconnaissance and planning teams from 39 and 22 Engineer Regiments moved to Dhahran and Muharraaq. Valuable early assistance and information was provided to such teams from Sapper officers, including Survey, working from Riyadh on the Al Yamamah project, the scheme under which aircraft and other military equipment and the back-up for it was being supplied to Saudi Arabia from Britain.

In London, the EinC, Major General R. L. (Richard) Peck, and his staff played a significant role as an integral element in force planning for this expeditionary campaign. First, there was the need to establish the necessary scale and command structure of the engineer element of the UK contingent. Second, there was an urgent need for the acquisition and coordination of Engineer intelligence, much of which had to come from non-military sources. It also immediately became clear that the R&D and Procurement agencies must be alerted to be prepared to provide urgently needed specialist equipment. A system had to be set up for identifying requirements and monitoring the effort.

As soon as Iraq had invaded and captured Kuwait, a dedicated operations/intelligence room was set up in HQ EinC under the control of Lieutenant Colonel S. K. E. (Steen) Clarke. This served as a briefing centre for all branches of the EinC's staff and for visitors. Input from the briefings in the MOD Main Building was obtained by the EinC's SO2, Major J. F. (John) Crompton. Colonel A. A. (Alasdair) Wilson was drafted in to coordinate the briefing and liaison effort. This system ensured coordination in forward planning and enabled the Corps to anticipate operational needs. This became especially important in the Engineer Resources area. A complication was that the headquarters was already fully stretched by the staff work for *Options for Change* (see Chapter 4). The dedicated Operations/ Intelligence Room meant that these two highly active functions could proceed without interference.

Prior to this emergency, grave doubts had been expressed that British forces would ever again be called upon to take part in Out Of Area (OOA) operations. This had tended to shape thinking on equipment priorities, provision of movement assets and force size and composition. Radical rethinking had rapidly to be developed.

The Chief of the General Staff, General Sir John Chapple, paid a visit to Headquarters EinC. Major General Peck recalled the visit in his *Recollections of the Gulf War*:

After a routine discussion in my office, I took him to the operations room. Steen Clarke briefed him using our display of aerial photographs and other information. The aerial photographs

showed the Iraqi defences in Kuwait, including lines down to trenches forward of the first defended line. It was clear to us that the lines were pipelines from the oil refineries and it was our conclusion, which we stated, that the enemy intended to fire these when they came under attack. CGS showed great interest. Later that day, I was called by CGS's office and asked to give the same briefing to Air Chief Marshal Sir Patrick Hine in the Main Building. Having done so, I was asked to attend his HQ in High Wycombe to brief his staff.²

Events speeded up when, on 14 September, the decision was announced that an armoured brigade, 7 Armoured Brigade, commanded by Brigadier P. A. J. (Patrick) Cordingley would be sent. Major General R. N. (Roger) Wheeler, GOC 1 (UK) Armoured Division, announced this to the Division's officers at the end of the study day in the Jerboa Cinema at Fallingbowl, with electrifying effect. It had already emerged that 21 Engineer Regiment would provide the troops for the force package, but the level of support required would depend on the result of a reconnaissance to Saudi Arabia. The MOD was keen to limit the force by numbers deployed rather than by capability required – a form of control that became known as 'rate capping'. The Engineer order of battle had to compete with those of other arms within a fixed manpower budget presented to Ministers.

Operation Desert Shield

The Americans had by now named the operation *Desert Shield*, with the intention of defending Saudi Arabia from invasion, and the UK gave it the name Operation *Granby*. Throughout the war the Press preferred to use the US names (later *Desert Storm* for the offensive operation). Initially the intention was to provide a military presence to deter further aggression from Saddam Hussein, while diplomatic efforts were made to persuade him to withdraw from Kuwait, and the build-up of the Coalition forces was intended to achieve this end. For diplomatic reasons, command of the Coalition was shared between the Saudis and the Americans, but there was no doubt that General N. (Norman) Schwarzkopf, the US Commander-in-Chief of Central Command (CENTCOM) was in charge and the USA was the de facto leader.

Lieutenant General Sir Peter de la Billière was appointed Commander-in-Chief British Forces Middle East (BFME). He brought with him extensive knowledge of the Middle East and understood Arab culture, as well as having a reputation for being an outstanding soldier and leader.

Joint Headquarters (JHQ)

Early in the campaign it was agreed that Strike Command would provide the Joint Headquarters for the operation, with the CinC, Air Chief Marshal Sir Patrick Hine, as the Joint Commander. The choice of Strike Command followed naturally from the early RAF involvement in the campaign, and the hardened Command Centre at High Wycombe provided an excellent working environment with first-class communications. An important by-product of the CinC's visit to brief the Joint Commander at High Wycombe was that proper arrangements were made for providing Sapper advice in the headquarters.

In accordance with existing contingency plans, the Army element of JHQ was found initially from those staff officers at UKLF known as the 'away team', whose drills for this detachment had been well-practised on exercises. The engineer representative was the SO2 (Engineer Operations), Major I. M. (Ian) Tait, who deployed to High Wycombe in August 1990. The Commander UK Field Army, Lieutenant General Sir Michael Wilkes, became the Deputy Commander (Land), with Commander Engineers UKLF, Brigadier P. M. (Mike) Hill, as his engineer adviser. The SO2 (Engineer Logistics), Major J. D. (Derek) Beaumont, joined Major Tait quite soon, but no more officers could be accommodated in the bunker, and the small engineer staff at UKLF was thus split between High Wycombe and Wilton, the latter being reinforced as the pace of events quickened.

The initial roles of JHQ were to plan and agree in detail with the MOD the UK order of battle and then to mount the force. In particular the Engineer cell had the task of obtaining agreement for the requests for men and stores resulting from the initial reconnaissance and converting these into movement plans. They

also had to coordinate all engineer intelligence, interpreting aerial photography and other source material. Preparation and training of the armoured formations remained the responsibility of BAOR, but the whole complex movement, logistic and resupply operation was run from High Wycombe. The speed and scale of the deployment was impressive and only dwarfed by the incomparably larger US operation. Even so, the movement of the



British brigade, and later the division, with supporting elements required dozens of ships taken up from trade (STUFT) strung out between Germany, the UK and the Middle East. A huge logistic staff effort was needed to ensure all the right supplies were loaded on to the correct ships and subsequently dispatched to the receiving units sitting somewhere in the Saudi desert. The Engineer cell at High Wycombe remained the first point of contact for all requests for manpower, stores and equipment from the theatre until Headquarters British Forces Middle East (HQ BFME) was set up in early October and became the focal point through which requests were passed.

Reconnaissance and Deployment

The first reconnaissance parties left on Sunday 16 September, comprising strategic and tactical commanders and logisticians to plan host-nation support, reception and sustenance of the force. The Sapper element was the Commanding Officer 21 Engineer Regiment, Lieutenant Colonel J. D. (John) Moore-Bick and Lieutenant Colonel M. G. Le G. (Meryon) Bridges from MWF. After briefing in High Wycombe, and a short meeting between the two Sappers with the DEinC, Brigadier E. H. (Eric) Barker to clarify the support available from HQ EinC, the fourteen-strong team flew to Riyadh and thence to the port and airfield of Al Jubayl on the Gulf coast. The result of the recce was briefed to Strike HQ on their return and confirmed the need for a full RE regiment to support the brigade, for an RE regiment to deploy first to prepare the reception of the brigade and the deployment of MWF personnel to plan and execute the many logistic engineering tasks that were needed to support the force. Another significant result of the recce was confirmation of the need for an Engineer cell in Riyadh as part of HQ BFME. Colonel Alasdair Wilson was released from HQ EinC to lead the team, with Major C. A. (Colin) Mildenhall as the SO2 and Captain R. L. (Roraigh) Ainslie as SO3.

On 19 September, 39 Engineer Regiment, under the command of Lieutenant Colonel R. (Bob) Pridham, was recalled from exercise in Germany to prepare for deployment in support of the

Royal Air Force and to prepare to assist the deployment and reception of 7 Armoured Brigade. It arrived in Al Jubayl on 29 September and was received by the United States 1st Marine Expeditionary Force. Accommodation was in huge warehouses on the dockside with centrally prepared meals provided from a kitchen for 25,000 men and women, with quality appropriate to scale and 'Meals Ready to Eat', the US Army dehydrated ration packs, as the only alternative. Daytime temperatures in the region of 42° Centigrade made rapid acclimatisation, proper clothing and water discipline essential.

Though restricted to less than a quarter of its full strength by the Government's numbers policy, the Regiment deployed 53 Field Squadron (Construction), to construct the 2,000-man tented camp, Baldrick Lines (named after a character in a BBC comedy programme, *Blackadder*), and 60 Field Support Squadron to handle freight and organise the British line of communication into the port. A troop of 3 Field Squadron (22 Engineer Regiment) deployed to Muharraq in Bahrain on 23 September to establish 22 Field Hospital, and a troop of 48 Field Squadron moved to Tabuk, Saudi Arabia, to support the RAF detachment of Tornados there. CRE (Works) Middle East, under the command of Lieutenant Colonel Bridges, deployed to Al Jubayl to support the FMA.

RHQ 39 Engineer Regiment, as the British command coordinating headquarters, provided daily briefings, allocated real estate and coordinated the reception of personnel and stores from the airport.³ Thus it formed the nucleus of what was to become HQ FMA. One of 39 Regiment's most significant tasks was to rehabilitate 'Camp Four': originally intended by the Saudis for housing 'third nation' labour, this hutted camp required complete renovation to provide a rest and recuperation facility and centre of the administrative world throughout the campaign.

The earlier reconnaissance had identified the testing operational environment that the brigade would face. This was to pose completely different problems from operating in BAOR. First of all there was the heat and dust of the desert, which affected the performance of both men and machines. The first

priority for the soldiers was water supply in an empty desert. This was to be solved initially by the provision of bottled water, but, as the supply dried up in Saudi Arabia and the rest of the Gulf, alternatives had to be produced. The UK quickly brought into service reverse osmosis equipment, which could be used to purify all sources of water, including that from the Gulf. The next priority was to provide clean, fresh food. Again, local supplies were soon exhausted, and food had to be brought in by ship. Clothing had to be able to cope with intense heat during the day and extreme cold at night. The much desired 'desert camouflage' clothing was late in arriving – because of production delays, some units only received it after the war was over. Vehicles required 'desertisation' with improved sand filters added to most. The lack of air-conditioning in all vehicles was a huge problem to begin with, but the weather soon turned cold and eventually freezing at night – those who kept their temperate combat kit were the wise ones. In addition to the heat, sun, sand and bitter cold at night, the historic skills for desert driving and maintaining operational effectiveness over an extended period of field living needed to be learnt from the archives of the Second World War. The basis of 21 Engineer Regiment's standard operating procedures was to be a translation of a Nienburg neighbour's from his time in the Afrika Korps. The great distances over empty desert made logistic supply a great problem, while the lack of roads made it difficult for fuel and water bowzers to keep up with the armour. Ammunition resupply was also a problem. There were no forward storage depots in the desert.

As the Regimental organisation hardened up, 21 Engineer Regiment went through a rigorous programme of training – physical, NBC, map reading and desert navigation. Arabic culture and courtesies, and weapon handling were included. The commanders' reconnaissance had identified that the UK force would support the US Marine Corps units in theatre. The main Engineer problems being experienced by 1 US Marine Division were those of field and armoured engineering. Considerable internal reorganisation took place to create a headquarters squadron, to integrate 26 Armoured Engineer Squadron,

substantial numbers of individual reinforcements, especially REME, RAMC and ACC tradesmen into 1 Field Squadron (general support) and 4 Field Squadron (close support). Steps were also taken to prepare for the reception of 14 Independent Topographic Squadron and 49 Explosive Ordnance Disposal Field Squadron in theatre. Many equipments and vehicles had to be found from other regiments' holdings to produce an operationally ready fleet in infra-red-reflecting desert camouflage. Full support was received from all of the Royal Engineer units in BAOR, which seriously degraded their own operational capability.

All units had hard decisions to make on who to take and who to leave behind. In 21 Regiment, 7 Field Squadron was due to deploy to Northern Ireland; the decision to rescind this direction late in Gulf planning left little choice but to leave that Squadron as the backbone of the rear party, a significant and disappointing setback for many in the short term. However, most were deployed eventually in a variety of roles. The OC of 7 Squadron, Major C. M. (Chris) Sexton, was selected to be the 'escort' for Kate Adie, the formidable war reporter for the BBC. Many of those left behind were eventually deployed as Battle Casualty Replacements (BCR). Preparation of the rear parties was a major challenge for wives and civilian staff, particularly in the single regiment stations of Nienburg and Waterbeach. Casualty bereavement training put the statistics of operational analysis, which predicted up to 20% casualties overall, into sharp focus – Royal Engineers in the lead elements of the breaching operations were expecting up to 60% casualties.

Study groups covered the full range of information requirements, travelling widely to rediscover old lessons, obtain geographical data and to research the best techniques for mobility, counter-mobility and water supply. As the emphasis on defence switched to thoughts of an as-yet not openly talked about offensive operation, new challenges abounded: breaching techniques against formidable multilayered obstacles with mines, wire, ditches, oil and fire had to be developed and practised. Plans for new devices to give better mine-clearing were devised, as were

techniques for crossing pipelines. Some of these, such as the 'Clegg super wedges', to arch the No. 8 Tank Bridge to enable pipelines to be crossed, could be tried out in Germany; others, such as the Roller Tank, had to wait for deployment, and other ideas were passed on to the Defence Research Agency (DRA), already working flat-out on Gulf problems at all their establishments. An example of this was the work at DRA Christchurch to find some method of overcoming burning oil-filled trenches.

A major threat was from Saddam Hussein's stockpile of chemical weapons, which had been used in the Iran-Iraq War and against his own people in Kurdistan. Though it was known that Iraq had experimented with biological warfare, it was not known if they had developed biological weapons. The organisation for NBC warning and reporting had to be set up and constantly exercised to make sure that nobody would be let down in the face of the considerable chemical and unknown biological warfare threats.

Loading of vehicles from Germany began at Emden on 27 September. The advance party of 7 Armoured Brigade, led by 21 Engineer Regiment, arrived on 11 October. Al Jubayl proved to be an ideal port of disembarkation for the force. One of the two



Crossing oil-filled and fired anti-tank ditches using foam fire-suppressant.

deep-water ports had been made over to military use and was capable of taking six or eight ships at a time with both roll-on roll-off and general cargo-handling facilities. To the west there was a complete, but unused, airport capable of taking wide-bodied jets, and this, too, had been placed entirely at the disposal of operations. The whole facility was under the control of the United States Marines, and an early task for 39 Engineer Regiment and CRE (Works) was negotiating for real estate from which to operate.⁴

The first need was for facilities for the reception of the main body of 7 Armoured Brigade. The 2,000-bed tented transit camp, Baldrick Lines, was set up initially against an estimated longer-term requirement of 9,000, of which 4,000 would be for transit only. Ideally units would only be in transit while waiting for their equipment to arrive by sea. 2,000 beds soon proved inadequate, however, and capacity was supplemented initially by warehouses on the port jetty and then by the allocation of the ready-built camp, 'Camp Four'. Another warehouse was taken over as a workshop for modifications to armoured vehicles, all of which went through an upgrade to enable them to operate in the desert. Two bulk fuel installation sites were established, an ordnance storage area grew up in a civilian cold store, and an ammunition storage point was established in a disused quarry.



Queuing for a shower, Blackadder Lines.

The early planning had been based on the assumption that units would spend a minimum of time in transit, with most time being out in the forward positions. The realities were to prove that troops needed to be rotated out of the desert, so the planned facilities were never enough, and tented camps and hospitals were occupied as quickly as they could be assembled. As the hard-standing in the port filled, the imperative was to get fighting units out, to begin acclimatisation and training. To maximise deterrence, heavy armour arrived, to great press acclaim, before engineers and logistic troops. However, no deployment to the desert could take place until rudimentary hard-standing and roads into the sand were completed, since tank transporters could off-load only with difficulty, and administrative vehicles could not follow over the soft sand. Borrow pits for hard-core storage needed to be opened, very soft rock turned to dust, and bulk water supply points had to be set up. The US Marine Corps were helpful in every respect, always ready to lend plant to British operators still awaiting the arrival of ships; early engineer capabilities were pooled, and American engineer resources, especially of timber, were lent pending arrival of British stocks. In a common effort to get the armour out into the desert, Royal Engineers operated Marine Corps equipment, and Marines took over incoming British equipment if it could not be manned. Lieutenant Colonel J. (John) Moore-Bick wrote:

Most Sappers prided themselves on desert living and were scornful of the so-called Baldrick lines where they reckoned they got messed about. And as the USMC were in defensive positions fearing that the Iraqis with 2,000 HETs available, might attack down into Said to disrupt the build up we also occupied defensive leaguers behind them. Those with heavy A vehicles were quick to realise that this was home for however long it would take and made themselves at home.⁵

Command and Control

The effect of the piecemeal deployment to theatre led to flexible command and control arrangements being adopted for RE assets



Coalition Engineers: US Army, Navy, Air Force, Marines and Royal Engineers.

there. On paper it was neat: 21 Regiment supported 7 Armoured Brigade, while 39 Regiment and CRE Works supported the FMA; but in reality there were no clear boundaries until full deployment. A pragmatic agreement between the Chief Engineer Middle East, CO 21 Engineer Regiment, CO 39 Regiment and CRE Works for Engineer responsibilities behind 7 Brigade's rear boundary resulted in:

- all technical assets being commanded by CRE (Works), including those garrison engineers and clerks of works within the RE units. CRE (Works) eventually included an STRE (Fuels) and STRE (Works);
- 60 Field Support Squadron from 39 Regiment re-rolling as a field park squadron and looking after all stores arriving in theatre and local purchase, allowing 45 Field Support Squadron from 21 Regiment to draw from these stores and give normal support forward to the brigade units.

HQ 39 Regiment was to return to the UK when the main force had passed through the FMA and its task had ended. This enabled 53 Squadron to be redeployed to the airfields – its

proper role – enabling its OC, Major W. D. (Bill) Fawkner-Corbett to be responsible for all the RAF airfields in theatre. The Squadron HQ and one troop were based in Bahrain, with other troops at Dahrán and Tabuk.

It was replaced in the FMA by 3 Field Squadron, under the command of Major N. H. (Hamish) Rollo. Because of the 'rate capping', by which the MOD tried to limit the number of troops in theatre, Major Rollo had been ordered to deploy with less than half his squadron, which would have proved totally inadequate. But in the hurly-burly of the time he managed to smuggle his whole unit out – and, when it became obvious that it was needed, nobody minded.

While the technical problems for the tasks before the Corps were not too challenging, much improvisation had to be resorted to. Water supply and sewerage arrangements were produced with the help of local resources. More of a technical challenge was to be the field hospitals. A modest start was made by 53 Squadron with the 200-bed 33 Field Hospital in an abandoned tyre factory in Al Jubayl. This was developed eventually into the 600-bed General and Surgical Hospital, where a large range of



53 Field Squadron improvised air raid shelter, Dahrán airport.

medical facilities had to be allowed for, and the conflicting demands for full biological protection and clean, cool air had to be met. On arrival, 3 Squadron were given an area of open desert upon which to build 32 Field Hospital (200 beds), a job they did in three weeks with the help of AM2 matting rescued from the Falklands. CRE (Works) assisted in the construction of both those hospitals, the Norwegian hospital (200 beds) in Al Jubayl, 205 General Hospital (600 beds) in an uncompleted terminal at Riyadh airport, 22 Field Hospital (200 beds) and the Canadian hospital (200 beds), all in the area of the FMA. The main technical effort went into providing the power for the lighting, air conditioning, and the NBC filtration needed in all the hospitals. This support for the RAMC proved essential and re-confirmed the need for Sapper support to the medical services in expeditionary war.

Protective structures on the airfields were high on the list of priorities and were the responsibility of the field troops on the airfields supported by the STRE (Airfields). Between Muharraq and Dhahran, contractors supplied 3,000 reinforced-concrete Splinter Protection Units of varying shapes and sizes designed by the team. These provided protection for parked Tornados,



Bulk fuel installation, Dhahran.

ammunition dumps, buildings and equipment from blast and splinter from bombs. At Tabuk a complete semi-protected combined operations centre was constructed by the field troop of 48 Field Squadron from sixteen 20-foot ISO containers. Meanwhile, the STRE (Fuels) was fully occupied in deploying Emergency Fuel Handling Equipment (EFHE) on the airfields, sufficient to store small lakes of aviation fuel to meet the needs of modern combat aircraft.

Resources

One of the paradoxes of this war was that although the battlefield area was barren desert, the logistic base was located in a modern city where nearly every sort of raw material or commercial equipment could be acquired, at a price. The QM of 39 Engineer Regiment, Lieutenant Colonel G. (George) Donald, was one of the first Sappers into the theatre; armed with an Army-issue gold credit card, he made short work of obtaining the necessary local supplies.

Specialist items of engineer equipment, however, had to come down the supply chain from the UK, and here the value of the Sapper in-house supply organisation became apparent. This was the last operation to enjoy this 'cap-badge' dedicated service (see Chapter 2). The speed of reaction, hard work and determination of Resources staff at HQ EinC, UKLF and Central Engineer Park impressed all who saw them. Above all the Sapper units and headquarters in the theatre could feel that they had a technically intelligent provider who understood their problems and would do everything possible to find a solution – if necessary by improvisation or manufacture.

A notable success story was the extremely rapid development and procurement of containerised reverse osmosis plants, which worked by forcing impure water through a membrane that filtered out impurities. These transformed the problems of water supply in the desert. They could accept water from almost any source – including the sea – and were only defeated by some poisons and gross oil pollution. Each standard-sized container had its own diesel-engine power supply and from a suitable source could produce up to 100,000 litres a day of completely



Desert well, 3 Field Squadron.

pure water. Containers could be transported by helicopter to ensure that water supplies kept up with the moving battle. The application and control of reverse osmosis techniques was a new area for the Corps, and expert advice was needed. Fortunately, a quick trawl by Personnel Services flushed out an RAVC officer who had already received the appropriate training. He was promptly borrowed for the duration of the conflict and dispatched to the theatre, where his assistance proved to be invaluable.⁶

Survey

Iraq's invasion of Kuwait triggered Military Survey's standard initial response to any developing international crisis situation: the MOD-based General Staff Map Branch commenced production of desktop briefing maps, and staff at the Map Library started an immediate review of its holdings of relevant geographic information. Soon the largest Military Survey operation since the Second World War began to unfold. The geographic support was provided in a number of different forms: map and air-chart production, map supply, terrain analysis, field survey and desert navigation training.

The map production and supply functions were much affected by close international liaison. There was intense activity on the international front, with three main aims: to acquire mapping and related geographic intelligence; arrange for the release of maps that were on restricted issue; and to coordinate the production programme with the United States. It was soon agreed that the two nations would provide for the mapping needs of all Coalition forces, the Americans supplying the bulk of the cartographic effort, and Military Survey compensating by taking the major reproduction role. When the British Forces in theatre were increased to divisional strength, a Joint US/UK Geographic Cell was established in Headquarters British Forces Middle East/US Central Command, headed by Lieutenant Colonel N. T. (Nick) Fickling. There were Survey soldiers attached to Headquarters VII (US) Corps, 30 US Engineer Battalion (Topographic), US Central Command Theatre Map Depot and 1 and 2 US Marine Divisions.

Military Survey's operational response was controlled from the Military Survey Operations Room at Feltham, with a subordinate operations room dealing with the detailed military aspects at 42 Group, 14 Squadron, commanded by Major R. N. (Nick) Rigby, deployed to the Gulf with 7 Armoured Brigade and provided all aspects of field geographic support, including acting as the staff function until the creation of the Joint Geographic Cell. As the in-theatre requirement grew, so did the need for reinforcements to 14 Squadron and the various headquarters. By the end of the conflict more than a quarter of all military surveyors were in theatre.

At the start of the campaign Kuwait was well mapped, but what medium-scale coverage of Iraq did exist was dated, and large areas were unmapped. There were no large-scale plans, and the Moving Map Display films essential for aircraft navigation had not been produced. Saudi Arabian mapping was also dated or not held. The situation was further aggravated by the use of different gridlines and the mapping of each country being drawn to different specifications.

Once the decision to deploy combat aircraft into the area was made, production began of the many charts and moving map

display filmstrips for the Tornado and Jaguar cockpit displays that would be essential for the air operation. The decision to send 7 Armoured Brigade increased the mapping bill alarmingly: 1,200 map sheets at 1:50,000 scale and 85 at 1:250,000 scale would be needed to cover the area of operational interest – more than twice the geographical area of Western Europe – and all required within a period of weeks.

The agreement for the United Kingdom to print sufficient copies to meet the needs of all Coalition forces led to print runs of more than 80,000 for some sheets. Every possible resource was pressed into service. Apprentices at Chepstow and soldiers on courses at the School of Military Survey were thrust into production work. Permanent staff and reserve soldiers assisted, and the long-standing Memorandum of Understanding with the Ordnance Survey was invoked, causing the national mapping programme to be set aside in favour of printing Gulf maps. Commercial printers were contracted and in BAOR and Belgium all survey assets were engaged in printing tasks. In all, more than three times the typical annual production output was achieved in a little over four months – some 14.6 million map sheets. Allied to the map production was the task of providing materials and data for the precision targeting of the so-called 'smart' bombs used in the air campaign: well over 13,000 sets of precise coordinates were provided.

While there was a limited in-theatre capability once 14 Squadron and HQ 1 (UK) Armoured Division arrived in Saudi Arabia with its TACIPRINT vehicle-mounted tactical printing capability equipment, the need for a larger format capability soon became apparent. The print and guillotine semi-trailers from the vintage print train that had been grounded at Ratingen since the early 1980s, a Cold-War vehicle-mounted printing facility, were moved to the Gulf and set up at the Squadron's desert base in the Forward FMA. Here the old press performed well, providing a much quicker turn-around than had previously been possible.

The vast stocks had to be distributed quickly. Bulk stocks were dispatched into the combat map supply system from Guildford,

using UK and US aircraft, and from the BAOR Map Depot. The mapping arrived at a map depot set up by 14 Squadron in the FMA, and this fed on to formations via a forward depot in the FFMA. RE surveyors were placed in the US Theatre Map Depot in Bahrain, which in time became a joint asset. In addition, 14 Squadron provided map supply points to the two US Marine Divisions, who in return attached Marine personnel to the Squadron. By the end of the conflict, 8 Map and Air Chart Depot had received into stock 19.5 million map sheets and issued 13.6 million. (In due course, as part of the withdrawal of forces, all bulk stocks in theatre were returned to Guildford for salvage.)

The unfamiliarity of the ground meant that terrain analysis became of great importance. Geographic information on the area of operations was gathered from all possible sources, including terrain reconnaissance along the Kuwait border by military surveyors. The vital part that terrain analysis played in the conflict was highlighted by General Schwarzkopf: when asked what had been the most important factor in planning the Gulf War replied, 'The terrain; once we knew where we could move, the rest of the planning fell into place.'

The field surveyors of 14 Squadron reverted to the role of their First World War predecessors, providing control for the Royal Artillery. Initially they deployed with 7 Brigade, but with the arrival of 1 (UK) Armoured Division they were reinforced and formed into a Divisional Survey Team, whose task was to use their geodetic GPS receivers to provide a survey control network for the Gunners. During the ground offensive the field survey teams travelled ahead of the guns, setting up survey points through Iraq until the cease-fire, by which time they were twenty kilometres north of Kuwait City.

The Coalition forces were faced with navigating across unfamiliar, featureless terrain, at night and probably under fire. Small desert navigation training teams were set up to train troops in basic desert navigation techniques, the use of the sun compass and the hand-held GPS receiver. The introduction into service of this navigation aid allowed troops to manoeuvre across the

desert with confidence and accuracy and was, to again quote General Schwarzkopf, 'a war-winning factor'. By the start of the ground offensive, fifteen military surveyors had trained more than 6,000 troops to map-read and navigate in the desert.

Postal

The Postal and Courier Service was still a proud part of the Corps at the time, and they too responded appropriately.⁷ The first detachment arrived on 11 August 1990 to establish an operational network for the RAF between the UK, Dhahran and Riyadh in Saudi Arabia, and Thumrait in Oman. By the time the land war began on 24 February 1991, 5 officers and 150 soldiers from the Service were deployed in the Gulf and 12 British Forces Post Offices were established. Initially all Gulf mail was circulated through 23 PC Squadron in Cyprus. From 1 November 1990, daily direct postal flights from Brize Norton to Riyadh, Dhahran and Al Jubayl were made; the mail was then distributed by road and air to the Forward Post Offices (FPOs). The 'Posties' proved an invaluable asset to Sapper officers trying to get around the area of operations – at every airfield a Sapper flag would be flying, so officers had only to go and ask, and transport to forward units would be provided.

So great was the volume of mail (peaking at just under 500,000 kilograms a month) that the Postal and Courier Depot at Mill Hill had to be reinforced to cope. This included the Forces Free Air Letters ('Blueys'), of which more than nine million were despatched to and from theatre. Two-week attachments from other units, including the Corps Band, helped to solve this problem. The volume of classified material handled by RE (PCS) also increased by some 20%. Special arrangements were made before Christmas to organise welfare mail for the Gulf. An indicator number, BFPO 3000, was established at Mill Hill, and letters and parcels addressed to unnamed military personnel in the Gulf were carried free of charge. The British public were very generous, and a campaign by the *Daily Telegraph* and the Royal British Legion to ensure everyone in theatre received a gift at Christmas was highly successful.

Training for War

The Al Fadhili area, 45 kilometres west of Al Jubayl, was allotted for the Brigade to concentrate and train. Operational readiness date was ordered to be 16 November. 7 Armoured Brigade was not clear of the port until 29 October, and Sappers were still arriving in theatre. The most important task in the desert, creating the obstacle belts on which to train, relied on hiring local plant, chiefly D7 and D8 dozers, and improvising with pipes and concrete structures made available from the local oil infrastructure. Again, the full support of a small number of hardy expatriates proved invaluable in scavenging resources, while competitive hiring between British and American units pushed up prices. The scale of the training obstacles matched those thought to be on the border – two to three kilometres in depth and not less than two kilometres wide. In addition, targets were assembled for artillery and mortar firing, sand berms for tank firing, and a network of surveyed oil barrels to assist navigation was laid out over the 200-square-kilometre area. All the elements of 21 Engineer Regiment contributed to this, including the most recently arrived, 49 EOD Squadron, which diagnosed and



Chieftain AVRE on exercise, Saudi Arabia, mineploughing, towing Giant Viper explosive hose and mounting anti-magnetic influence fuzed mine coil on front.

rectified several of the problems incurred in firing new types of artillery bomblet ammunition in sand and was fully occupied during the training in dealing with unexploded ordnance.

This period was marked by many high profile visits, including the Secretary of State for Defence and the Parliamentary Defence Committee. Meanwhile it dawned upon the public that casualties in future operations could be high. Nowhere was this clearer than in the preparations and training for obstacle crossing, where up to 60% casualties were expected. Rehearsals and trials developed the principle of simultaneous commitment of all of the regiment, with equally balanced squadrons side by side, as well as the principle of supporting a leading, or in contact regiment-size, battle group with a full squadron. A small regimental reserve was usually created, travelling with the leading regimental headquarters group.

Minefield breaching was the most complex and potentially dangerous operation. Mine ploughs were essential to breaching the obstacles, but they had to be substantially modified to cope with the sand. The tines required levelling plates welded on to keep them from digging in. Giant Viper, an explosive hose pulled by a rocket over a minefield, followed up with the mine plough, often mounted on bridgelayers, was the general method practised. Aspirations to use fuel air bombs as a preliminary demining treatment proved to be technically too difficult to develop in time. This period of training was widely televised in the interests of deterrence and because of the visual drama of multiple, successful, Giant Viper firings.

Techniques were refined, but, with the realisation that better solutions were needed, new methods and ideas were tried out in Saudi Arabia and Britain. For counter-mine measures, the Scatterable Mine Clearing Device, segmented blades mounted on the front of an AFV 432, was developed; sixteen units of the Aardvark flail were procured; and the Magnetic Influence Mine Induction Coil (MIMIC), developed in the UK research establishments, was brought into service. MIMIC worked by throwing forward a magnetic signature that matched that of a tank, causing an influence fuze to detonate. Minelaying

capability was much enhanced by the purchase of the newly developed Minotaur scatterable anti-tank mine system from Giat of France, which was mounted on an Alvis Stormer chassis,⁸ and new ways of laying barmines to protect against counterattack were perfected. Other experiments included bund-busting explosive-filled pipes mounted as prongs on the Combat Engineer Tractor, which showed promise; and tank- and dozer-drawn sledges, since the Al Fadhili area featured particularly soft sand dunes.

While these were the more obvious achievements of Sapper initiative, the real success was the operational effectiveness developed at individual, crew, squadron and regimental level in all brigade units. Living in the desert became familiar, and laying out regimental positions and conducting training and operations from these became a standard drill for the campaign. Rapidly reducing daytime temperatures allowed the 'Desert Rats' to become comfortable in their environment, and a few Scud (the Soviet-built free-flight rockets, which it was thought could contain chemical or biological warheads) alerts tested and developed confidence in chemical defence preparations. Throughout the



Combat Engineer Tractor mounting explosive-filled 'Bund Busting' pipes for breaching anti-tank bunds.

brief period culminating in operational effectiveness, anti-invasion operations continued in support of 1 US Marine Division under whose tactical control 7 Armoured Brigade was placed. The relationship was a close one, with great mutual trust; Marine Corps Sappers began to develop breaching skills to emulate the British techniques as they received suitable equipment to undertake a more offensive role.

Developing the Offensive

In military circles there had never been much doubt that a forcible ejection of the Iraqis from Kuwait would be required. This lay at the root of the British desire for a balanced armoured force, and at the heart of the American Marine Expeditionary Force's approach to the operation. As soon as the threat of further Iraqi attacks had receded, planning and close border reconnaissance was conducted with the assistance of Saudi troops manning the border forts. This enabled 7 Armoured Brigade to see the nature of the formidable obstacles in front of 1 Marine Division. Early plans were based on a frontal attack, causing disquiet on the part of the British command in Riyadh and London, and a new appreciation, Sapper-led, was made in 7 Armoured Brigade to explore the merits of a shallow left-flank approach.

At the same time it became clear that a new range area for both fire and movement would have to be developed; the prospect of introducing further forces into Al Jubayl, principally lead elements of 2 Marine Division and the balance of 1 (UK) Armoured Division, necessitated preparations for the redeployment of 7th Armoured Brigade. 1 Marine Division was also now exercising the type of operation that an assault into Kuwait would require, including breaching operations. (Al Fadhili turned out to be a prime camel grazing area, with considerable local sensitivity about its occupation.) The centre of gravity would have to move a further 30 kilometres up the coast, with the development of a new, more ambitious range and training area for all-arms obstacle and live-firing training of both American and British Troops. This was the 'Devil Dog Dragoon', or 'D3', Range. Preparation of what became the largest British live-

training area outside the battlegroup training area in Suffield, Canada, was an ambitious task for all of the 7 Armoured Brigade Sappers. It required eight kilometres of obstacles, wire, minefield fences, high bunds, infantry trench systems and defensive emplacements. Much of the work fell to 45 Field Support Squadron, with the largest possible sizes and numbers of dozers being hired.

Simultaneously the Squadron received and moved forward the very considerable tonnages of Engineer resources despatched from Central Engineer Park and from 40 Army Engineer Support Group and 65 Corps Support Squadron in Germany. In all, 14,000 tons of camp, fuel handling, water supply, general and armoured engineer stocks, mines and explosives were to be moved by the in-theatre Engineer resources chain.

Momentous changes in direction were heralded by the announcement in the House of Commons on 22 November that a second brigade would be deployed, together with divisional troops and a divisional headquarters, to constitute the 1 (UK) Armoured Division, now with its new commander, Major General R. A. (Rupert) Smith. In Saudi Arabia attention turned to the reception of divisional reconnaissance parties, together with receiving helpful technical visits as new ideas and new devices came out of the research establishments. New tasks included the building of the 3,500-man Blackadder Camp in order to receive the planned reinforcements, hardening and emplacing field defences at vulnerable points and preparing to take over the running of water-supply points from the 7 Armoured Brigade squadrons. Training on the Al Fadhili area and preparation of the D3 range continued, with no immediate distraction caused either by the announcement of the Division's deployment or by the resignation of Margaret Thatcher and her replacement as Prime Minister by John Major.

Mounting the Division – The Units

The revised Engineer order of battle encompassed 23 Engineer Regiment, commanded by Lieutenant Colonel D. J. (David) Beaton, to support a very ad hoc grouping of 4 Armoured

Brigade, Commanded by Brigadier C. J. A. (Christopher) Hammerbeck, and 32 Armoured Engineer Regiment under the command of Lieutenant Colonel A. R. E. (Alwin) Hutchinson as Divisional Troops. In addition, 37 Field Squadron of 35 Engineer Regiment was to come under the command of 32 Regiment, and 15 Field Support Squadron of 38 Engineer Regiment was to provide an intermediate link in the Engineer resources chain plus additional support to the Force Maintenance Area. From 25 Engineer Regiment 12 Field Squadron was selected as the core of the individual replacement organisation, initially known as Battle Casualty Replacement (BCR), and much of 5 Field Squadron from 26 Engineer Regiment was deployed over three months to provide additional battle casualty replacements. This additional requirement had a major effect on the units in BAOR. Having so many men and equipments stripped out of them meant that they found it difficult to maintain their other commitments to Northern Ireland and BATUS exercises in Canada – it is not an exaggeration to say that mounting a division of two brigades for Operation *Granby* rendered 1 British Corps non-operational.



OC 49 EOD Squadron Major N. H. (Nick) Larkin briefs CRE I UK Armoured Division, Colonel A. J. (Tony) Reed Screen. Well-drilling in the background.

It was soon realised that morale among the individual replacements was low as no one relished the idea of replacing a battle casualty in a unit where they knew neither the personnel nor the operational procedures. Also the lack of a command chain left them leaderless. The Chief Engineer BFME ordered them renamed 'In-Theatre Reserves', and individuals were reformed into units and sent forward to join the Division. Everyone was given a job and gainfully employed during and after the war. Practically every unit of the Corps provided individuals or groups; Territorial units were conspicuously involved in both survey and engineer resources support, while the massive build-up of mail and parcels throughout the campaign, with a crescendo at Christmas, stretched the Postal and Courier Service to the full – two and a half million kilograms of letters and parcels were moved, as post became the British public's contribution to the war effort.

Preparation for the reinforcements was greatly complicated by the two-phase approach to mounting the force, something that had not been foreseen when 7 Armoured Brigade was despatched. Reinforcement to the strength of a division of only two brigades, but with additional artillery units, was a considerable, and for some a dispiriting, challenge. Many engineer regiments had given up material and manpower reinforcements for the deployment of 7 Armoured Brigade, to ensure that the best possible regimental group with homogeneous vehicle fleets could be established. Now, precisely those units that had given the best equipment, and who had lent keen volunteers to man it, had to be prepared for deployment. What fighting equipment they had not given up had been cannibalised for spares, either sent direct to the Gulf or into base overhaul for subsequent despatch, and the residue was being prepared for as-yet ill-defined employment with 'roulement forces'.

Equipment was shipped from Canada as reconstitution of the Chieftain AVRE fleet focused on 23 Engineer Regiment, deploying with 39 and 73 Field Squadrons in close and general support configurations, while 32 Armoured Engineer Regiment

prepared the Centurion AVRE fleet with 31 and 77 Armoured Engineer Squadrons, backed up by 37 Field Squadron of 35 Engineer Regiment. Hectic preparations, again hampered by the culture of 'rate capping', required the full support of all units of the Corps in Germany and most in the United Kingdom. Equipment, transport, individual reinforcements or rear-party support were universally required and freely given during the month of November. Training was generally made possible by air-lift of personnel, allowing good use of the time taken to complete the sea-lift of equipment.

Command and control of the engineer campaign component was to be vested in CRE 1 (UK) Armoured Division, Colonel A. J. (Tony) Reed Screen for the manoeuvre units of the brigades and Divisional troops, while the functions of support to the RAF, CRE (Works) Middle East, 3 Squadron in the FMA and the Al Jubayl Engineer Park run by 60 Squadron were to be commanded by Chief Engineer BFME in Riyadh.

Despite the experience of the previous two months, planning was made on the assumption that 1 (UK) Armoured Division could use the transit accommodation vacated by 7 Armoured Brigade, but this was unworkable, as it was being used by the Brigade to rotate troops for Rest and Recuperation (R&R). Emergency measures had to be taken. Stores were flown out for a new 2,800-man tented camp, more local labour camps were requisitioned and had to be made serviceable, and new requirements arose, such as helicopter landing areas, vehicle marshalling areas, car parks and fencing. Heavy rain in the early weeks of the New Year added to the problems. Nevertheless, there was a good response from the contractors, and serious hold-ups were few.

War becomes inevitable

United Nations Security Council Resolution (UNSCR) 678 of 29 November set Iraq a deadline to withdraw from Kuwait by 15 January 1991, promising the use of 'all necessary means' to eject Iraqi troops from the country in the case of non-compliance. This in turn set the military timetable for the units in Saudi

Arabia and those beginning their preparation and deployment. Training time, at six weeks, was now finite, as was the time for development and transport of the many urgent operational requirements, large and small, now in the pipeline. The first divisional reconnaissance party, with the CRE and CO 32 Armoured Engineer Regiment, arrived in the operational area on 24 November. Advance parties deployed on 5 December, and reinforcing units began to arrive in Al Jubayl on 10 December. While command activity was intense, this period gave time for the squadrons to consolidate, experiment with equipment in hand and prepare to recast manpower and internal organisation in order to fit in with the new order of battle; advance parties attached themselves to desert units in order to learn training and operational lessons early. A major engineering spectacular programme for press and television took place on 27 November. The US Marine Corps Sappers (both American and British) training in breaching drills and practising passage of line procedures through obstacle breaches were given particular emphasis in the expectation that this widely broadcast demonstration of Allied ability to break through the well-publicised Iraqi barrier minefield would be seen by the Iraqis. It was all part of the psychological warfare campaign.

The overall readiness of 7 Armoured Brigade was reduced to the level sustainable for counter-invasion contingencies and skill maintenance in order to be ready for live-firing exercises shortly after Christmas, while regular Iraqi test-firing of Scud missiles gave an operational edge to the period. Christmas preparations were made amid much speculation about their compatibility with the Islamic environment, chiefly in circles far removed from the desert. Again, this debate fuelled the British public's generosity and added to the mail turnover.

The opportunity to celebrate Christmas brought a visit by HRH The Prince of Wales and also gave the opportunity to service equipment, test new devices and procedures, and to think hard about the type of operations that might unfold. Mines came to the foreground as techniques for the rapid laying

of defensive minefields in the face of counterattack were trialled. Additional armour was fitted to Warrior and Challenger vehicles. Unknown to the troops, as low-level exercising continued, radio traffic began to be monitored and stored for later retransmission in a highly effective deception campaign. With the end of a Christmas marked by generous rations and British Legion parcels, the step-by-step move to war proceeded. The centre of gravity of 7 Armoured Brigade moved to the D3 range, and dry runs to test and prove tactics, procedures and, not least, safety drills got under way. A chilling taste of the future was provided by the start of the biological warfare inoculation programme: anthrax, botulinus and plague serum, together with others to increase the effectiveness of the overall programme, provoked serious thoughts then and great controversy well after the campaign.

In their preparations and training, 23 Engineer Regiment had much catching-up to do. Lieutenant Colonel Beaton commented:

We were required to be fully operational by the end of January so with little time to lose we began to carry out collective engineer training concurrently with individual and survival training. There was time for one Regimental level exercise which concentrated on rehearsing the command and control problems associated with carrying out a deliberate breaching operation against a prepared Iraqi obstacle belt and developed some Signal Operating Instructions for the task. It was during this exercise that we first experienced the very real problems of moving and, equally importantly for engineers, regrouping at night in a featureless terrain. Gradually, or so it appeared to us, the emphasis changed away from the deliberate breaching of the Iraqi first tier border obstacles to the breaching of the less heavily fortified second tier obstacles and later to the possibility of only hasty breaching operations being required.⁹

For 32 Armoured Engineer Regiment the major obstacle breaching role gave way to that of route development and protection. This was practised in two major divisional exercises in which a passage of lines through a breached obstacle and subsequent breakout were rehearsed. Extra plant from 45 Field Support Squadron and provost support from 203 Company RMP

was taken under command, which brought the Regiment's strength to just under 950. Equipment preparation was top priority. Lieutenant Colonel Hutchinson commented:

Throughout this preparatory training period (interrupted by numerous false NBC alarms as the air war took place and as Iraq retaliated with Scud missiles), trials, equipment preparation and modifications took place although spares availability continued to exercise patience. Trials were conducted with AVREs and pipe mines for explosive breaching of sand berms and with tank over-bridging techniques to overcome wire obstacles. SCAMP (scatterable mine pusher) was fitted to two of 37 Squadron's APCs and tested, proving most effective. The Centurion AVREs and Chieftain AVLBs were up-armoured with a mix of Chobham plate armour, Explosive Reactive Armour scales, chain-mail and MIMIC, a device to fool (or defeat) mines fitted with a magnetic influence fuze. The Regiment also took delivery of a fleet of US M548 tracked delivery vehicles which were put to immediate use as ammunition and fuel carriers.¹⁰

After unit-level live-firing refresher training, brigade-level range exercises began on 9 January, by day and night. Each 'run' was estimated to be using an amount of ammunition equivalent to seven years of training. The Press and media representatives



C-130 at desert airstrip constructed by 45 Field Support Squadron.

attended, and much was televised on world networks in a mounting effort to bring home to Iraq the weight of firepower that was being prepared. Engineer squadrons were exercised and tested in Sapper and infantry roles, taking over the short-range anti-tank systems of the Staffordshire Regiment; Giant Viper, improvised bund-busting charges and serial obstacle breaching put engineering in the limelight. There were, astonishingly, no casualties despite dismounted trench fighting practice with grenades, and most Sapper reconnaissance vehicles operating in front of the battlegroups proudly bore the bullet scars of the tanks and armoured infantry moving up behind.

As a result of a detailed Sapper appreciation of the increasing strength of the Iraqi defences (gleaned from observation on the border, all-source intelligence and brought together by the intelligence cell in HQ EinC working together with the Director of Military Survey, it was recognised that the obstacle posed a formidable challenge and would severely limit the mobility of 1 (UK) Armoured Division. General de la Billière persuaded General Schwarzkopf that a new task for the British force was more appropriate than supporting the US Marines into the south-west of Kuwait, the role for which 7 Armoured Brigade had trained. That sector had by now become secondary to the main thrust, the wide 'left hook' through southern Iraq, which was the developing American plan, and the British commander wanted to ensure that British forces were not relegated to a low-profile role. Schwarzkopf's agreement on these grounds obviated the need to express a third concern – that casualties in operating in Kuwait could be greater than the British commander thought desirable.¹¹ As a result, orders to move to join VII (US) Corps inland across the Wadi Al Batin were received on 13 January. The American Corps commander, Lieutenant General F. (Fred) Franks, welcomed 1 (UK) Armoured Division and gave it a vital and integral role on the right flank of the Corps.

The first main point of effort was to build up logistic stocks, with 7 Armoured Brigade moving early to protect the developing Forward Force Maintenance Area (FFMA), Fort Pippin, the new Engineer Rendezvous (known as RV throughout NATO), and

base for 45, and later 15, Field Support Squadron. Heavy rain turned parts of the desert into a sea of mud, and cold weather gave a new twist to desert fighting. While the period of uncertainty was now ended, and with it a dauntingly ambitious Engineer task of completing the frontal break-in over the obstacle belt on the Kuwait border, the implications of the changed mission were substantial. Much longer distances were now involved in the approach march, the break-in and the fight through. While the final objective of the British forces remained unknown, Kuwait City, Basrah and even Baghdad were all likely and possible. Immediate action was taken to minimise wear and tear to equipment, and Challenger training was restricted to five kilometres per week.

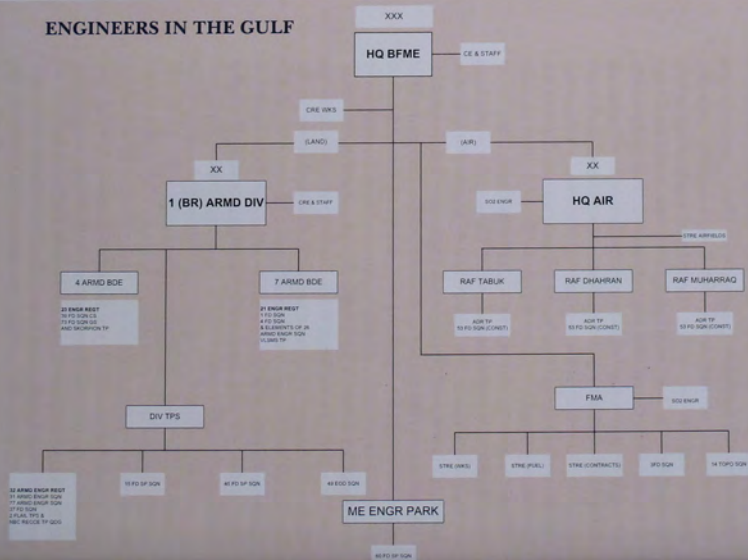
Engineer intelligence was now needed by the fighting forces for the new area to be fought over. This was not available in theatre, and forward reconnaissance was forbidden. For operational secrecy (Opsec) reasons, only a very few people were allowed to know the plan, but this was becoming an example of secrecy denying information to friendly forces rather than the enemy. General Smith asked his Sappers for help. Despite coded messages back to MOD, no usable intelligence was forthcoming. It was available, but as it was for a different area from southern Kuwait, it was not being sent to theatre. It was agreed on the Sapper net that Lieutenant Colonel Steen Clarke could come to theatre to be briefed to provide what was needed. He returned to the UK, and the necessary intelligence began to flow down the UK chain.

Operation Desert Storm

War Begins

The Coalition name for the overall operation now became Operation *Desert Storm*. 1 (UK) Armoured Division, on the right flank of VII (US) Corps, was to take part in the broad 'right hook' across the desert, Operation *Desert Sabre*. While new arrivals came and carried out desert training, the move of logistic stocks got under way – 18,000 tonnes of ammunition, 7 million litres of fuel

ENGINEERS IN THE GULF



and more than 6,000 tonnes of materiel. 7 Armoured Brigade began to move westwards, 21 Regiment leading, 300 kilometres up the Tapline Road (codenamed Main Supply Route Dodge) to concentration area Keyes (see Figure 2). No sooner had this huge undertaking begun than the UN deadline for Iraq to withdraw from Kuwait expired on 15 January. Massive cruise missile and air attacks against Iraqi command centres and infrastructure targets followed at midnight on the 16th. The early hours of the 17th saw Coalition and Saudi Arabian NBC countermeasures executed to their fullest extent, bringing home to all the reality of the possible employment of Iraqi weapons of Mass Destruction (WMD). Nevertheless, a calm momentum to the move built up steadily, with nose-to-tail traffic in both directions – and, tragically, a steady stream of casualties and deaths in traffic accidents. On 31 January 1991, the first death sustained in the campaign by the Royal Engineers occurred – Lieutenant Colonel A. J. (Alec) Wright, who was visiting theatre from the Defence Research Agency at Fort Halstead to demonstrate a model for breaching the Iraqi obstacle belt in Kuwait was killed in a road-traffic accident.

The logisticians had worked out that the move of the Division could not be achieved with the limited fuel carrying equipment available. The only solution appeared to be to hire all available tanker lorries in the Gulf, but the Americans had already done that. Major J. (Jim) Kingham, OC of the STRE (Fuels), came up with the idea of building a pipeline to halve the turn-around time of the tankers, which would solve the problem as the move proceeded. The STRE (Fuels) team was increased to build what became known initially as 'Pipeline Over the Desert' (PLOD), a 56-mile pipeline designed by the team and built under their supervision by a company from the US Army in fourteen days. This feat enabled both US and British units to complete the logistic move. The team also designed and contracted out the construction of 42 steel storage tanks to help meet the full demands for fuel and water for which the resources of flexible tankage were deemed inadequate. The pipeline was re-named the 'Kingham Pipeline' after their very gifted commanding

officer, who was killed in a road traffic accident when driving in the early morning from Riyadh to Al Jubayl while trying to balance the competing demands of his staff job in HQ BFME and commanding his STRE.

Consolidation in the new area was swift, as there was the threat of an Iraqi spoiling attack or raid. Another concern was caused by lateral movements across the front by Egyptian and Syrian divisions moving to their new positions: the presence of Russian-designed equipment in the Coalition became apparent, with all the potential for friendly-fire incidents later on. As the Division concentrated, the sheer scale of the number of vehicles and their coordinated movement became clear. Unlike exercises in Germany, the flat terrain allowed the assembled Division to be viewed all at once – an awe-inspiring panoply of modern weaponry. Having completed live-firing exercises on the coast, operational secrecy covered the move, reinforced by the play-back of radio transmissions to give the Iraqis the impression that British forces remained grouped with the Marines. While it seemed too much to believe that the Iraqis would hold this belief, the plan worked, and the true location of 1 (UK) Armoured Division on the right flank of VII (US) Corps remained undisclosed.



The assembled talent of 1 Armoured Division Engineers and a few friends.



Centurion AVRE self-destructed after petrol fire ignited ammunition.

The exercises that followed the concentration of the Division on 1 February, named *Dibdibah Drive* and *Dibdibah Charge*, practised the move of the Division through the obstacle breaches, into forming-up points for the break out, a passage of lines on a vast scale. The breaches were to be made by 1 (US) Infantry Division supported by 32 Armoured Engineer Regiment. Sapper Richard Royle of 1 Field Squadron died as a result of a submachine-gun accident during *Dibdibah Drive*, the third Sapper death of the campaign. Meanwhile the true implications of using fully ammunitioned vehicles were dramatically displayed by the total destruction of two Centurion AVREs and several artillery guns and limbers following refuelling accidents. By the time of the second exercise, Global Positioning System (GPS) sets on a scale of about 25 per Engineer regiment had become available, creating a near-revolution in capability to regroup on the move, even at night. Provided that distribution of GPS included logistic and repair elements, the responsiveness of subunits to regimental and squadron commanders was greatly enhanced. In the background, last-minute negotiations seemed to offer hope that war could yet be avoided, but on 21 February such hope finally collapsed – G Day, the start of the ground war, was confirmed as



The new Giat/Minotaur Vehicle Launched Mine System arrives in the front line.

24 February. Perfection of drills for the two scatterable minelaying systems hastily introduced, the Giat/Minotaur and the Skorpion AT2, was complemented by refinement of loading plans in all-too-little cargo and trailer space.

Lieutenant Colonel Hutchinson wanted his petrol-driven Centurion AVREs that had blown up replaced and informed HQ BFME that three were waiting with their crews at Gütersloh airfield in Germany. Air movements were approached and advised that neither the UK nor the USA had the capability to lift such a load, but the Russians had offered to support the Coalition if asked for help of a logistic nature. They agreed to provide an Antonov heavy-lift aircraft capable of carrying the three Centurion tanks. Within a day the Russians picked up the tanks and flew them to theatre, where they landed in the desert and were married up with their unit in the nick of time for the land war.

Forthcoming Engineer tasks were estimated to be:

- Limited minefield breaching on the line of attack.
- Laying of flank protective minefields of barmines and scatterable mines to repel counterattack.
- Destruction of abandoned enemy equipment to prevent re-use.

- Bridging of oil pipelines.
- Hasty construction of POW compounds.

Reviewing the Sapper order of battle at this stage, it can be seen that the special demands of the Gulf War had led to three tailor-made organisations for the Sapper combat units moving into battle. While the principal factor was the differing needs for support within 1 (UK) Armoured Division, the final arrangements actually grew out of the units' original peacetime configuration. They then developed, as unfamiliar roles and tasks presented themselves during the planning and work-up period and specialised equipment was procured from the defence industry or developed within the theatre.

21 Engineer Regiment formed up as a regiment consisting of a headquarters and two 'field' squadrons, each with three field and one armoured engineer troops. Engineer reconnaissance was found to move with the leading armoured reconnaissance regiment (the Scots Dragoon Guards). The squadrons each moved with the battlegroups of 7 Armoured Brigade (1 Field Squadron with 1 Staffords and 4 Field Squadron with the Queens Royal Irish Hussars). A field troop, the scatterable mine-launcher troop and the armoured engineer echelon formed the regimental reserve, held at brigade tactical headquarters.¹²



Minefield in the desert.

23 Engineer Regiment was in the then relatively new configuration of a headquarters and two close-support squadrons. The squadrons re-roled so that they formed up as a close-support (39) and a general-support (73) squadron. 39 Field Squadron was reinforced so as to be able to provide each battlegroup in 4 Armoured Brigade with a close-support troop of two AVREs, two AVLBs, two CETs and two APCs. 39 Squadron's headquarters located itself with whichever battlegroup was at the point of main effort. 73 Field Squadron, with three field troops and a support troop, moving behind brigade headquarters, was to provide counter-mobility support for any brigade action on the flanks. It also provided the Regimental reserve with a mobility troop based on CETs, AFV 432s equipped with scatterable mine-clearing devices and Giant Viper.¹³

32 Armoured Engineer Regiment had already had to allocate 26 Armoured Engineer Squadron's assets to 21 Engineer Regiment (although not its headquarters). For its role as divisional troops it was given 37 Field Squadron from 35 Engineer Regiment. On arrival in the Gulf it had also acquired two troops of Aardvark flails and also Canary Troop, a special chemical reconnaissance unit. These elements formed the Regiment's eventual line-up with the addition of Plant Troop of 45 Field Support Squadron and 203 Company RMP. It formed the core of the Route Development Battle Group, in the process earning the nickname 'The Antique Road Show', the Centurion tanks being two generations out of date. In this role it was to pilot, create, mark and maintain the Division's main supply route through Iraq and into Kuwait.

During the days leading up to G-Day, all the Divisional Engineer Group plant, less Combat Engineer Tractors, was used to dig gun positions to support withering artillery fire by the Coalition across the border into Iraq over the break-in sector.

Over the Start Line and into Battle

In order to maintain the maximum force ratios, each brigade of the Division was scheduled to attack sequentially, thus gaining the maximum support from the Divisional Artillery Group for

each objective. With 7 Armoured Brigade leading out of *Tactical Assembly Area Ray* over line *Vermont*, the border, across control lines *Alaska*, *Oregon*, *Colorado* and *Utah*, the British forces moved over the *Line of Departure*, line *New Jersey*, in the late afternoon of 25 February, having covered 58 miles on the approach march. What seemed like an enormous traffic jam forced the command group of 7 Armoured Brigade to sit for a couple of hours on the border berm. Light relief in a period of intense uncertainty was given by the broaching of a bottle of whisky donated by HRH The Prince of Wales for consumption when out of Saudi Arabia with its prohibition of alcohol. As dusk fell, the arcing of MLRS rockets through the sky provided the most dramatic display of firepower. As each objective was engaged, the power of other modern weapon systems was shown and the consequent overwhelming of the inferior forces left little for the Sappers of the leading squadrons, 1 and 4 Field Squadrons, to do. Mines and uncleared obstacles or fences could be manoeuvred around, and the main task remained equipment denial. Dismounted infantry combat remained the one area where forces were evenly matched. Men of the infantry battlegroups of both brigades were required to charge with bayonet and grenade as in the past.

Global Positioning Systems had made coordination of fire and movement possible on a scale not experienced before. Nevertheless, satellite cover failed for two or three hours a day because of atmospheric or technical problems, and it was decided that activity would be minimised at these times to avoid fratricide. These periods were to be the only respite for most of the manoeuvre forces. This was especially important for the Engineers; the older equipment managed to keep up within the battlegroups only by catching up during the satellite down-time. The closer the degree of integration of squadron headquarters into the command and control nodes of the battlegroups, the more warning of movement time and direction could be gained.

No mines were laid, and no Giant Viper breaching was required. 23 Engineer Regiment carried out a planned crossing of a pipeline. Lieutenant Colonel Beaton wrote:

We drove through the breach absolutely petrified but believing in what was right, there was no going back now, we had passed the point of no return ... We had objectives to take that morning, Copper, Bronze, Nickel, Steel and so on, all enemy positions named after metals. As we passed through the enemy side of the breach British humour came into its own, a hastily constructed sign which read 'you are now entering occupied Iraq.' Right lads! This is it.

Daylight dawned after the first couple of objectives had been taken and it brought with it the truth of war, we looked and smelt like down and outs, unshaven and unwashed, but so alert it wasn't true. Then the POWs started to come into our position, they were on the top of Warriors, 436s, Challengers, you name it, it had at least 10-20 Iraqis on top ...

We were ordered to carry on the advance ... Approaching an Iraqi position we were told to stop. 'Arty' were going to put in a fire mission on the position. 'Aye, Aye. Are we far enough away?', we thought, but our Arty mates assured us we were. Then it came, I was witnessing 34 years worth of November the fifths in one go. MLRS' were attacking this position, a sight I am sure I will never see again, and the only words I could utter were 'those poor bastards'.

After a few more battles we were told to go 'hell for leather' for Kuwait and cut off the enemy. Thousands of vehicles screeched across the Iraqi desert and, as we were reaching the border, hundreds and hundreds of Iraqi soldiers were walking towards us, hands in the air, they had had enough. We crossed into Kuwait to be informed of the ceasefire.¹⁴

The '100-Hour War'

The remorseless attack on the Iraqis by the Coalition unfolded in steps that look clean on the battle map edited after the war. In the 'finer grain' of what occurred in the '100 Hour War', many local episodes of bravery and self-sacrifice came to light only later, when citations for operational awards were compiled. Great uncertainty surrounded those behind the active fighting, where indistinct surrender, or the sudden recourse back to arms of those who had ostensibly given up, made conditions precarious. A lost Iraqi T-55 constituted a vastly superior threat to an unarmed fitter team or command vehicle. Dealing with batches of unsorted, still-armed prisoners of war required a special nerve.



THE COALITION OFFENSIVE

The single gallantry medal awarded to a Sapper (apart from the SAS) recognised Lance Corporal I. M. (Ian) Dewsnap of 73 Field Squadron, who took the surrender of a succession of groups of armed Iraqis, finally numbering over 100, when he was cut off with his Light Wheeled Tractor, and armed only with a submachine-gun. He received the Military Medal.

Fratricide, so-called 'Blue on Blue', or 'friendly-fire', accidents represented a considerable threat within the British forces caused by indistinct visibility and the heavy firepower employed within VII (US) Corps, on the British left boundary. Multi-Launch Rocket Systems became the weapon most feared. Prisoners-of-war who had manned gun and anti-aircraft positions acknowledged that they had been terrified by the five weeks of air attack but had been able to maintain some sort of cohesion. This was totally destroyed, together with all of their equipment, by an MLRS strike. Within the British forces, there was a keen dread of

any mistakes with this new system. Thankfully there were no MLRS mistakes, and no Sappers were casualties of Blue on Blue.

As the leading elements of the Division poised to enter Kuwait, contingency orders were given to move as follows:

- North-east to Basrah.
- South to breach the shorter logistic route into Kuwait.
- East into Kuwait, either to Kuwait City or to the coast north of the city.
- West to support VII (US) Corps' mission to destroy the Republican Guard.

The Wadi Al Batin was crossed by leading elements moving into Kuwait at 0915 hours on Wednesday 27 February. Little rest had been taken, and 40,000 prisoners had been captured. American A-10 aircraft had attacked two Warrior APCs of the Royal Regiment of Fusiliers, and there had been other local incidents of fratricide. Considerable tiredness slowed the pace of events. Burning oil wells became evident with some effect on visibility in generally gloomy, overcast weather and light rain. The flying of any regimental, regional or Union flag was ordered to aid identification – there were plenty of such flags stored away in stowage bins for such a day. After waiting in *Objective Varsity*, about 30 kilometres into Kuwait, for final attack orders during much of 27 February, they finally came at 0530 on the 28th. Political considerations dictated that Arab forces were to liberate Kuwait City, and television pictures had been released showing the Iraqis now fleeing out of Kuwait under vicious and unrelenting air attack. To mitigate the charge of needlessly slaughtering a defeated enemy, deliberations culminated in the announcement of a ceasefire at 0800 hours local time on 28 February. The military imperative was to occupy Kuwait in full by this time. So a race towards the coast was ordered, crossing Kuwait to the Basrah Road, cutting off the balance of the Iraqi army: time to move was 0600 hours, the distance 60 kilometres, and the road to be in 7 Armoured Brigade's possession by 0800 hours. This was done with ten minutes to spare. As the ceasefire came into

force, the war ended amid scenes of desolation, destruction and carnage, with the attendant dangers of a battlefield wholly littered with ammunition, unsafe weapons and bits of bodies.

Behind the attacking brigades the Route Development Battle Group followed closely on a central axis, using four graders abreast to carve out the safe route, which had been cleared of mines and unexploded ordnance. As 32 Armoured Engineer Regiment closed up to Kuwait City and the Basrah Road, it was to take over the clearance of the sector of the road through the bottleneck of the Mutla Pass. This was the scene of greatest devastation, where Iraqi tanks had sheltered under a bridge across the road. They had been destroyed from the air and effectively blocked the road, causing a jam of hundreds of fleeing vehicles loaded with goods that Iraqi troops had looted from Kuwait City. The line of vehicles, military and civilian, stretched back almost three kilometres. The military vehicles were mostly destroyed, but the civilian vehicles were largely intact. The occupants had melted away into the desert and presumably made their own way back to Iraq.

Sappers of all squadrons now set to work clearing routes and burying the many dead. The vehicles were simply dozed off the



The Basrah Road at the Mutla Pass.

road into the desert, leaving a scene of metal carnage that stretched over many square kilometres. Other tasks involved making safe and collecting Iraqi weaponry, and the assembly of



Propaganda postcard of Kuwait.



Desert debrief, 4 Armoured Brigade, p.m., 28 February. In the photo, RE officers, from right: CO 23 Engineer regiment Lieutenant Colonel D. J. (David) Beaton, Chief Engineer BFME Colonel A. A. (Alasdair) Wilson. In the background, Commander British Forces Middle East, General Sir Peter de la Billière, and GOC 1 Armoured Division, Major General Rupert Smith.

an exhibition of the major items for another visit by the Prime Minister, John Major. Searches were made for technical intelligence and museum collections – but most of all to gather evidence of the presence or use of chemical ammunition. None was found. To all of this came the administrative challenge of guarding, treating and moving thousands of prisoners in cold, inclement weather as the first and foremost duty. Most were placid, but feeding and watering caused great difficulty, as did the wish of many to be segregated from others, for reasons which were never clear.

The Post War Period¹⁵

Among several promises and rumours that had circulated during the previous five months, one had gained sufficient currency to remain valid: the principle of 'first in, first out'. While 23 Engineer Regiment, 37 Field Squadron, 49 Explosive Ordnance

Disposal Field Squadron, elements of 53 Field Squadron (Construction) and CRE (Works) Middle East moved to assist with rehabilitation and restoration of essential services, 21 and 32 Regiments prepared to move back to Al Jubayl when transporter lift could be provided. 32 Regiment set up the Divisional Recovery Area north of Al Jubayl for unloading vehicles and ammunition, while 36 Engineer Regiment was shipped out to Saudi Arabia to reconstitute Engineer stores that could be salvaged. 21 Engineer Regiment flew back to the UK on 10 March in the last two British Airways Boeing 747s assigned to troop movements; KLM then took this role over as part of the highly varied support 'in kind' to the Coalition. 23 Regiment followed on 30 March, and 49 EOD Field Squadron was relieved by the newly formed 21 EOD Field Squadron in May.

When the air war was over, the RAF saw no more need for their Sappers, so Chief Engineer BFME was able to order 53 Field Squadron, together with elements of 49 EOD Field Squadron, to regroup at Bahrain and drive up to Kuwait City. They were the first British units to enter the city, apart from the Special Boat Service (SBS) squad, who had landed on the roof of the British Embassy from a Chinook helicopter and liberated it by blowing the front door off, despite having the keys. When the British Ambassador furiously asked General de la Billière why his front door had been blown off, the General turned to his Chief Engineer and asked, 'What can you do about it?' He looked a little puzzled but said nothing when told that the Sappers had a squadron in the City and would have not only the door fixed but water and power by nightfall. The Ambassador was mollified and the Commander pleased. Their immediate work received an accolade in the *Daily Mail*:

In the shot-up British Embassy the air-conditioners hum, the satellite fans are working, hot and cold showers are available and the ambassador's staff dispense ice with the drinks. All this courtesy of the Royal Engineers who got everything up and running.¹⁶ How this was done is reported in full in *The Royal Engineers Journal*,¹⁷ but it required ingenuity, excellent local relations and the availability of both expertise and equipment, all



Kuwait coastal minefield.



Oil wells on fire, Kuwait.

of which owed much, as in the Falklands, to the Corps policy of maintaining its hardcore of professionally qualified and experienced engineers and technicians, and the foresight of those responsible for making preparations for war.

The war officially ended on 3 April 1991 with a declaration of the end of hostilities signed by General Schwarzkopf and eight senior Iraqi officers.¹⁸ The United Nations Iraq-Kuwait observer mission (UNIKOM) was then established under UNSCR 687 to monitor the demilitarised zone (DMZ), deter any violations and report any hostile actions. Among their many problems was the random infiltration of the DMZ by, and casualties caused to, Iraqi civilians in search of mines, for which a financial reward was being offered by their government.

Within Kuwait the history of this conflict continues to late August 1991, when the residual British force was finally withdrawn. Due to continued unrest in Iraq, a battlegroup¹⁹ remained in the country, grouped within British Forces Middle East Forward (BFME Fwd), commanded by a Sapper, Colonel I. D. T. (Ian) McGill. Additionally, a Battle Area Clearance (BAC) cell under the previous commanding officer of 33 Engineer Regiment (EOD), Lieutenant Colonel M. H. H. (Mike) Brooke,²⁰ had been created immediately after the war to prepare the way for 21 Squadron. It came under the command of BFME Fwd, and it effectively took control of the whole international clearance effort throughout Kuwait until a more permanent arrangement could be put in place – a very challenging task from which the Corps emerged with great credit. Throughout Kuwait there was an extensive period of mine and unexploded ordnance clearance.

MOD support to the mine-clearance contract, which had been awarded to the firm Royal Ordnance, in Kuwait was controversial, with 21 Squadron providing clearance teams until Royal Ordnance could recruit sufficient civilian manpower to continue without military support, but the requirement for the clearance of the vast quantity of mines and munitions was undisputed. The need for urgency was extreme, and the teams were required to clear oilfields (not pleasant areas to be in, since the oil wells were burning at the time) and beaches before they started on their

main sector of responsibility. Competition heated up with the later arrival of US and French commercial companies, and of contingents from the Egyptian, Pakistani and Bangladeshi armies (whose commanders had all been trained at Chatham).

The remnants of BFME (Fwd), which included an RE Troop, survived an interesting day on 11 July 1991 in the camp it shared with an American Air Cavalry Regiment when a fire starting in a US field artillery support vehicle initiated the first blast of a catastrophic series of explosions, involving assorted ammunition packed in American vehicles fully loaded with war stocks. Damage was extensive, with the loss of some 100 American vehicles and with unexploded shells, mines and bomblets spread over a one-kilometre radius. Destroyed vehicles included M1A1 tanks, Bradley APCs, bridgelayers and fuel tankers. Fortunately there were only two minor British casualties on the day. During the clearance operation a few days later, however, a sergeant from 21 Squadron was injured in the foot by the blast from an M-42 bomblet.

The Kuwait mine-clearance operation, together with smaller programmes in Afghanistan and Cambodia, were to prove the foundations of global humanitarian mine clearance. The Royal Ordnance team contained a high proportion of ex-Sappers, many of whom went on to work in other commercial mine-clearance companies or Non-Governmental Organisations. Brigadier P. M. (Paddy) Blagden, a retired Sapper, who led the team for part of their time in Kuwait, went on to establish the United Nations Mine Clearance Office. Serving officers subsequently held posts of responsibility in UN mine-clearance programmes. It can be fairly said that the Corps made a major impact on the field of humanitarian mine clearance. (See also Chapters 5 and 9.)

Operation Haven

The dust had scarcely settled after the departure of the units that had taken part in the Gulf War when a crisis blew up in the Kurdish region of northern Iraq. The Iraqi Kurdish minority, mostly located in the border areas adjoining Turkey and Iran, had a long tradition of hostility towards the Baghdad government,

which for their part had pursued a policy of repression against ethnic Kurds and had attacked areas they believed to be centres of rebel activity. Many alleged atrocities occurred in these operations, including the use of chemical weapons against the civilian population. In April, Iraqi Army forces moved into the Kurdish area supported by artillery and bombing from the air in an apparent move to prevent possible destabilisation of the country following the humiliation of the defeat at the hands of the Coalition. The terrified population had no option but to flee across the border to Turkey, creating an appalling humanitarian crisis and a potential long-term political problem.

The Western powers decided on a limited operation to create safe areas with UN protection to enable the refugees to return. An international Combined Task Force was set up under United States command, with British, French, Italian and Dutch representation. The British element was based on 3rd Commando Brigade with their Sappers, 59 Independent Commando Squadron, who arrived on 21 April. Essential additions were a troop of 49 Field Squadron (EOD) (the Commando Troop, which had not been deployed to Kuwait), 51 Field Squadron, 524 STRE and a Resources Section from 6 Field Support Squadron. In addition an ad-hoc field troop had to be found from 35 Engineer Regiment in BAOR. A three-star combined headquarters at Incirlik in Turkey, with its British National JFHQ element, commanded two US-led task forces. Task Force A looked after the survival and security of the refugees in the mountain camps and was to be responsible for assisting with their resettlement. Task Force B had the role of securing the safe haven to which the Kurds would return and then assisting them with their resettlement. 18 (US) Engineer Brigade, with international elements, gave general support throughout the area, 51 Field Squadron and 524 STRE being placed under its operational control. 3 Commando Brigade with 59 Squadron, with its EOD troop and a small Resources element, became part of Task Force B.

After deployment to the theatre and providing some help for the disaster relief teams, the priority was to support the Brigade

in their advance into Iraq, with the emphasis on water supply, mine reconnaissance, clearance and marking, and reactivating local stocks of plant and essential equipment to provide an infrastructure for the returning refugees. In the event, Iraqi resistance was minimal. The focus of the engineer tasks was able to shift from direct support to the force towards working with the Kurds to create their new infrastructure. Five safe havens were created with facilities for the aid agencies, which were able to move in once operations were complete. The Sapper units moved home in June and July, leaving a small multinational force as a deterrent to further Iraqi aggression.²¹

A Final Look

The Gulf War marked the end of an era for the Royal Engineers, that of the Cold War, for while the campaign had held the world's attention, in Europe barriers had fallen, the Soviet Union had begun to fragment and the Warsaw Pact alliance had disintegrated. At home the *Options for Change* programme of restructuring from an already unsustainable order of battle presaged reductions in the size of the Army, with concomitant amalgamations and disbandments that had been seen several times since the Second World War. While the new era was to be as demanding as the old, in some surprising new regions of the world, the Gulf War had shown that the 1990s Sapper could meet new challenges with the old virtues of improvisation, determination and endurance. The length of the deployment to Saudi Arabia and its uncertain outcome put a premium on regimental and station coherence and loyalty; the well-developed system of welfare support and wives' clubs and networks stood the test in exemplary fashion. The enormous generosity of spirit and solidarity shown by the British public in gifts, letters and thoughts was a strong thread woven throughout the campaign. While the equipment in the hands of the regiments was generally the oldest in the Division, at least one generation behind the modern fleets, the speed with which it was modified and improved testified to the excellent back-up available in conceptual, research and development fields.

The combat action was mercifully swift and free from the anticipated British casualties, but Sappers were tested to the full. Brigadier Cordingley described his Sappers as, 'my insurance premium; I knew that I could go anywhere with them'. Other commanders would surely have echoed that sentiment. There were lessons learnt and lessons unheeded. Equipment improvements were espoused but were slower to be implemented. Command and control arrangements were overhauled with much influence on the restructuring of the British Army then gathering pace. Most of all, flexibility had been demanded, and flexibility had been the key virtue shown by all Royal Engineers and their vital comrades in arms, whether in the sands of the Middle East, the ports and airfields, the depots or in the rear parties of home stations. This was to serve the Corps well in the following decade.



Gulf War Pipeline (Jonas)

NOTES

- 1 *Royal Engineers in the Gulf*, p. 16.
- 2 Major General Peck, *Recollections of the Gulf War*.
- 3 *Royal Engineers in the Gulf*, p. 50.
- 4 *REJ*, 105/2 August 1991, p. 138 for the full story.
- 5 Lieutenant Colonel J. (John) Moore.
- 6 *REJ*, 108/2 August 1994, p. 154.
- 7 *REJ*, 105/2 August 1991, p. 132 for the full story.
- 8 *REJ*, 105/2 August 1991, p. 106.

The First Gulf War: Timetable of Events

1990

- 1 Aug Invasion of Kuwait.
- 14 Aug RAF Tornados deploy to Dhahran.
- 18 Aug Three-man RE recce team deploys to Saudi Arabia.
- 14 Sept Decision announced to send 7 Armoured Brigade.
- 29 Sept 39 Engineer Regiment arrives Al Jubayl.
Chief Engineer HQ BFME arrives in Riyadh.
- 30 Sept CRE Works deploys to Al Jubayl.
- 11 Oct 7 Armoured Brigade (including 21 Engineer Regiment)
arrives in Al Jubayl.
Lieutenant General Sir Peter de la Billière arrives in Riyadh.
- 24 Nov CRE and CO 32 Armoured Engineer Regiment arrive.
- 29 Nov UNSCR 678 approved.
- 5 Dec Advance party of 1st (BR) Armoured Division arrives.

1991

- 2 Jan 23 Engineer Regiment deployment complete.
- 7 Jan 32 Armoured Engineer Regiment deployment complete.
- 13 Jan 1 (BR) Armoured Division regroup to VII US Corps.
- 15 Jan UN deadline to Iraq for withdrawal.
- 16 Jan Massive cruise-missile and air attacks on Iraqi command
centres and infrastructure targets begin.
- 24 Feb G Day, start of the ground war.
- 25 Feb British forces (as part of VII US Corps) move across line of
departure into Iraqi territory.
- 27 Feb Kuwaiti territory entered.
- 28 Feb 0800hrs ceasefire.
- 17 April Announcement of British contribution to Operation *Haven*.
- 17 June End of Operation *Haven*.
- 31 July Withdrawal of BFME (Fwd) from Kuwait.
- 25 Aug Withdrawal of British Forces Kuwait and 21 (EOD) Field
Squadron.

- 9 *REJ*, 105/3, December 1991, pp. 268–71.
- 10 *Royal Engineers in the Gulf*, p.46.
- 11 De la Billière, *Storm Command*, pp. 92–3.
- 12 *REJ*, 105/3 December 1991 pp. 260–7 gives a full account of 21 Regiment's mobilisation, deployment and action.
- 13 *Ibid*.
- 14 *Sapper*, August 1991, p. 130.
- 15 *REJ*, 105/3 December 1991, p. 108.
- 16 *REJ*, 105/2, August 1991, p.104.
- 17 *REJ*, 105/2, August 1991, pp. 136–47
- 18 *REJ*, 106/2, August 1992.
- 19 The 2nd Battalion The Royal Anglian Regiment battlegroup relieved the 3rd Battalion The Royal Regiment of Fusiliers battlegroup in early April.
- 20 On the departure of BFME (Fwd) on 31 July, Lieutenant Colonel Brooke became Commander British Forces Kuwait.
- 21 *REJ*, 105/3, December 1991, pp. 230–9 gives a full account of Operation *Haven*.

The Balkans

The Operations in Support of the UN and NATO in Croatia, Bosnia-Herzegovina and Kosovo, 1992–2000

Foreword

by General Sir Mike Jackson, GCB, CBE, DSO

Throughout my military career I kept hearing the cry, 'there are never enough Sappers!' This was particularly relevant during the many years that the British Army was involved in the peace support and peace enforcement operations in Bosnia and also in Kosovo. Sappers played a pivotal role during these crucial years to ensure that the remainder of the British Army, and also the various members of the UN, NATO and Coalition forces, could live, work and fight. The opening of routes, building of bridges, clearance of mines and camp construction alongside the many other tasks required to rebuild a country's infrastructure all fell to the Sappers, especially during the early days of these operations – tasks in which they excelled and which ensured our success.

There is no doubt in my mind that there are many people alive today in both Bosnia and Kosovo who owe their lives to the courage, resilience, determination and skills of the Royal Engineers: truly an accolade and a story that needs telling.

Their story unfolds in this chapter from the perspective of those who took part; it is written with clarity, humour and honesty. I was proud to serve with them and especially to have them under my Command during all my tours in Bosnia and Kosovo.

First on the Ground (May 1992)

In May 1992, 1 Troop 3 Field Squadron, under Captain D. (Damian) McKeown, arrived in Croatia as the military engineer back-up to the small United Nations (UN) force that was there primarily to enforce the demilitarisation of four UN-protected areas. The troop's immediate tasks were improving accommodation

for 24 Field Ambulance Group in Zagreb and the construction and refurbishment of medical section accommodation and working facilities in each of the UN's 'protected areas'. The principal locations were Knin, Toprska, Daruvar and Vukovar, but within eight weeks the troop was widely in demand by the UN elsewhere in the disintegrating Yugoslav federation. On completion of their tasks in Croatia, the troop deployed to Sarajevo to provide much-needed support to the United Nations headquarters and battalions based there. This included protection of the headquarters itself and UN Military Observer Observation Posts (OPs) throughout the city as well as improving living accommodation. They also played a leading role in the liaison and planning of the repair of the city power and water supplies. So began a commitment that was to dominate Corps life throughout the remaining period of this history and beyond.¹

Background and Outline of Events

The area occupied by the 'Former Republic of Yugoslavia' (FRY) had been a hotbed of discontent and divided national, religious and ethnic loyalties as well as the scene of invasions for many centuries. Indeed, Bosnia was a 'client state' of Hungary in medieval times and became autonomous for a while prior to the Ottoman Turks conquering the area in the middle of the fifteenth century. Each successive ruler left his mark – from the Ottomans, the Austro-Hungarians and the Germans during the Second World War to the Communist government in the post-war years under Tito. So it was that years of discontent, oppression, family feuds and religious rivalry provided the necessary tinder for this powder-keg to be ignited. A period of fragile calm existed in the decade following Tito's death in 1980, and it was in this context that the first multi-party elections ended Communist rule in Slovenia and Croatia.

Both these former Yugoslav republics declared their independence of Belgrade on 25 June 1991.² The Federal Government of Yugoslavia initially took military action to halt Slovenia's bid for independence but within a few weeks abandoned this struggle to focus on preventing the indep-

endence of Croatia. By December 1991, with 30% of the territory in Serbian hands, fighting in Croatia reached deadlock, and in January 1992 the Serbian leader, Slobodan Milošević, who had replaced the Croat Marković as federal president, accepted international mediation on behalf of the United Nations by their representative, Cyrus Vance. This resulted in protected areas, enclaves where the UN had negotiated an end to hostilities, and 3 Field Squadron's men became busy in these areas. However, an unsatisfactory territorial split remained a bone of contention between the factions, and the UN presence developed into a 14,000-strong peacekeeping force, composed principally of Canadian and French troops, operating principally in Croatia but with its headquarters in Sarajevo.

Worse was to follow in Bosnia-Herzegovina. Whereas Croatia (and Slovenia) had received international recognition as independent states on 15 January 1992,³ Bosnia was considered unviable as an independent state and would have to be the subject of some arrangement within the Yugoslav federation. The Bosnian Serbs under their leader, Radovan Karadžić had already taken steps to build up their military strength, and the Yugoslav federal army (which was, effectively, the Serbian army) had increased its presence in their support. Heavy artillery positions had been constructed around major Bosnian towns, including Sarajevo, by early 1992, and federal troops moved into Bosnia from Croatia as the agreed withdrawal from there began to be effective. The Muslim and other non-Serb communities of Bosnia now began to feel threatened with absorption into a 'greater Serbia' – and the only hope they could foresee lay in independence. The mixed ethnic, Muslim-led government under President Alija Izetbegović held a referendum on this in February 1992, but Bosnian Serbs were forbidden by their leaders to vote, and every effort was made to enforce this. Nevertheless some 64% of the population did vote and almost unanimously backed the proposition of 'an independent Bosnia-Herzegovina, a state of equal citizens of Muslims, Serbs, Croats and others who live in it'.⁴ Bosnia seceded from Yugoslavia, and

a 'civil war' broke out in which the Bosnian Serbs were sustained by the actions of the Yugoslav federal army. However, at this stage this was not a 'civil war' in the sense of an internal conflict between the parties in Bosnia-Herzegovina – the main factor was the external influence of the federal government of Serbia, whose strategy was to create a 'greater Serbia' and whose power base within Bosnia-Herzegovina lay in the Bosnian Serb community.

It is of interest to note that even in 1992 the racial and religious divisions instigated by Tito to maintain control in Yugoslavia still prevailed. While the Croats and Serbs were known as such, the third group – 'the Muslims' – were referred to by their religious affiliation as though this was a nationality in itself. The Croats were generally Catholic, and the Serbs Orthodox (although the causal observer could be forgiven for thinking that, in view of the well-publicised atrocities committed on each other by all sides during the conflict, none of the factions had religious affiliations at all.)

By the end of 1992 Bosnia-Herzegovina had degenerated into near chaos. Communities that had coexisted apparently happily since 1945, despite ethnic and religious differences, were now fighting each other with undisguised hatred and brutality, and the terrible sufferings of the civilian population were portrayed in horrific detail on television screens and other news media worldwide. Pressures grew for intervention by the international community. The particular concern was for Sarajevo, where the Muslim population was resisting Serb efforts to take control of the city, with dire consequences to the population as a whole. Relief was urgently needed, and it seemed that it must be feasible to create some sort of protected corridor through which this could be achieved. The United Nations decided to limit its contribution to the provision of humanitarian aid. To that end, in the autumn of 1992, UNPROFOR (United Nations Protection Force) was mandated to establish an infrastructure and protection force for the various international agencies, including its own, which could provide relief for the population in northern Bosnia-Herzegovina. Diplomatic efforts to achieve peace continued

throughout 1993, centring on the allocation of territory between the warring parties initially based on the 'Vance-Owen' plan, originally formulated in October 1992 and named after Cyrus Vance and Lord Owen, special envoys for the United States and the European Union respectively.

In the fighting up to this point the Bosnian Muslims (Bosniacs) had succeeded in cooperating with the Croats in the territorial struggle against their Serb enemies and, at the end of 1992, had formed an alliance under which Croatian forces were allowed to operate in Bosnia-Herzegovina. One unfortunate (from the Bosnian viewpoint) effect of the Vance-Owen plan was the breaking down of this cooperation and the encouragement of the Bosnian Croat extremists to greater violence. It led to inter-communal war in which the Bosnian military forces were at a particular disadvantage because of the UN arms embargo. This lasted until a cease-fire was agreed in December 1994, to be followed by a Cessation of Hostilities Agreement (COHA) in December. The military forces involved in the war were:

- The Bosnian Serb Army (BSA), supported directly from Belgrade.
- The Army of the Republic of Bosnia-Herzegovina (ARBiH or BiH).
- The Army of Croatia (HV).
- The Bosnian Croat Army (HVO) (the Croatian Defence Council).
- The Croatian Liberation Army (HOS) (Hratiše Olobodilačke Snage), which was integrated into both the HV and the HVO. Dressed in a sinister manner, all in black, and thus resembling the SS stormtroopers of the Second World War, they were often seen at the forefront of ethnic cleansing operations.
- The UN Protection Force (UNPROFOR), which was originally deployed for humanitarian purposes such as delivering aid and protecting convoys, developed into an actual peacekeeping force.

The fighting continued against this confused background until the realities of the situation obliged the three communities to

accept the Dayton Peace Accord late in 1995. By that time the widespread devastation of the country, the dire refugee problem and forced migrations had created a rehabilitation and reconstruction challenge unseen in Europe since the end of the Second World War. An even more sinister element, also with echoes of the conflict with Hitler, now became manifest. Irrefutable proof emerged that the policy of 'ethnic cleansing' was not simply a question of relocating communities, itself bad enough, but of actual extermination, either summarily in the process of the evacuations or methodically in camps such as those that came to light in mid-1992. None of the ethnic groups were innocent of these crimes. However, it was the Serb action against the Albanian community in Kosovo that was eventually to lead to the second major commitment of British forces in the Balkans, in 1999, which forms the second part of this chapter.

Bosnia-Herzegovina

Background

From the earliest days of the efforts to achieve peace in, and provide succour to, the former Yugoslavia, the military operation was fully international. Even in the relatively small UNPROFOR force (22,500-strong), twelve nations were represented – Belgium, Canada, Denmark, Egypt, France, the Netherlands, Norway, Portugal, Spain, the UK, Ukraine and the USA. This section will necessarily concentrate on the British contribution and the Sapper work in particular, but it must be appreciated that this was conducted within an international framework much wider than had been experienced since the Second World War. Britain initially committed a battalion group to be based at Vitez, and 35 Engineer Regiment deployed on 15 October 1992 from their base in Hameln in Germany to prepare for the arrival of the force and to continue to provide engineering support in the region.

From the start of the emergency it was appreciated that this was going to be essentially an Army affair and that command from Headquarters United Kingdom Land Forces (HQ UKLF) at Wilton would be preferable to the Army, rather than from High

Wycombe as had been the case for the Gulf War (see Chapter 6). CinC UKLF was appointed to command the operation, and an operational complex was created with some difficulty in the HQ UKLF office block in Wilton. Though cramped and uncomfortable, these quarters had the great advantage of being just yards away from the staffs' normal offices thereby avoiding the physical separation and consequent double-manning experienced on Operation *Granby*, the name given to the first Gulf War. Commander Engineers UKLF carried out his normal function of engineer adviser to the commander, and his staff controlled and coordinated the engineer logistic support. In due course the new Land Command Operations Centre at Wilton became a vast improvement on the original ad hoc arrangements, although only occupied after a brief sojourn away at High Wycombe. The final evolution came when, in late 1995,



the new Permanent Joint Force Headquarters (see Chapter 4) at Northwood took over on the deployment of the NATO-based Implementation Force to Bosnia. By then HQ Land's responsibilities were limited to the training and deployment of their troops.

The deployment of the British Army element of UNPROFOR was known as Operation *Grapple*. Events in Bosnia took place in two main phases. For *Grapple 1*, from October 1992 the forces were working strictly to the mandate of UN Security Council Resolution 770 (13 August 1992), 'to take all necessary measures to facilitate delivery of Humanitarian Aid to Bosnia-Herzegovina'. The UNPROFOR was not therefore originally intended to be a peacekeeping force. Its role was to support the UN High Commission for Refugees (UNHCR) by escorting convoys and providing logistic backing for the force itself. However, under UNSCR 743 issued on 21 February 1993 the mandate was extended to peacekeeping.⁵

UNPROFOR (later UNPF) was controlled from its headquarters in Zagreb, Croatia. Its military headquarters, Bosnia-Herzegovina Command (BHC) was in Kiseljak, with a forward element in Sarajevo, twenty kilometres to the north-west. The British Forces (BRITFOR) were controlled from HQ BRITFOR, based on HQ 11 Armoured Brigade at Divulje Barracks in Split. There were 9,000 troops of various nationalities deployed in BHC of which over 1,000 were engineers, mostly under the direct command of their own national battalions. The mission of the engineer branch of HQ BHC was to keep open the routes for supply of humanitarian aid and to supply all UNPROFOR units with engineer materiel.⁶ During most of this time the British contribution was based on a mechanised battalion of infantry. To sustain it there was a logistic battalion, an engineer regiment, a flight of Sea King helicopters, a brigade headquarters, a signals squadron, a logistic supply ship permanently moored in Split and smaller detachments from the Military Police, Intelligence Corps, Chaplains, Medical personnel and Postal and Courier Services RE – in all around 2,000 personnel. Success in this mission was to be achieved despite

continuing efforts by the warring factions to manipulate the flow of aid to suit their own purposes – but in the many confrontations that had to be overcome the UN forces were unable to use military force as their rules of engagement forbade it, despite being the target of aggression in many cases.

Operation Grapple 1 (October 1992 to May 1993)

Apart from the work of the field troop in Sarajevo, the first Sappers into central Bosnia-Herzegovina under Operation *Grapple* were as part of the UK's reconnaissance mission in September 1992 to establish the feasibility of a major UK troop deployment under the UN banner. This unarmed eight-man party contained two Sapper officers (Lieutenant Colonels J. S. (John) Field, CO 35 Engineer Regiment, and N. (Neil) Munro from MWF) who were only included at the last minute. A short foray into Serbia from Zagreb was aborted due to lack of access into Bosnia across the frontline of the fighting, and the party returned to Zagreb, being re-routed via Split on the Croatian coast. Lieutenant Colonel Field recounted some of the incidents in his journal article:

The recce did not pass without incident: elements of the party were shelled in both Prozor and Zenica, some of us were shot at in Vitez and Ribnica as well as being caught in crossfire in the Black Hills; we also ran into several roadblocks where mines were used instead of bollards to channel the traffic, an effective but alarming method of traffic control. In addition, I had been arrested twice along with other members of the recce party! This number of incidents on a short recce gave me the uneasy feeling that any large operation was not going to be trouble free. Much to my consternation, this feeling was to prove far too near the truth for comfort.⁷

The reconnaissance ended on 5 October, but it was the Sapper CO rather than the infantry CO who was part of the small team that briefed the MOD on the feasibility of a UK deployment. As a result of this briefing, the decision was made to deploy a UK force to Bosnia under the UN flag – although prior to the reconnaissance a 1,822-strong force had already been promised to the UN! Hence the unseemly haste as only ten days elapsed

from the end of the reconnaissance and the deployment of the engineer advance parties. The advance party from 35 Engineer Regiment deployed almost empty-handed on 15 October to join the other advance elements of the force in Split, where HQ 11 Armoured Brigade was to be based. After considerable debate at staff level as to how many people from the Regiment would be allowed on the advance party, it was something of surprise for the CO to find, on arrival in Split, that there were more RE cap-badged personnel from the Postal and Courier Service, as part of HQ 11 Armoured Brigade's contingent, than there were in his Regiment's advance party.

There was much planning to be done, base locations to find and establish, suppliers of engineer materiel to locate, contracts to set, routes to reconnoitre and much more. Lieutenant Colonel Field's notes at this early stage reveal the huge extent of the problems faced not only by the Sappers but also by the logisticians, and indeed the whole force:

Lieutenant Colonel M. (Malcolm) Wood, RLC, and I were standing on the waterfront in Split and he remarked, 'We have 2,000 troops arriving in two weeks; we have no food, no water, no accommodation, no resources, little ammunition and no way to unload our ships when they start to arrive!' ... Together we worked out the priorities and a plan emerged using local contractors despite not being sure if indeed we had the necessary funding in place to set up these contracts. As the tour unfolded during the harsh Bosnian winter it became apparent that the Sapper main effort was [to be] keeping open the MSR [main supply route] for the re-supply of the Cheshire's Battalion Group based in Vitez as well as the passage of aid flowing northwards. I had some difficulty balancing this important role with the fact that the same route was also being used by the Croatian and Bosnian Armies to resupply their own troops on the front line, not to mention the committal of various atrocities like the sacking of Rumboci, a small Muslim village which straddled the MSR some 20kms north west of Tomislavgrad.⁸

The roles of the logisticians and the Sappers overlapped considerably, and without a viable MSR the logistic business of re-supply could prove tricky – indeed, impossible – as the restrictions

imposed by winter weather on helicopter flying ruled out that option. It was CO 35's faith in his unit's capabilities that lead him to pin the hopes of the whole UK force on the ability of the Sappers to open and maintain the only route north through Bosnia and for it to become the MSR to the designated infantry base in Vitez. As it happened, it remained as such for the next twelve years.

The UK contingent comprised a Brigade HQ, elements of a logistics battalion, the majority of 35 Engineer Regiment and the 1st Battalion the Cheshire Regiment, which included a company of Royal Irish to make up their numbers. The Cheshires were to be based in a school in Vitez supported by 42 Field Squadron under the command of Major J. W. (Jamie) Sage. The initial deployment was a high-profile affair attracting much media coverage, with TV crews following every move of the various advance parties. Because all the soldiers wore the same blue berets with UN cap-badges it was difficult for media correspondents to distinguish between infantry and other arms, even if they understood the difference. Television news programmes in the UK presented most of what they showed as the deeds of 'The Cheshires' even though frequently it was the Sappers who were actually appearing on the screen, probably because the Sappers formed the largest contingent in theatre at the time.

The Sapper tasks identified were (not in priority order):

- The construction of up to six main bases as well as three route maintenance camps along the main supply routes; using existing structures wherever possible as well as green-field sites to house 1,822 men and women, within a budget of £10 million, including protective works as necessary. The actual requirement by the end of October had risen to 2,600 bed spaces and was rising daily.
- The improvement and maintenance of some 450 kilometres of MSRs. There did not appear to be any local authority that would claim responsibility for road maintenance, gritting icy roads or clearing snow, and, even if they did, the equipment for doing these jobs had been used for digging defensive positions for months and was all but ruined.
- The construction of two bulk fuel installations (BFIs) for a total of 1.6 million litres of fuel.

- The repair or replacement of twelve bridges on the MSRs, including two main road bridges that had been partially demolished with explosives.
- Snow clearance, salting roads and gritting on most of the MSRs and other roads.
- Support to the United Nations High Commission for Refugees (UNHCR) convoy escort operations to be conducted by the Cheshire Battalion Group from their base in Vitez.
- EOD and mine clearance throughout the area.
- Water supply and purification as well as general combat engineer support for the force.⁹

Not until after the arrival of the advance party did it become apparent that the port authorities at Split were uncomfortable about the UK's force using the main entrance of the docks, so the construction of a container park and a new exit road for the heavy engineer plant from the port of Split suddenly became a top priority. The Military Plant Foreman managed a fleet of contracted plant machines and tippers in order to complete the task, and the new facility was then used by every other nationality in the UN force arriving via Split.

The main body of 35 Engineer Regiment deployed later in October 1992 with 37 and 42 Field Squadrons (Majors I. R. A. (Iain) Wright and J. (Jamie) Sage respectively), 44 Field Support Squadron (Major M. (Martin) Grimshaw) and 519 STRE (Construction) (Major M. J. (Mike) Cox) plus 3 Troop from 5 Field Squadron attached to 37 Field Squadron, as well as the REME workshops. As the winter set in there was immense pressure to complete the accommodation for the soldiers of the force, many of whom were living in tents in temperatures dropping to -20°C . HQ UKLF provided a large and complex accommodation facility shipped out from UK in flat-pack temporary buildings. These were the modern equivalent of the old camp structures, and with their built-in power and light and fitted kitchen and ablution units they were a far cry from the old canvas, hessian and timber structures.

After negotiation with the mayor of Vitez, the main battalion base was to be its now-empty school, which had not functioned since the conflict started. Promises to return the school in the state

we took it over seemed to be forgotten once camp construction started in earnest and with successive Operation *Grapples*. The Bosnian winter posed a few problems that had not previously been encountered with the construction of this sort of camp accommodation. Temperatures as low as -20°C meant that all the water pipes as well as the drains had to be laid a metre underground. However, before any of the modern accommodation units arrived – a heavily populated tented camp having sprung up at the school grounds with some 600 men in residence – the snows set in and temperatures plummeted. This made the task of constructing a permanent camp on the same location all the more difficult. The frozen ground was impossible to dig, so the only solution to prevent the problem of frozen pipes was to lay stone over the whole site. The thought of removing it all when 'hand-back' time came was a problem for another day.

During the reconnaissance, an old Yugoslav National Army (JNA) base in Split, Divulji Barracks, was identified as the ideal location for a UK springboard into Bosnia. However, from an engineer work perspective, it also had its problems. The eight barrack blocks offered to the UK's contingent were structurally sound but they had been trashed – this area had been the scene of heavy fighting between the Croats and the resident Serbian Army personnel during the early struggles. All the windows were broken, every electrical fitting had been looted, water pipes had been smashed, all sinks and showers had been smashed, cellars were flooded, piles of clothes, debris, rotting food and excrement occupied every room. To compound the issue, rats and snakes (not surprisingly) seemed to thrive in this environment. Just to add the 'icing on the cake', four days prior to the advance party's arrival there had been a hail storm: the hailstones were like pebbles and riddled the brittle asbestos roofing sheets with holes. It was not, therefore, surprising that the Croatian authorities permitted us to occupy this prime location. Local contractors were tasked, and during the two weeks before the UK's main body arrived they transformed the eight barrack blocks into habitable living and office accommodation.

However, this first tour in the *Grapple* series was much dominated by the need to keep open the mountain roads from Tomislavgrad through to Vitez, 220 kilometres in all. This daunting task fell to 44 Field Support Squadron based in Tomislavgrad. The first step was to establish their rights to work on the roads. Officially this had been granted by the government, but in practice the roads were under the jealous control of local power groups. This problem fell away when Colonel Field's smart offer to purchase a 40-kilometre stretch of the road between Tomislavgrad and Prozor was surprisingly accepted. Later in the tour when Paddy Ashdown, MP, visited the UK contingent he travelled up the still very bumpy MSR to Vitez and, having been told of the purchase, commented to his escort, 'I think he was overcharged!' On return to the UK he had an article published in *The Independent* newspaper on 15 December 1992, and the opening paragraph contained the following:

The British taxpayer now owns the 40km (25-mile) road from Tomislavgrad to Prozor in central Bosnia. Lieutenant-Colonel John Field, Royal Engineers, bought it for us from the local council for 10 dinars – slightly less than 10p. In my view, he was scandalously overcharged. But then, in my view, this is not a road. To call it a dirt track would be an exaggeration ... The soldiers clearing this vicious little track through the snowy woods are performing a job to be proud of. They need an aim to be proud of, too ...¹⁰

Captain A. (Alex) Hay, the Plant Troop Commander, recalled the working conditions they encountered while at the Redoubt:

The climate was unforgiving. The day we arrived it was scorching at 30°C, but within a week blizzards and serious cold arrived to stay for the next six months. Snow was not permanent, though the temperature stayed doggedly below -10°C, dropping to a low of -65°C with wind chill. When it snowed, up to 2m would be deposited within 36hrs which would then just blow around for the next two weeks. Weather prediction was difficult and the local authorities probably thought the joke would be on us when they sold us the road.

Within a matter of days the first MSR base was established at Redoubt, in an old logger's cabin. This was shortly followed by a



One of the eight barrack blocks in Divulje Barracks in Split.

second base, Happy Eater, 10km towards TSG. There were no cabins at this second site and initially the team lived in a tented camp they had to establish in a blizzard. Drawing upon their childhood experiences of cowboys and indians, they drew all the equipments up in a circle around a lean-to and huddled over all sources of heat that could be made. Within 24hrs 12ft x 12ft tents had been erected complete with improvised insulation from cardboard and polythene.¹¹

The 'Redoubt' base was some 35 kilometres from Tomislavgrad, and although very basic it was an essential plant base for work on the MSR. Facilities improved over the first winter, but space was limited. A large steel-framed marquee was erected as a plant workshop. This was meagre protection against the bitter cold, but it did keep the snow off the vehicles. Working outside in such adverse conditions was not easy, and the speed of the deployment meant that nobody had yet been issued with any type of cold-weather clothing. This started to arrive during the tour but not before the Regiment has suffered eight frostbite casualties, all of



Above: A drilling rig on Route Triangle during the winter of 1992.
Below: Overview of the Redoubt mountain base.





Above: Inside the plant workshop at the Redoubt mountain base.
Below: The plant park at the Redoubt.



whom had to be casevaced to the UK. The lack of proper clothing combined with the cold, exacerbated by wind chill, meant the troops working in the open could only do so for short periods before they needed to thaw out.

The task group for this work was about 120 strong, divided into three construction teams under the Combat Support Troop commander, Captain Hay, with a headquarters base and two outstations about ten kilometres apart, in the area of Mount Vran. The plant used on the project was all standard-issue equipment: Heavy Crawler Tractors (Terex 8230B), Medium Wheeled Tractors (Volvo 4400), Medium Graders (Aveling Barford), Rollers (Hamm), Light Wheeled Tractors (Hydrema) and tippers (Iveco). By and large they performed well in the arduous conditions, bringing credit to the now well-established system in the Corps of selection and purchase of equipment from the commercial market and replacing out-of-date machines on a regular programme. The cold weather produced all the predictable problems of such conditions, but the urgency of the unit's deployment had not allowed time for the necessary preparations. Much improvisation and working to strict drills was necessary to prevent hold-ups. For example:

One hour of plant exercises each morning got the actuators quite hot and the engines up to working temperature to allow the machines to travel to the work site without problems as long as they didn't stop – if they did, the wind would cause the main rams to freeze in transit, and sometimes the fuel lines as well, rendering the machine useless and a severe problem to recover ...¹²

After heavy snowfalls, clearing the route and rescuing those that had risked a crossing during blizzards became the dominating consideration. The main customers for whom the route was intended were the relief convoys and the elements of the battalion group and their logistic support, whose job it was to carry out the humanitarian mission. However the project team also had to cope with elements of the warring factions, who manned checkpoints along the route and maintained bases nearby. These local troops were unpredictable – those manning the checkpoints seemed to be drunk most of the time and were keen on waving their AK47s around in a threatening and very casual manner. There was also a constant stream of refugees.

The work that we did on Mount Vran on the MSRs was very much a team effort. It is still hard to believe that we achieved so much, but that we did was all due to team spirit. The chefs kept us fed, the petroleum depot kept us fuelled, the REME fitters kept us operational and the stores sections kept us clothed and supplied. There can be no doubt that our presence and the fruits of our labours assisted the humanitarian efforts of the UN significantly, if only in the British areas. All are proud of that but each is also wiser for his experience, and that is to the benefit of the Corps.¹³

Some flavour of the unpredictability of life in the Regiment's area and the difficulty of bringing relief to the terrible plight of the local population can be gained from the following extract from the recollections of the RSM, WO1 G. (Graeme) Ferguson:

The CO had intended to return to Split via Kiseljak and Jablanica as we had other sites to visit and various contractors to see; therefore the party endeavoured to leave Vitez at 1100hrs. The local UNHCR office considered that the situation was getting too dangerous and asked us to take out three UK civilians who had been doing a job for the Overseas Development Agency (ODA). So here we were, five Landrovers and fifteen people, twelve armed with SA80 and 20 rounds apiece, about to depart into an unknown situation. Jeremy Bowen and the BBC TV crew, who were hovering in the area, got to know of our plans and thought that a story was in the offing so followed us in their armoured Landrover.

As a small precaution we donned flak jackets and helmets as we were heading into an area where there had been some incidents and from where we could see plumes of smoke rising; a very wise decision I thought! We left the town to the east at a steady speed so as not to alarm the drunken soldiers with AK 47s on the checkpoints and quickly saw evidence of fighting, shelling and some burnt out houses.

We were about 2kms out of town when we came under small arms fire; it seemed to come very close and the noise was frightening enough. As the bullets weren't making contact the CO decided to continue, a little faster this time: my heart rate as well as the vehicles! For quite a few years I had been a member of the national biathlon squad and had spent many hours and countless different methods to get my heart rate up – being fired at does it in seconds!

It was not until an RPG 7 round went between the front two Landrovers, and exploded 5m from the convoy that I thought the situation was getting tricky; a mortar round landing at the rear of

the convoy confirmed my suspicions. I uttered a few unprintable words because the RPG 7 round went past the back door of the CO's Rover and I was in the back! There isn't a lot of protection from three army sleeping bags, which was all I had around me. The driver was told to step on the gas; he needed no further instructions. After 500m when we took a bend by a Muslim graveyard some 3kms from Vitez, we ran into a barricade of TMA 3 and TMA 4 antitank mines scattered across the road. There is nothing like mines on the road to concentrate the mind on stopping. And I nearly ended up in the front!

I dismounted with the CO to take a closer look and the remainder of the other crews went to ground, except for the three ODA civilians who we had forgotten about and who were trying to get into the Landover battery compartments. As we were still being fired at and had no equipment to deal with mines under these circumstances, the CO decided that it was time to turn around, another wise decision. I've never seen five vehicles execute three point turns quite so fast.

Meanwhile, the BBC crew had holed up in their armoured Landover and were getting good footage of us in this tricky situation. This was later shown on the 10 o'clock news, and bits were repeated some three weeks later to cover another incident. We returned to Vitez without knowing whether it was the Croats or the Muslims who had been firing at us but we knew it certainly wasn't the Serbs. By this time the situation in the town had deteriorated even further with Muslim snipers shooting down the length of the main street from the Mosque's minaret with fire being returned from police and militia standing in the middle of the road; the odd mortar and artillery shell also landed in the town, adding to the confusion. I was beginning to wish that I had an extra flak jacket.¹⁴

The shelling of the UN bases of the UK's engineer and logistic units in Tomislavgrad in January 1993 by the Serbs brought some urgency to the need for protective structures. Luckily for both the logistic and Sapper troops based in Tomislavgrad, there were no human casualties from the 137 shells that fell in the area. However, quite a bit of equipment was destroyed, and the accommodation was damaged. There was therefore an imperative for designs for blast walls, sangars and collective shelters, which were developed taking account of the availability of materials locally. As well as these new structures, protection

was also produced for existing buildings such as the school building in Vitez, which housed the battalion headquarters and main communications centre. The Hesco-Bastion 'concertainers' that had proved successful in the first Gulf War were found to be particularly useful and versatile for this task.¹⁵

Much of 35 Engineer Regiment's contribution in the operational area was complemented by Military Survey's team of some twenty officers and soldiers based at the headquarters of UNPROFOR and at BHC in Kiseljak and COMBRITFOR. Their role was to provide geographical planning support, terrain analysis and graphics in the headquarters, updated tactical situation maps and an in-theatre map-supply system. A particular task arose for Survey when the Serbs were besieging Sarajevo and surrounding the city with heavy weapons. The UN undertook monitoring of an agreement under which the Serbs would not fire their weapons. For this, mortar-locating radars were brought in by the Royal Artillery and a party of six from Military Survey allocated to their support.

Operations Grapple 2 and 3 (May 1993 to April 1994)

After 35 Engineer Regiment's departure in May 1993, RE support to the battalion group was reduced to a single squadron, albeit enhanced to some 250 strong, despite concerns within the Corps that such an operation in a complex military and political setting required a regimental level of command. 1 Field Squadron (Major G. C. W. (Geoffrey) Dodds) undertook *Grapple 2*, with 521 STRE (Well Drilling) brought in to help solve the water-supply problem for British UNPROFOR units. This proved highly successful. Productive boreholes were drilled at Vitez, Gornji Vakuf, Tomislavgrad and (for the Dutch) at Busovaca. These bases were thus relieved of dependence on local supplies, which, being subject to the vagaries of factional fighting, were unreliable.¹⁶

The difficulties and the context in which the UN force had to operate are brought out in an article about the experiences recorded by a Sapper officer, working in an international headquarters at the time, in the *Royal Engineers Journal*:

The best intentions of the UN mission statement and of the commander on the ground to bring humanitarian relief and generally improve the lot of the local population would be frustrated at every step by the determination of local warlords to maintain their own military advantage. Thus, for example, restoring electricity supply to a centre of population, against the interests of those who had deliberately cut it off, became a matter for endless negotiation for access throughout the area concerned in order to allow the necessary stores and electrical engineers to reach the site and work on it.¹⁷

11 Field Squadron (Major J. E. (Jonathan) Passmore) followed on *Grapple 3*, but it was soon appreciated that a single field squadron was insufficient to provide the necessary support to the force. As a result, the tactical headquarters of 38 Engineer Regiment was sent out in February 1994 to help relieve the pressure on 11 Field Squadron and assess the tasks that lay ahead.

It has to be appreciated that meeting the Bosnian commitment coincided with the process of 'drawdown' following *Options for Change* (see Chapter 4), causing great problems in overstretch. These were most serious in the small trade groups, where individuals found themselves committed to 'back to back' operational tours with only weeks between them.

Operations *Grapple 4, 5, 6 and 7* (April 1994 to August 1995)

From April 1994 the *Grapple* commitment was met by an engineer regiment of two field squadrons, a field support (or HQ) squadron, STRE (Construction) and a troop from 33 Engineer Regiment (EOD), a total establishment of 400. By this time UNPROFOR's operational area had been divided into three sectors, the British contribution being located in Sector Southwest. The regiment was known as the British Engineer Battalion (BRITENGBAT). The commanding officer was the Sector Chief Engineer, with a small forward RHQ co-located with Sector Headquarters at Gornji Vakuf. For *Grapple 4*, one of the field squadrons was based at Vitez and the other at Gornji Vakuf, with a detachment at Bugojno and the support squadron at Tomislavgrad. The engineer task priorities were:

- Security of UNPROFOR lines.
- Construction and maintenance of UNPROFOR and UNHCR routes.
- Monitoring of minefield marking and clearance tasks.
- Construction and maintenance of camps and services.
- Support to key civil infrastructure projects.

The regiment's work was divided between giving close support to the British units (two infantry battalions and a reconnaissance regiment) and more general support throughout the Sector. BRITENGBAT represented some 40% of all engineer effort in the Sector and possessed the only capability in some specialisations such as heavy plant, diving, design and EOD. A continuing priority was the security of the UNPROFOR units and personnel. This involved protection work in the unit bases, building sangars, blast walls and hardened operations rooms and accommodation. It also led to numerous EOD tasks; for example 2,750 mines or unexploded ordnance were disposed of during the tour of duty by 21 Engineer Regiment (Lieutenant Colonel M. F. N. (Mark) Mans) during *Grapple 6*.

Route maintenance was probably the main focus of the engineer work in the Sector. The regiment became responsible for some 500 kilometres of roads, including the mountain routes opened by 44 Field Support Squadron (Major M. (Martin) Grimshaw) on *Grapple 1* in the winter of 1992. There was ever-increasing traffic on these routes as the security situation improved and humanitarian aid convoys became routine. Winter conditions again demanded particularly heavy commitment, and dealing with snow and ice frequently interrupted other work in the area as 24-hour operations were needed to keep the routes open. The scale of this work is illustrated by some of the statistics from 21 Engineer Regiment's tour: 579 kilometres of routes maintained, 12 bridges constructed, 65 culverts repaired or constructed, 2,905 kilograms of explosives used, 86,400m³ stone or sand excavated, stockpiled and hauled.

It was during this period that 61 Field Support Squadron, who deployed on *Grapple 4* with 36 Engineer Regiment (Lieutenant Colonel D. R. (Robbie) Burns) were called upon to help build the

new 'Tito' bridge in the city of Mostar. The background to this task illustrates the complexity of the political and military situation in Former Yugoslavia. The Croats, who formed the majority of the population in the area, owed little allegiance to either Bosnia-Herzegovina or even the majority of Bosnian Croats in the rest of the country. In 1992, they had declared yet another ethnic faction, the 'Union of Herzeg-Bosna' and, after the allied Croat and Muslim forces had wrested the city of Mostar from Serb control, the Croats gradually turned against the Muslims to gain their own ends. The havoc caused by the ensuing fighting, some of the worst for its ferocity and dire consequences to the civilian population, included very severe damage to the Bailey bridge that had been erected the previous year. This was the only crossing over the River Neretva after the destruction of the historic and symbolic Stari Most Bridge, which was originally built in 1566 in the days of Ottoman rule. (The stone bridge was subsequently rebuilt by Turkish contractors and opened in July 2004.) It was destroyed after being subject to direct fire from Croat tanks in November 1993. The damage to the Bailey bridge was such as to permit only small numbers of people to work their way across the wreckage on foot. Replacement of the bridge was therefore an essential element in normalisation and a step towards reconciliation of the communities.



The 400-year-old Stari Most Bridge in Mostar – before its destruction!

Mostar, though in Sector South-West, lay in the area of responsibility of the Spanish battalion group. After a cease-fire had been achieved and the concept of a new bridge accepted (with some reluctance) by the Croats, the city came under the administration of the European Union. The EU appealed to Sector South-West for help. Thus the project became the responsibility of CO 36 Engineer Regiment and the British Sappers, with the small detachment of Spaniards in support. The materials and associated works were funded by the Overseas Development Agency, and after reconnaissance what eventually was to become a two-span 270-foot extra-widened Bailey bridge was agreed upon, giving a military load classification of 60.

The most difficult part of the task turned out to be the removal of the damaged Bailey bridge, which had to be broken up into sections using explosives in one single demolition, the remains to be taken away by crane and recovery vehicle. This took six days to achieve. For the actual firing of the demolition, tens of thousands of people living nearby had to be moved out of the danger zone. The event was undertaken in the full glare of publicity, with 200 press reporters present. An hour beforehand scarcely any of the residents had moved, but once the urgency of the situation was brought home to them they cleared the area in



The 270-foot Bailey bridge erected across the River Neretva in Mostar.



The Slovakian PMP constructed on Route 17 south of Mostar.

45 minutes and all went well. Thereafter the actual building of the pier and two spans were straightforward once the necessary preparations and layout had been finished. The bridge was formally opened on 12 September 1994.

Farther downstream towards the coast another great normalisation project was underway: to restore a crossing on Route 17, a critical route into central Bosnia through Mostar and Jablanica, where both Serbs and Croats had both carried out extensive demolitions. The only means of crossing left was a Russian equipment ferry constructed and manned by the Slovakian Engineers with a 1½-hour turn-round. The fragile peace established in 1994 now required backing up with both aid convoys and normal trade. The first stage of this complex project was to blast a short bypass causeway round one of the demolitions. Twenty-four Sappers from 61 Field Support Squadron under WO1 Cook, the Military Plant Foreman, achieved this in three weeks. This allowed for the construction by the Slovakian Engineers of a floating bridge using the same PMS equipment that they had employed on the ferry. Within a further three weeks, 16,500 vehicles had used the crossing.¹⁸

Dealing with the widespread mines problem was a continuing commitment; the subject is dealt with more fully later in this chapter. However, for the Sapper units, not only clearing mines but also support to all arms in collecting minefield information was a lengthy process calling for persistence, patience and delicate negotiating skills dealing with many sources, including the former warring parties. Monitoring the work of the clearance and marking teams and contributing to mines awareness training was of utmost importance in meeting the aims of UNPROFOR.

Construction and maintenance of camps remained a big task for the British Sappers. The longer-term aim of handing the camp maintenance task over to the UN Engineer Operations Section had still not been achieved in 1995. For example, during *Grapple 5* the regiment built three camps and was responsible for maintaining thirteen, which included the 'winterisation' of British units' accommodation and offices.

Central to the UN mission was the reconstruction of civilian facilities generally known as 'G5 Infrastructure Projects'. This sort of work, restoring power or water supplies, refurbishing hospitals and schools and repairing local road networks, was crucial to the settlement of communities and to discouraging them from taking up arms again in inter-communal violence. For UNPROFOR to undertake such projects, approval would be required from UNHCR, through whom funding would be made. UNHCR also had to coordinate the efforts of numerous other agencies working in this field. In 1995, for example, these included thirteen government organisations such as the Overseas Development Agency and 98 non-governmental organisations (NGOs), such as Oxfam and Médecins Sans Frontières.¹⁹

Escalating Conflict

Grapple 4 started in February 1994, shortly after the signing of the Cessation of Hostilities agreement. This brittle peace was not to last for long, and its breakdown gave NATO the pretext for tougher action. Among the events in this period of heightened tension were NATO air strikes in an attempt to enforce the

agreement and the deployment of a rapid reaction force by Britain and France in response to the taking hostage (mid-1995) by the Bosnian Serbs of 370 UN soldiers. As early as 1993 'safe areas' and 'exclusion zones' had been established by the UN in their efforts to hold back the escalating movements of population and the terror tactics of the ethnic cleansing paramilitaries. Violations of the areas were frequent, and eventually retaliation followed in the form of strikes by NATO aircraft. The hostage-taking was in response to these air strikes. The British and French governments promptly announced the formation of a joint rapid reaction force, to which the Dutch also offered support. The immediate result was the release of the hostages. However, the force was duly despatched against the possibility that entry to Sarajevo, by then under siege and bombardment by Serb artillery, might have to be forced. The following extract from the EinC's report describes the situation, August to December 1995:

35 Engineer Regiment [Lieutenant Colonel N. M. (Neil) Fairclough], with 44 HQ Squadron, 37 and 42 Field Squadrons reinforced by 45 Field Support Squadron and 522 Specialist Team RE (Works), was deployed to the infamous Ploče dockyard camp [in June] to provide a main administrative base for the 3,500 personnel of the Brigade and the Combat Service Support Group (UK) that was required to support the increased deployment of UK troops on Operation *Grapple*. The work completed included the provision of tented accommodation and temporary ablution areas, an emergency bulk-fuel installation, the Brigade command and control complex, an explosive storage area, the aviation battlegroup's hard-standing and many other support services and facilities. Particularly notable was the work required to provide support facilities for the largest Army Air Corps deployment ever undertaken. Winterisation of the facilities was also a main effort for the regiment, which completed an astonishing amount of work, before departing in November 1995.

51 Field Squadron, 24 Airmobile Brigade's integral RE support, deployed with its parent Brigade and was committed to accommodation tasks alongside 35 Engineer Regiment. Unlike the regiment and the Brigade, 51 Squadron did not leave the theatre at the end of November but stayed on for a further, cold, four weeks to complete fortification and winterisation tasks on Mount Igman.

Support was also provided to the HQs of 24 Airmobile Brigade and the Rapid Reaction Force operational staff by two detachments from Military Survey.

A further, but most significant, element of the force enhancement was the deployment of a strong 6 Troop 31 Armoured Engineer Squadron. In the event that the situation had deteriorated and a break-in operation into Sarajevo, or one of the enclaves, had become necessary then these armoured engineers would have been the lead element. Once again we are reminded that there comes a time in war when Sappers have to go in front to open up the way. 'Follow the Sapper' is a timeless cry.

The deployment of the Rapid Reaction Force signalled a clear intention to the warring factions and created the conditions that allowed the Dayton Agreement to be brokered and the Peace Implementation Force (IFOR) to be deployed.²⁰

The deployment of armoured engineers in Bosnia did not just contribute to the conditions under which the Dayton Peace Accord became possible. The armoured troop's adventures in their four months in the theatre provided experience and information about moving armour in such difficult terrain that was shortly to prove invaluable.²¹

In January 1996, just after the switchover between UN and IFOR, the then Minister of State for the Armed Forces, Nicholas Soames, MP, made a statement in Parliament relating to the achievements of the Sappers in Bosnia over the preceding four years which included the following:

Since 1992, the British Army has served with great distinction in the former Yugoslavia, first as part of UNPROFOR and now as the second largest element of the NATO-led peace implementation force, IFOR. As the line is now drawn under the UNPROFOR operation, we can look back with pride at the fantastic contribution made by the British Army and, indeed, the other services, which resulted in the saving of many thousands of lives over three bitter winters in the Balkans ...

Sappers were heavily involved in a wide variety of projects to improve the civilian infrastructure. Among other notable achievements, they have constructed more than 100 km of brand new roads. They have constructed, improved and maintained more than 1,000 km of routes to help the humanitarian effort and the distribution of aid. They have disposed of more than 3,500

mines and unexploded objects, and overseen the clearance of more than 70 major minefields, reducing the risk to innocent civilians. They have repaired and rebuilt bridges, notably a 270 ft Bailey bridge in Mostar, to link the Muslim and Croatian sides. They have reconnected water, gas and electricity supplies, including the water supply to 45,000 people in Bugojno and 26,000 more in Gorazde, thus dramatically improving the quality of life of the local people. They have also reopened and rebuilt schools and health centres ...

The contribution that they made to the humanitarian effort that saved so many lives and to the restoration of relative peace and stability in central Bosnia during this period was second to none, and all those who took part can look back on their performance with considerable pride.²²

Although the statistics quoted above are not exhaustive and only relate to a very small part of the Sapper contribution, they highlight the enormous amount of planning, work, resilience and professionalism shown by all ranks throughout the early years of the Balkans operation. It is doubtful that at this stage that anyone would have thought that the UK military commitment in Bosnia would continue for a further eleven years.

Implementation: Operation *Resolute*, December 1995 to December 1996

The background to the relatively routine work described above was the continuing aggressive attitude of the Bosnian Serbs. The political and military circumstances arrived at in mid-1995 opened a window of opportunity for peace talks. By then the Serb position in Bosnia had deteriorated as UN sanctions abated the extent to which Milošević was able to support Karadžić's Bosnian Serbs. Meanwhile the Bosnian Croats had not only built up their military strength but had re-established an alliance with the Muslims. These factors, together with the United States' involvement in air strikes, were an indication to all parties that realistically there was no further room for manoeuvre. Hence the Dayton Peace Accord, following talks between the leader of the Yugoslav federation (Milošević), the Bosnian Muslim leader (Izetbegović) and the Croatian president (Tudjman), signed on 14 December 1995. According to this the sovereign state known as the Republic of

Bosnia and Herzegovina was agreed to consist of two entities: the Bosnian Serb Republic (Republika Srpska) and the Federation of Bosnia. The Dayton Accord identified an agreed boundary line between the Federation of Bosnia and the Bosnian Serb Republic that was to be implemented in stages from D-Day on 20 December 1995 onwards.²³ Special arrangements were made for Sarajevo, Mostar, Gorazde Road corridor access and Brcko.

The accord was to be guaranteed by the deployment of the international Implementation Force to be known as Operation *Joint Endeavour*. The mandate was for only one year – as it transpired, this proved to be totally unrealistic and adversely affected sensible long-term planning. The UN authorised NATO to provide a force level of 55,000 troops (including 8,400 British

BOSNIA-HERZEGOVINA AFTER THE DAYTON AGREEMENT



troops) from sixteen NATO and seventeen non-NATO countries, and appointed Carl Bildt as a civil High Representative. The British contribution to this was known as Operation *Resolute*.

In accordance with the Dayton Peace Accord, IFOR was to undertake the following primary military tasks:

- Ensuring continued compliance with the ceasefire.
- The withdrawal of forces from the agreed ceasefire zone of separation back to their respective territories.
- The separation of forces.
- The collection of heavy weapons into cantonment sites and barracks and the demobilisation of remaining forces.

They were also responsible for 'creating conditions for the safe, orderly and speedy withdrawal of UN forces that have not transferred to the NATO-led IFOR and for controlling the airspace over Bosnia-Herzegovina'.²⁴

For the British Sappers, IFOR represented a complete change of gear upwards. The land element was commanded by Headquarters ACE Rapid Reaction Corps (ARRC). It comprised three multinational divisions (MND), MND South-West being allocated to the UK, MND North to the US, and MND South-East to the French. The first UK formation appointed to this task was 3 (UK) Division, whose CRE was Colonel J. S. (John) Field; he thus found himself back in the territory with which he was so familiar from the days of *Grapple 1*. The Division had 'robust' rules of engagement for the mission, 'To monitor and enforce compliance with the military aspects of the General Framework Peace Agreement [Dayton]'.²⁵ The two Brigades in MND (SW), 4 (UK) Armoured Brigade and the Canadian's 2 (CA) Brigade had their own national Sappers.

In the case of 4 Armoured Brigade this was 32 Armoured Engineer Regiment (Lieutenant Colonel P. A. (Peter) Wall), with 2 HQ Squadron, 26 and 77 Armoured Engineer Squadrons, the latter in the mechanised field squadron role.

Divisional general support was provided by 38 Engineer Regiment (Lieutenant Colonel J. W. R. (Jeremy) Thorn), with 5

and 11 Field Squadrons (Majors C. L. (Carew) Wilks and J. E. (Jonathan) Passmore respectively) and 15 Field Support Squadron with 527 STRE (Works) (Major W. M. G. (Bill) Morris) plus elements of 49 Field Squadron (EOD), who were already in theatre wearing blue berets on *Grapple 7*. The designation 'field support squadron' had applied to the two engineer logistic units (15 and 65) in the post-*Options for Change* Corps' order of battle. (In 2000 all Corps logistic units would become support squadrons.) An important change was the inclusion of the headquarters of the EOD squadron with a troop allocated to the support of each brigade in MND (SW).

The ARRC and NATO advance party was led by Brigadier J. D. (John) Moore-Bick. The handover was not straightforward, there being no understanding by either side of the difference between NATO and UN financing mechanisms. The ARRC engineers, comprising officers of fourteen nations, had to make it work. They managed to stop the 60 or so UN technical engineering staff in Sarajevo from going home and seeking work elsewhere by promising them that they would be employed, but there was neither money nor resources available to do that until much later. Most of them were ex-RE, and old loyalties prevailed over rationality. They were eventually re-formed as Engineer Support Services (ESS), running the maintenance of Corps headquarters sites and the Materials Management units at Split, later Ploče, and Kiseljak.

The close cooperation between multinational engineers at Corps level was demonstrated when the wall between the office of the Canadian UN Chief Engineer, Colonel E. (Ed) Fitch, and the ARRC engineers was knocked down to combine the two departments after he obtained permission from his government to stay on with IFOR. It was a great engineer occasion and of much more than symbolic worth.

NATO financial systems were not structured to deal with the realities of the effort required. It took the arrival of a practical and competent NATO Italian civilian, Ennio Mazzucato, to get the financial approvals moving. Every bridge, every engineer expense for the Corps troops had to go through the NATO

Infrastructure Committee, which had not done that work before. Finally, a helicopter tour of Bosnia for the admiral chairing the NATO committee made the realities plain and unlocked the purse. He was astounded by the size of the rivers and the complexity of the tasks.

This transition from a non-fighting UN role to an Implementation Force with an aggressive stance capable of using force should not be underestimated. It involved a completely different tactical posture, totally different priorities, a mandate to use force if necessary and the cooperation and funding of aid agencies both governmental (for example, the UK's Overseas Development Agency (ODA) (later renamed DfID) and Non-Government Organisations. ODA was conspicuously the best development agency in theatre and operated all over Bosnia, not just in the British division. They were very active in Sarajevo and played a major part in maintaining the gas system. There was also the perceived historical weak stance of UN forces to overcome. Many of the warring factions had come to regard the UN people as 'fair game' because of their weak mandate and their inability to enforce any decision on the ground. This was a very brittle time due to the movement of the boundary between the new entities created by the Dayton agreement. There was much wholesale destruction of property, burning of haystacks, slaughtering of domestic animals and exhumation of dead bodies from cemeteries – 60,000 Serbs left the suburbs of Sarajevo, partly forced out by terror under the noses of the international community and also by their own leaders. At this stage IFOR neither used nor appreciated the 'muscle' it had.

Apart from the Canadians, also under command of MND (SW) – HQ 3 (UK) Division – were engineer units from the Netherlands, the Czech Republic and Malaya. These engineer units tended to focus on their own national contingents' needs, with the majority of MND (SW) engineer support being provided by the UK Sappers. Dutch and Czech units also had their own EOD detachments, the former working throughout the divisional area. In addition, selected engineer tasks throughout the theatre were taken on by the Hungarian and German contingents from

the ARRC once funding became available through NATO. Thus the engineer support was very much a multinational affair.

The ARRC Headquarters itself was based, as it had been since its inception (see Chapter 4), on a UK structure. The Chief Engineer was Brigadier Moore-Bick. There were, however, no Corps-level engineer troops to begin with. Engineering was not seen by the chain of command as an attractive task at the outset, in contrast to later on. So while there was a clear requirement stated, none of it was met. An Indonesian and a Slovakian battalion remained for six weeks only, before they went off to Eastern Slavonia with the UN. As luck would have it, several Sappers had recently been in posts in which good post-Cold-War contacts had been established with Eastern Europe. The previous EinC, Major General K. J. (John) Drewienkiewicz, had himself visited Poland in June 1995, and Brigadier Moore-Bick had personal contacts in Hungary, Germany and Italy. Moreover, there was a strong UK Sapper presence in the multinational framework of the ARRC. Thus more by chance than by official wisdom were the forces assembled. The first engineer deployment at the Corps level included contributions from Hungary, Romania, Germany, Belgium and the UK. The latter included 62 CRE (Works), under Lieutenant Colonel A. P. (Tony) Carruth, and 523 STRE (Works), whose presence was invaluable, plus a geographic support group from 13 Topographic Squadron.

Herculean work was done by Captain (GE) G. (George) Hunter, RE, of 62 CRE to repair the fire-ravaged and dangerously snow-laden Zetra Ice Stadium (of Torville and Dean fame). Once again the improvisation skills of the engineers of all nations proved invaluable; electrical and mechanical systems were repaired by innovative Slovaks, who made spare parts out of items found on rubbish heaps and gaskets out of old boots; a Queen's Gurkha Engineers staff sergeant rewired a complicated burnt-out switchboard, and a Military Plant Foreman controlled the recalcitrant Serb labour, stopping them knocking off for the Serbian Christmas on 13 January.

The overall output of the international Sappers was prodigious. The count was 77 bridges, two of them railway,

2,000 kilometres of road under maintenance, 480 kilometres of restored railway line, the 122 kilometre route, 70 kilometres of it through virgin mountain ranges and goat tracks, to Gorazde (this being the final clinching deal for the Dayton Peace Accord). It was magnificently led by 62 CRE and financed for \$3M by the US State Department. The nature of many of the tasks was well outside either the current experience or teaching of the Corps. Much of the bridging required skills such as pile-driving, and the railway restoration used a track tamper and railway grader hired from Serbia for which units were neither equipped nor trained. Additionally the international strategic gas pipeline needed cleaning – another unscripted task undertaken by 62 CRE. Nevertheless, individuals on the Sapper staffs, such as the SO2 RE Plans ARRC, Major W. J. (John) Heminsley, and those in the planning and design teams of 62 and 64 CRE, led by Lieutenant Colonels Carruth and P. C. (Peter) Marsh, were able to use the unfamiliar resources to achieve remarkable successes. A case in point was bridge restoration in conjunction with the company allotted from the Italian 1 Battaglione Armamento e Ponti (Track, Railway and Bridge, First Battalion). The Hungarians repaired the line into Croatia at Volinja, using a second-hand Russian Army railway bridge. All the engineering achievements at corps level were underpinned by the international transport fleet, the BELUGA Group provided by Belgium, Luxembourg, Greece and Austria, and a hired fleet of 600 local tipper trucks to help with the Gorazde Road.

Significant too was the energy and enthusiasm of former Royal Engineers such as Major M. (Mike) Young, who set up the Material Management Unit in Split, and Brigadier (Retired) G. A. (Garth) Hewish of Mabey & Johnson effecting the supply of bridging equipment. Many of the main infrastructure bridges, replacing those that had been demolished in the war, were Bailey-derivative Mabey Johnson Compact 200s, making their inaugural appearance in an operational theatre.

An extract from the EinC's Annual Report to the Corps for this period sums up well the general nature of the work:

In theatre the tasks built up quickly with freedom of movement for IFOR and civilians as the priority. Snow and ice clearance was an obvious requirement but put out to contract as quickly as possible. Locating and marking of minefields required ingenuity, patience, close liaison with the troops of the former warring factions, as they are known, as well as courage and skill. Construction of bridges to open up routes quickly gathered a considerable momentum and in the last six months we, along with our Hungarian, Romanian, US, French and German colleagues have built a vast variety of bridges throughout Bosnia. The IFOR nations' Sappers have built Bailey bridges, Mabey Johnson Compact 200 bridges, dual carriageway bridges, railway bridges, floating bridges, armoured engineer bridges, in single and combination format, and improvised timber bridges. The real effort, of course, is aimed at returning the country to normal life which, while not a military task per se, begins with the military, and more specifically the Sappers, 'building the peace'.²⁶

This extract from the EinC's report carries particular significance: this programme had to be actively 'sold', not only physically through infrastructure, but also intellectually with the explanation of the need for the campaign to remove police



The Hungarian Engineers' PMP (Pontommo Mostovj Park, former Soviet Pontoon Bridge Set) across the River Sava.

checkpoints off the roads and put back water and electricity and other basic life needs.

For Operation *Resolute* the HQ and unit locations within 3 (UK) Division were:

- HQ RE 3 (UK) Division Main: Gornji Vakuf and then Banja Luka.
- HQ RE 3 (UK) Division Rear: Split (Divulje Barracks).
- 38 Engineer Regiment RHQ (Divisional Troops): Gornji Vakuf
 - 5 Field Squadron (General Support): Gornji Vakuf.
 - 11 Field Squadron (General Support): Vitez School and then Gornji Vakuf.
- 32 Armoured Engineer Regiment RHQ (Brigade Troops): Mrkonjić Grad, Wood Factory.
 - 26 Armoured Engineer Squadron (Close Support Armoured role) Mrkonjić Grad, Bus Depot.
 - 77 Armoured Engineer Squadron (Close Support Mechanised role) Mrkonjić Grad, Wood Factory.
- 15 Field Squadron's HQ and Plant Troop (Divisional Troops): Tomislavgrad.
- 15 Field Squadron's Reserve Troop (Divisional Troops): Split.
- Elements of a squadron from 33 Engineer Regiment (EOD): Gornji Vakuf.
- 527 STRE (Works): Gornji Vakuf and then Banja Luka.

During the early months of Operation *Resolute* there was considerable 'debate' about what the UK's Division was doing to achieve its mission, particularly in terms of tasks in support of the civil community. Some critics referred to this as 'mission creep', or carrying out tasks that were both beyond the scope of the operational deployment and for which funding had not been approved. However, the GOC, Major General M. (Mike) Jackson, was adamant that a lasting peace was not possible without:

- Freedom of movement for the civilian population by reopening all the routes and rebuilding bridges where necessary, as well as removal of any UXB hazards along these routes.

- The re-establishment of 'normality', which included repairs to water supplies, electricity installations, schools and community centres.
- Consideration for the health of the local population by improving hygiene, e.g., clearing debris, rubbish, dead animals from the towns and villages as well as reopening the hospitals and clinics.
- The revitalisation of the local economy by giving some of the above tasks to the local population by placing commercial contracts for such work to be carried out by local contractors.

All these factors put a new dimension into the concept of peacekeeping operations and were to influence the nature of all such future operations. General Sir Mike Jackson, who was Commander MND (SW) at the time, neatly summarised this in his autobiography:

I use the analogy of a rope to describe peace support operations in a post-conflict situation. The provision of security is only one strand; the other strands are political progress, humanitarian aid, demobilization of the factions' armies, reconstruction and economic progress. Once the strands are woven together, the rope is stronger than the sum of its parts. It's essential to demonstrate that, for the majority of the people, the future is going to be better than the past.²⁷

Another strand of Gen Jackson's 'rope' was force protection. There were those both in the Ministry of Defence and in-theatre who regarded this purely in terms of armoured vehicles, weapons, helmets and flak jackets. However, it went far beyond this and encompassed health and hygiene, road safety and fire precautions as well as protection of bases and personnel from armed attack. Sadly, even high-profile force protection measures did not prevent many casualties from road traffic accidents, fire and sickness caused by poor discipline and/or hygiene. Of course, the Sappers played their part in the force protection role too, not just with Hesco-Bastion blast walls (fabric containers filled with hard core) but also with constant road repairs to improve the driving surfaces, and (in conjunction with the Logistics HQ)

providing all prefabricated accommodation units with fire-extinguishers prior to issue and comprehensive fire orders compiled for each base prior to hand-over.

The business of 'mission creep' was also a constant worry for the NATO command structure. They saw this operation as a sideshow sucking in NATO forces. Practical engineers on the ground at both corps and divisional levels saw the need for the development of the infrastructure as being an essential part of the process of returning the place to normality – and hence, in the longer term, a means of extracting NATO forces. After a trip to SHAPE to brief SACEUR on the concept, Brigadier J. Moore-Bick reported:

After I had finished the briefing he [SACEUR] punched me (hard) on the shoulder and said, 'You've got it! Why can't they all understand down there?' He gave me his medal and asked me what he could do for me. I replied that I needed the Italian railway engineers. He said that the Italian Foreign Minister was coming to see him on the following day and that he had wondered what he was going to say to him. So he duly ambushed the Minister with my request and I then asked the Italians to come into Bosnia through Serbia with their train, for supply and technical reasons. This they did with some interesting political problems with the Serbs and Americans.²⁸

Engineering projects were eventually aligned, through Freedom of Movement, to the Organisation for Security in Central Europe (OSCE) elections run with the support of another ex-RE, Colonel A. (Albert) Whitley, chief planner of the ARRC. So, after an uphill battle, engineering now took the spotlight.

The task that absorbed more Royal Engineers manpower than any other and featured most urgently in the priorities was the essential, but not so glamorous, one of camp construction. There was no Christmas holiday for those involved in the planning, design and procurement of accommodation for the 10,000-strong UK land contingent. The commitment scarcely reduced throughout the whole of IFOR's existence as temporary measures gave place to more permanent arrangements. The results, though impressive, provoked questions as to whether custom-

designed expeditionary force camps built at the start of the operation would not have resulted in a better use of the available engineer effort at later stages.²⁹

The urgency of the deployment and the massive flow of jobs needed in a devastated country once again demonstrated the dependence on an efficient and flexible resources system. Although there was a system in existence at the start of Operation *Resolute*, the current incumbent unit, 15 Field Support Squadron, had to adapt rapidly to cope with the new situation, not least the switch of funding from the UN to UK in mid-tour. However, the bridges provided from civil sources were funded by non-governmental organisations, which meant that they came quickly without having to wait while their funding was sorted out. 61 Field Support Squadron, on taking over, described the rate of taking in new information as 'drinking from a fire hydrant'. It was clearly a high-pressure task, but: 'We survived – just, which will no doubt leave some to feel vindicated, [i.e., for the sparse cover of specialist tradesmen] but it was a close-run thing!'³⁰

However, 'hand-wringing' never achieved anything, so the improvisation skills of the Sappers came to the fore in all situations, and things were made to work despite the lack of specialists. Among the essential resources in great demand were quarried stone and aggregate. Many of the local quarries in Croatia and Bosnia were unproductive because the machinery had been either vandalised or stolen during the war, so the quarries still operational charged extortionate prices for their stone – it became cheaper to import stone from Italy than it did to buy it locally. A nationwide plan was therefore devised to restore quarries, brick factories, cement and other building-supply industries, in which Royal Engineer technicians took an influential part. Fortunately the Corps policy of maintaining a capability for quarrying in the training syllabus (a lesson learned from the post-Falklands work) prevented any serious hold up in this critical field, but much depended on in-theatre resources. The Engineer and Logistics Staff Corps (E&LSC) (V), Corps engineer and logistics staff arranged for a quarrying expert to visit 30 quarries in six days in order to help the military prioritise

and recommend most potentially productive sites.³¹ Many of the quarries were booby-trapped and mined with various anti-personnel mines as well as being above the snow-line

Prior to the arrival in theatre of the Mabey & Johnson bridges, which was not until three months after the initial deployment, the UK had deployed the entire stock of its war-reserve Bailey bridging, which was used extensively and very successfully to open routes and maintain the main effort of attaining freedom of movement for the population. Of particular note was the use of a Bailey to bridge the River Una at Bosanski Novi and enable the Czech contingent to deploy into MND (SW). The construction of this was a classic use of 'Operational Art' exercised by the GOC, Major General Mike Jackson. Most of the Czech contingent assigned to MND (SW) had previously been deployed in the UN role inside Croatia. General Jackson wanted them in theatre as quickly as possible, but there were no passable road routes into northern Bosnia from Croatia, and the Czechs seemed to be using this as an excuse to stall their deployment, saying they



The Class 40 double-double Bailey built by 32 Armoured Engineer Regiment over the River Una for Czech deployment.

wanted to move by road. However, the CRE was brought into the negotiations and agreed to provide a bridge, and thus a viable route, for their deployment. A target date of 1 February 1996 was set for the bridge to be open, and the Class 40 double-double Bailey bridge was duly constructed by men from 32 Armoured Engineer Regiment in sub-zero conditions on a very difficult site that first had to be cleared of mines, which were frozen to the existing road surfaces on both sides of the river. The Czechs now had no excuse for not deploying, so they were all in their assigned area of operations on time. However, as it transpired, they never actually used the bridge for their move, eventually deploying by means of alternative routes.

The use of bridges of all types to reopen routes and allow free passage for refugees, aid and the monitoring forces was one of the most significant contributions by the engineers during the early stages of Operation *Resolute* and contributed greatly to the overall success of the mission. The existence of the ageing Bailey stocks (date-stamped 1943!) from Central Engineer Park at Long Marston proved a godsend: they provided the essential element enabling the troops of MND(SW) to undertake their tasks in the critical early phase of this international military operation.

On the well-used main supply route between Jajce and Mrkonjić Grad, an old Serbian Bailey variant had been installed, and although damaged it was still usable up to a load of 30 tonnes. When the Bosnian Serb Army announced that they were recovering the bridge as part of their withdrawal, a double-triple Bailey was erected by 5 Field Squadron, and it was named 'Perie Bridge'. Although capable of carrying 70 tonnes, this bridge was sadly overloaded by IFOR transporters carrying Challenger tanks, so it was further strengthened by members of 32 Armoured Engineer Regiment, who inserted a Bailey pier underneath.

Part of the multinational cooperation within MND (SW) extended to engineer assistance when asked for by another nation. An excellent example of this was the building of a Class 70 triple-single Heavy Girder Bridge (HGB) by 32 Armoured Engineer Regiment on Route Clog to enable the Dutch contingent to patrol their area more effectively.



Above: Double Triple Bailey (Perie) Bridge near Sipovo.

Below: Members of 32 Armoured Engineer Regiment building a pier under Perie Bridge.





Above: The Class 70 Triple Single HGB built by 32 Armoured Engineer Regiment on Route Clog.

The Hungarian engineers also used their Soviet-made TMM bridges (truck-mounted scissors bridges) most effectively over smaller gaps in the Czech area of responsibility as shown in the illustration overleaf.

The Canadian engineers, who had not deployed with any equipment for bridging, reverted to good old combat engineer skills and built a first-class timber bridge near Bihać. The site was originally bridged in 1566 in the days of Ottoman rule to enable freedom of movement for the local population.

The use of bridges of all types was fundamental to the freedom of movement of the civil population, and General Jackson commented on the Sapper bridge-building exploits in his autobiography:

Many of the bridges had been destroyed and the Royal Engineers enjoyed themselves putting in new ones. There is only one thing that engineers love more than building bridges, and that's blowing them up.³²



Above: 'Timea Bridge' – TMM erected by the Hungarian Engineers.
 Below: The Canadian Engineer's improvised bridge near Bihać.

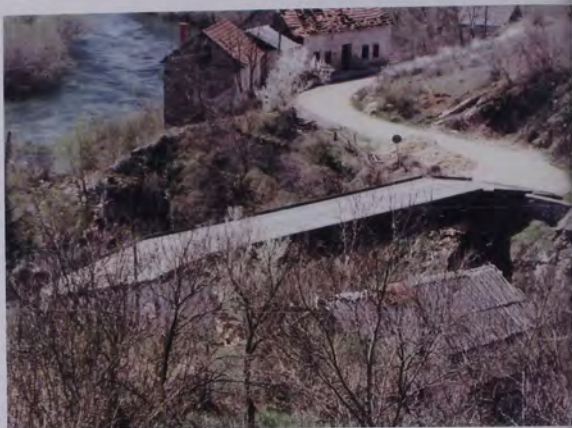




Above: Demolished concrete bridge over the River Vrbas near Jajce (*before*).

Below: Mabey & Johnson bridge installed over the River Vrbas (*after*).





An MGB used on a restricted site to ensure freedom of movement
(38 Engineer Regiment).

The use of the Mabey & Johnson bridges in MND (SW) area took some time mainly because it was perceived that 3 (UK) Division already had enough equipment bridges in service in the Divisional area. Therefore, as the Mabey & Johnson bridges arrived in theatre they were initially allocated to the ARRC engineers. However, subsequently the Mabey & Johnson bridges were used for the larger gaps on main supply routes crossing the River Vrbas that could not be bridged by Bailey and also to replace the Bailey bridges that were by then becoming stressed with the volume of heavy traffic. Even the air-portable Medium Girder Bridge was used as a temporary crossing on a particularly restricted site.

Inevitably, with a rapid deployment of forces immediately after the Dayton Peace Accord was signed in December 2005, contracts were not in place for the acquisition of equipment or for the camp structures necessary for a UK force of 8,000. So improvisation was once again the hallmark of Sapper work in these early stages. All elements of the UK's Sapper contingent worked closely together to produce solutions to the daily

problems, with outstanding results by converting derelict factories, recycling accommodation units left over from the UN deployment and modifying containers for all purposes.

Of particular note were the contributions of the Military Works Force and Military Survey contingents. Engineer tasks within MND (SW) whether of a 'combat' or 'construction' nature were seldom undertaken without close cooperation between the field units and an STRE. The whole spectrum of tasks undertaken included the reactivation of a hydroelectric power station, designs for Bailey piers and detailed plans for the many camps that had to be constructed. An enhanced Survey element was embedded with the CRE's staff, and they carried out vital work to establish the extent of the mine threat within the Division's area. After the CRE (Colonel John Field) had negotiated with the Serbian Army engineers to obtain the original minefield records used during the conflict, these were translated by a team of locally employed interpreters and then logged on to a database to produce accurate 'minefield danger maps', which were then printed by the Geo Section's TACIPRINT tactical vehicle-mounted printing equipment and distributed widely to both military and civilian agencies.

The bridge over the River Sava at Slavonski Brod afforded a good example of international engineer cooperation. It was damaged several times during the war and its reinstatement was required to restore communications between the communities on either side of the river, Croatian to the north and Bosnian to the south. The original construction was of two separate bridges, one reinforced concrete, the other steel truss, meeting on a central pier. The overall length was 522 metres over fourteen spans. In November 1995, Lieutenant Colonel A. (Tony) Burnside had become involved in the preliminary planning in his capacity as a staff officer at SHAPE. Six months later he was posted to the Regional Engineering Office, Zagreb, with responsibility for coordinating the project. Both 62 and 64 CRE (Works) worked on the plan at various stages. The solution arrived at, in the interests of speed, was to remove the whole of the central section, partly reinforced concrete and partly steel girder, repair several damaged

outer sections and 'overbridge' the remaining gap with a 162-metre 80-tonne capacity Mabey & Johnson bridge. The Hungarian engineer contingent, with the experience of several Mabey & Johnsons behind them, was tasked with the overbridge and the preliminary work on the southern side; the Nordic Brigade dealt with the mine clearance around the central pier; and a civilian



Example of a minefield danger map produced by Survey TACIPRINT.

contractor was employed to repair the damaged sections on the northern side. The Civil Engineering Institute of Croatia was brought in to undertake quality assurance, testing and design checks. The logistics of the project were enormous and were efficiently controlled by Major P. J. M. (Philip) Godsall-Stanton. The US Army would not let Croatian trucks carrying bridge parts into Bosnia, as they were regarded as a military capability prohibited by the Dayton agreement. So it all had to be cross-loaded. US air ambulances piloted by warrant officers, who were their own masters and could do what they thought right, were hugely helpful in using air ambulance Blackhawks to move bridge parts on to piers. Despite several setbacks during this complex project, the 162-metre bridge – probably the biggest of its genre since the Second World War – was handed over on 3 September 1996 on time and within budget.³³

At the end of the IFOR campaign engineering and elections were considered to be the two 'battle winners'. The vision for nation-building based on freedom of movement was enabled by engineers and also provided the catalyst for other nations to join the effort to put Bosnia back on its feet in a non-fighting role.

Utilities

The Sapper rubbish-collection teams were much in evidence mainly because they had the plant and tippers with which to remove it. Furthermore, This task, which was far from glamorous (and there was always the danger of unexploded ordnance among any pile of rubbish), also formed an essential part of returning the country to normality. Without clean streets the water sources became polluted, and health hazards loomed large both for the local population and the military personnel. Later in the tour all units became involved in this task. Across MND(SW) some 3,000 dead and bloated pigs were removed from the towns, sewers and water sources. Why so many pigs? It would appear that Muslims entering a vacated Serbian town before, during and after the boundary moved would immediately kill all the pigs, and it was not uncommon to see groups of men chasing pigs with large sticks in order to beat them to death!



Rubbish in the Mrkonjić Grad reservoir, plus pig!

The clearance of blocked sewers became a routine task for Sapper diving teams. It was hardly a military task, but unless they did so the sewers remained blocked, threatening the health of the local population. Once again it was often offending pigs that caused the blockage.

Specialists were brought out from the UK to advise on the identification of suitable land-fill sites – it appeared that the most efficient method in Yugoslavia in the past was to tip the rubbish into the nearest river and let nature deliver the debris to someone else. And by the sides of all the roads near towns and villages piles of litter and rubbish had accumulated over many years. In the fullness of time, the rubbish-collection tasks were passed over to the embryonic local government in the towns, with support from various NGOs and government aid.

Minewarfare

Mines were a feature of operations in Bosnia from the very start. In the early days of *Grapple 1*, as will be seen from the above accounts, the particular hazard to UN troops were mines often

laid casually at roadblocks and around observation posts. However, as the war developed, the factions were building up complex patterns of minefields along the boundaries between the enclaves. These so-called 'confrontation lines' provided security and protection to the communities often located in quite small pockets, such as at Vitez, a Croat area about 25 kilometres long and little more than 5 wide, with a small Muslim enclave within that. A wide range of mine types was used, from metallic anti-tank to non-metallic anti-personnel, jumping and 'Claymore'-type mines. A high proportion were home-made, explosive being particularly plentiful in the Vitez pocket where there was a factory, and with fuzes adapted from production mines. Minefields were not clearly marked: many were not marked in any way, some had the odd sign, and others were laid inside the limits of farmer's fields. However, records of varying quality were kept.

It was also not uncommon to find dummy and training mines mixed with live mines, especially at roadblocks and checkpoints. All sides used the same Soviet-manufactured mines that were previously available in Yugoslavia but employed different techniques when it came to improvised devices. Although the Cessation of Hostilities Agreement made no mention of clearing mines, it was quickly appreciated by all sides that they would become an intolerable hazard and a hindrance to normalisation, with the threat of hideous casualties to the civilian population. For the Corps, particular poignancy was given to the issue in March 1994 when Corporal Warburton was killed in a mine explosion while some home-made mines were being disposed of at Stari Vitez. Negotiations were opened to gain the trust of the two sides, HVO and BiH (see Glossary), and an agreement was signed at Corps level by which they agreed to clear the mines along the former HVO/BiH confrontation lines in central Bosnia. Maps would be handed over to the UN, then clearance would be carried out to a UN plan and monitored by UN soldiers. This work was undertaken by the troop from 49 Field Squadron (EOD). The plan was duly put into action and made an encouraging start to an immense problem, but it would take

many years to overcome. There were professional challenges to be met:

Thanks to some of the mine clearance drills used by the HVO and BiH it was soon realised that the Royal Engineers EOD teams had once again become involved in very dangerous work. The EOD teams had to be constantly vigilant as members of the BiH and HVO would often rush into the overgrown mined areas and come back bearing locally manufactured mines. The EOD monitoring teams had a difficult balance to strike between going forward to verify the detailed mine records and trying to maintain a safe distance behind the clearance team.³⁴

The truth of these observations was painfully borne out by the death, on 16 August 1994, of Sapper Nicholas as a result of a mine blast at Gornji Vakuf on just such an operation. By the end of July 1994 the BiH claimed to have cleared all their mines around the Vitez pocket although the number appeared only to make up 82% of their recorded mines. The HVO reported 2,802 to have been lifted.

Later, during Operation *Resolute*, the mine threat was tragically revealed; a Light Dragoons patrol suffered three soldiers killed when a Spartan armoured personnel carrier struck a mine on 28 January 1996. A quick reaction team from 49 Field Squadron (EOD) was abseiled in from a helicopter during a snowstorm and then worked through the night to clear a route to the vehicle, which was on fire. One of the sapper troop commanders, Lieutenant Nick Stott, had a lucky escape when his vehicle ran over a mine while he was on a route reconnaissance near Sanski Most in early 1996: he suffered some impact damage and did not regain full use of his feet, but he later recovered enough to lead a normal life.

The Dayton Peace Accord had required that: 'Information on mines, military personnel, weaponry, and other items must be provided to the Joint Military Commission within agreed periods ...' It also stipulated that a two-kilometre-wide Zone of Separation be established either side of the Agreed Ceasefire Line within 30 days. The patrolling necessary to meet this aim soon revealed the very widespread nature of the mine problem, but there were few records available in the early days. It took

months to build up an effective bank of information. This was achieved by liaison with the former warring factions and teasing out records from units and headquarters not only in Bosnia but also within Croatia itself. However, it is of some note that the Bosnian Serb Army produced the best and most comprehensive set of minefield records, which were then plotted by Military Survey on a database to produce maps showing the danger areas. Interestingly, this demonstrated strict adherence to Soviet doctrine in mine-laying drills. Each soldier was issued with two mines; he was then responsible for burying these at a defensive position; and when the troops advanced he recovered the mines and re-laid them at the next location. This meant that in many cases we were in danger of double, triple and quadruple counting of the same mines when assessing the overall mine problem. Inevitably some of the mines were left behind, either intentionally or unintentionally, so the front line of each successive defensive location had to be checked and cleared just in case – the workload did not change despite lack of buried mines. Even then the scale of the problem remained daunting.



The remains of Lieutenant Stott's Land Rover after it hit a mine.

An account in 1996 of this sort of work by the Light Dragoons related the distribution of mines to the operations of the warring factions and expressed fears for the future:

There are hundreds of thousands of mines still buried in Bosnia and to have hoped to unearth records of all of them would have been quite unrealistic. Despite the fact that, in those areas where confrontation lines were static for protracted periods, the Royal

Engineers working on our behalf came across numerous cases where re-mining had occurred; such lines were relatively easy to plot ...

Inevitably, however, the more fast-moving, not to mention confused and attritional, engagements provided the greatest degree of uncertainty, and therefore risk.



Typical roadside UXO debris that had to be cleared for freedom of movement. Left: A 122mm shell case by the roadside – one of thousands.



Mines would have been random- and even panic-laid, records would have been lost or never made, and those doing the laying could have been killed or become untraceable. An extensive mine threat will remain in Bosnia for many years to come, and whilst such a study can reduce the risk to those on the ground, it will never dispel it completely. Nevertheless a conservative RE estimate adjudged our efforts to have increased the knowledge of minefields in our AOR from 30% to something closer to 70% and, if nothing else, it did much to settle our nerve after the tragedy of 28 January.³⁵

Naturally the EOD detachments became a focus for much of this work, although they were also committed to dealing more generally with unexploded ordnance ranging from 500-kilogram bombs to surface-to-air missiles. Abandoned artillery firing positions were in evidence throughout the whole of MND (SW), and each of these had to be checked and cleared since they were normally adjacent to a main road or village.

Mines Awareness and Monitoring Training

Mines Awareness Training (MAT) had been carried out in the theatre by EOD or dedicated mines awareness teams for some time. All IFOR personnel arriving at Banja Luka or Split received a mines-awareness brief from an EOD officer or senior NCO. In



Pretty! But still a serious mine hazard on the banks of the River Sava.



This is a typical improvised minefield marking sign encountered all over Bosnia.

addition, units visiting non-government organisations, school-teachers and children were also so briefed. Towards the end of Operation *Resolute 1* and the start of Operation *Lodestar* (see below) more and more effort was being put into counter-mine monitoring. The work that had been started on the *Grapple* tours was developed into a more coordinated effort as the need for country-wide information became more urgent. A detailed and painstaking analysis was put in hand with the aim of contributing to a database that would enable agencies involved in mine clearing to carry out their task. The analysis involved the study of minefield records, questioning of members of the former warring factions and studying the tactical history of the war.³⁶ In order to spread the word more widely, a UN Mine Action Centre was set up in Sarajevo in May 1996. The increasing focus on this work contributed to this UN effort and reflected the developing global concern over the use of mines.

As to actual de-mining, a new initiative was taken to start the process by encouraging the Serb, Croat and Muslim 'Former Warring Factions' (FWFs) to do the actual work under NATO supervision. This was effectively trail-blazed by the Royal Engineers

of MND (SW) using a 'carrot and stick' approach whereby equipment and training would be provided, but non-cooperation would invoke penalties such as constraints on movement. Monitoring of the de-mining process was necessarily very sensitive and therefore heavy in resources. Allied to this, an 'emergency service' was provided, which was led by the deployment of EOD teams to numerous incidents such as crashed vehicles and broken-down helicopters.

Geographic: Military Survey

Operation *Resolute* brought with it the need to boost Geographic support beyond that mentioned earlier in this chapter. Essentially the new commitment meant the deployment of 14 Independent Topographic Squadron to support the ARRC by setting up a theatre Geographic Support Group (GSG). British military survey manning was to provide more than 80% of the geographic support within IFOR, some 130 posts out of 154 spread throughout ten different locations. The Squadron comprised a production troop, map troop, support troop and a multinational topographic survey troop³⁷ They were supported for part of their tour by 19 STRE.



Winter conditions did not prevent the EOD clearance operations.

Because IFOR's role depended fundamentally on the geography of Bosnia, progress would be slow until such matters as defining the Inter Entity Boundary Line (IEBL), cease-fire line, locations of mine-contaminated areas and availability of routes, could be produced in useable form. The single most important task of the Group, therefore, was map supply.³⁸ Over a thousand items were available, varying from town plans to planning charts, both on paper and on CD. Many were overprinted with the IEBL, to which minor changes had to be made as the detail was agreed on the ground. Maps from the producing nations (generally US and UK) were supplied to the Corps Reserve Map Depot in Split. Routine map supply was carried out through the Corps Map Distribution Point, part of the GSG at Kiseljak, to map supply points at each divisional headquarters and thence to units. Over six million maps were handled during the first six months of the operation.

The GSG's topographical survey capability provided the basis for much of the basic data used by units, commanders and intelligence staffs. They established a centimetre-accurate control network. This paid off when the Bosnians had difficulty meeting their obligation under the Dayton Peace Accord to mark the IEBL and appealed to IFOR for help. International teams of surveyors working directly for the MND HQs, using the framework of the control network, were provided to meet this need, a slow and delicate task involving local negotiation because the boundary line frequently passed through individual properties. The GSG's topographic survey teams also worked with 523 STRE (Construction) on the detailed alignment of a major new route through the mountains to link Sarajevo and Gorazde. At 70 kilometres long, this was claimed to be the biggest survey of its type carried out in the twentieth century.

Terrain analysis and production formed the other main business of GSG. A new computer-generated system of producing a three-dimensional view of the ground was based on the Tactical Information System (TACISYS), a fourteen-foot box body carrying two powerful systems. After some difficulties with untrained operators, the results began to prove valuable to

Brigade staffs. Likewise, the well-proven Tactical Information Printing (TACIPRINT) was supplemented by a new interim geographic support system, which proved a great success. One of the largest tasks using computer-generated graphics was the *Bosnia Helicopter Landing Site Directory*, about 160 pages with text, graphics and photographs. During Operation *Resolute 1* some 300 different products were produced in eight languages with this new equipment.

Military Survey was involved in all the various operations in the Balkans both in providing a vast array of conventional and digital products and by deploying its field assets to the UN and later to NATO. An appreciation of the size of the commitment can be gained from the following statistics: at one point 43% of uniformed military surveyors were deployed on operations, 6.1 million maps were issued into theatre in one six-month period, 80,000 map sheets were printed in Kiseljak each and every month throughout Operation *Resolute*, and 194 new paper and 214 new digital products were produced in one year alone. Every element of Military Survey was involved at some stage: the General Staff Map Branch in the generation of briefing graphics for the Central Staffs; Feltham and Tolworth facilities in the production of a huge range of products; and the Survey squadrons provided direct support in the field, including assistance in demarcating the Inter-Entity Boundary on the ground.

Stabilisation: Operations *Lodestar* (December 1996 to June 1998) and *Palatine* (July 1998–)

The UN Mandate for IFOR was due to run out on 20 December 1996. Apart from any political considerations, it was clear that this high intensity of operations could not be maintained indefinitely. IFOR was replaced at the end of its one-year mandate by a Stabilisation Force (SFOR). To command the operation a headquarters had to be designated, since HQ ARRC had deployed in mid-December 1995 and many individuals, not least the Sappers, had served continuously in theatre. The new HQ was formed around HQ LANDCENT in Heidelberg by combining elements of HQ NORTHAG in Rheindahlen with HQ CENTAG in Heidelberg.

This was a static Land Forces HQ, with no experience of joint operations, nor of operating independently in an expeditionary role. HQ LANDCENT was warned for operations in the Balkans in early July 1996 and needed considerable reinforcement, restructuring and re-equipping before it was ready for operation as the NATO Balkans Theatre HQ. Major General John Drewienkiewicz had been assigned to this HQ on conclusion of his tour as EinC in September 1995, and as such was responsible for all manpower, logistic and communications aspects of the HQ. Once the HQ was fully formed, and on arrival in Sarajevo he was selected to become Chief of Staff to the 4-star US general commanding SFOR, General William Crouch.

The UK contribution to this was called Operation *Lodestar* and was about half the size of Operation *Resolute*. The Sapper element comprised a regimental headquarters, acting as HQRE, two close-support squadrons, a field support or park squadron, an STRE (Works), two EOD detachments and the Geographic Support Group. All elements were placed under the command of HQRE. The start of Operation *Lodestar* coincided with the establishment of the Permanent Joint Force Headquarters (see Chapter 4), which now became responsible for it.

Such a drastic reduction in the force level was bound to cause some apprehension for the units responsible. For 39 Engineer Regiment (Lieutenant Colonel A. D. (Alan) Macklin), selected to take over from 22 Engineer Regiment but, as it turned out, to provide the only divisional engineers, the hurdles to be surmounted were particularly acute because of the normal role for which they were configured: air support. Moreover, two of the field squadrons were already committed to deployments elsewhere in that role, leaving only 60 Headquarters and Support Squadron and 48 Field Squadron (Air Support) to go to Bosnia. Delighted to be selected late in 1995 (and at that stage still blissfully unaware that they would be on their own) the Regiment set about solving their first problem, shortage of manpower, by appealing for volunteers from the TA and Reservists, more than 80 of whom joined them for their pre-Bosnia training. Many of these were from other arms and included a high proportion of women.

On deployment in October they relieved the outgoing units, but by December, on transition to Operation *Lodestar*, their deployment became:

- RHQ, 60 HQ and Support Squadron, Geographic Support Group, EOD and Military Works Force: Banja Luka.
- 48 Field Squadron: Gornji Vakuf.
- 31 Armoured Engineer Squadron: Mrkonjić Grad.
- 45 Field Support Squadron: Split and Tomislavgrad.

Routine winter tasks such as route maintenance and repair, snow clearance and camp maintenance and construction were carried out in difficult and variable conditions, often well below zero Celsius. The introduction of a civilian radio system, by which a Royal Signals Regiment could be released, led to the construction of military communication rebroadcasting facilities, principally self-contained accommodation on very exposed, minefield-surrounded hilltops. The change in force levels led to the stripping out and handover to locals of substantial numbers of existing, unwanted military camps in varying degrees of dilapidation.

During the early days of the IFOR/SFOR mandate the contribution of the RE chartered engineers became a true force multiplier. Almost all the NATO military contingents had no professional engineers and relied to a great degree upon civilian contractors. Thus, any work that needed contractors had first to be identified by the military commander and a statement of requirement drawn up. Work was thus always reactive and 'behind the curve'. Only the British and the Canadians had chartered engineers 'on tap', which ensured that they were much in demand. For instance, in September 1996, when the use of the Zetra Ice Rink Stadium was contemplated as the site of a 600-man temporary accommodation base for the HQ of the United Nations Stabilisation Force, a full structural survey was demanded by the Americans before they would authorise its use. This survey was carried out, and the recommendation was accepted, within four days. It would have taken at least two weeks to have achieved the same result from a civilian contractor.

In January 1997, one of the major existing communication rebroadcasting sites in theatre (Mount Igman) was snowbound and, due to appalling weather conditions, unable to be resupplied. As food and fuel ran out, it became critical to break through. This involved the deployment of emergency snow-clearance teams using their modified and standard engineer plant and equipment to open the access track through minefields in blizzard conditions. It was an extremely challenging task in very bad conditions, but after several aborted attempts it was achieved. Those involved earned a plethora of awards and commendations.

This period also saw the first deployment to Bosnia of the Royal Engineer Band, nobly sacrificing a more lucrative UK pre-Christmas programme to that end. They played very successfully to military and civilian audiences throughout Bosnia, but the highlights were undoubtedly the packed gymnasias of various schools, where thousands of children learnt that soldiers in uniform did not necessarily mean weapons, violence and danger.

21 Engineer Regiment (Lieutenant Colonel A. D. (Tony) Harking), with 7 HQ Squadron, 26 Armoured Engineer Squadron and 29 Field Squadron and 65 Field Support Squadron, followed in March, picking up the tasks of 39 Engineer Regiment. The tour was notable as the first operational tour of 65 Field Support Squadron for more than fifty years. Under its command the Squadron had a plant troop comprising largely TA and Reservist soldiers built up around a core provided by the Royal Monmouthshire Royal Engineers; the deployment would provide many lessons on the overall capability and utility of the TA. In July 1997 the camp at Tomislavgrad was closed down, and 65 Field Support Squadron was relocated to join its Resources Troop in Split. From then on all engineer logistics was provided from there.

Throughout the summer of 1997 the system of monitoring by senior NCOs of the Regiment of the de-mining efforts of the Former Warring Factions gained momentum and became the main focus for assessing compliance with the Dayton Peace Accord.

Two more regiments were to deploy before the official end of the mandate for Operation *Lodestar* in June 1998: 38 Engineer Regiment (Lieutenant Colonel J. W. R. (Jeremy) Thorn), with 3 Armoured Engineer Squadron (Major G. R. W. (George) MacGinnis), 11 and 32 Field Squadrons (Majors S. R. (Scott) Derben and J. E. (Jonathan) Passmore respectively) plus 15 Field Park Squadron (Major G. E. (Guy) Wilmshurst-Smith) and 517 STRE (Works) (Major S. P. W. (Steven) Boyd; followed by 35 Engineer Regiment (Lieutenant Colonel G. C. W. (Geoff) Dodds). However, the Stabilisation Force continued, called Operation *Palatine* for the UK. It was soon to be absorbed into the dramatic events in Kosovo.

Kosovo

Background

By the end of the Bosnian War, all that remained of the Republic of Yugoslavia was the federation of Montenegro and Serbia, the latter with its two provinces of Kosovo and Vojvodina. Kosovo had for some time been identified as a possible flashpoint. While it was the historic heartland of the Serbian nation, with deep religious significance in the minds of the Serbs dating back to the Serbian defeat by the Ottomans at the 'Field of Blackbirds' in 1389, its population was actually 90% ethnic Albanian. For years Kosovo had enjoyed the status of an autonomous region within Serbia, until Milošević withdrew those privileges in 1989. From then on, Kosovar Albanians were progressively removed from official positions of power and influence, as mayors, as policemen as civil servants and as state utilities workers. They were replaced by ethnic Serbs, who were seen by Belgrade as being more loyal to the ruling regime. Early in 1998 riots in the capital of Kosovo, Pristina, were suppressed with brutality by the Serbian-manned Ministry of the Interior Police (MUP).

The province of Kosovo is 4,203 square miles in area, approximately the size of Northern Ireland. It is completely surrounded by rugged wooded hills and mountains with peaks reaching 2,000 metres, particularly in the regions bordering Montenegro, Albania and Macedonia. Within the central region

of Kosovo there are two areas of relatively flat, open plain at a height of 750 metres above sea level, which are separated by a rough, wooded, hilly area. On the plain most of the land is used for agricultural purposes. Metalled roads link main towns to many villages. The only practicable route in from Macedonia for a military force is along the main motorway from Skopje to Pristina, through the Kačanik defile.

The Kosovo Liberation Army (KLA or UCK) had emerged in the mid-1990s as a response to severe discrimination and human rights abuses by the Serbian authorities. The Serbian government labelled the UCK a terrorist organisation, but its efforts to deal



with it involved disproportionate and indiscriminate violence with collateral damage to the civilian Kosovar Albanians. The outcome was a series of 'tit for tat' actions in which the UCK goaded the Serbs, often through violence aimed at the MUP, which resulted in heavy-handed reprisals by the authorities against the geographic areas from where the attacks had been mounted. These responses sometimes included the use of artillery and tanks to deal with instances of individual sniping. Such actions were carried out with scant regard for civilians who happened to be caught in the cross-fire. Throughout the summer of 1998 the intensity and scale of conflict increased and precipitated a flow of refugees from Kosovo. The international community was subjected to distressingly familiar Balkan images.

The veteran architect of the Dayton Peace Accord, US Ambassador Richard Holbrooke, returned to the Balkans armed with the threat of renewed NATO military action against the Serbs. However, this threat was constrained by the fact that any intervention in Kosovo, whatever the level of human rights abuses, would be *de facto* intervention in the internal affairs of a sovereign state. American domestic politics limited the options that could be considered and limited any possible military involvement by the US to strictly within the NATO context. Nevertheless Milošević was told in the bluntest terms what a NATO air strike would involve. As General Wesley Clark (SACEUR) expressed it: 'If they tell me to bomb you, I'm going to bomb you good.' In the event, the outcome was an agreement that the Yugoslavian Government would accept an unarmed mission to verify the state of the cease-fire between the Serbian army and police forces and the UCK, and eventually to oversee elections. This mission, the Kosovo Verification Mission (KVM), was to be provided by the 54-nation Organisation for Security and Cooperation in Europe (OSCE). The mission was built up from early November 1998, and the UK pledged to provide 10% of the mandated strength of 2,000. The KVM was created by deploying a mix of individuals, both military and civilian, and procuring equipment such as radios and vehicles simultaneously. This method was far slower than deploying formed units; hence

the KVM could not be brought up to its mandated strength quickly. The maximum strength attained was 137 in March 1999.

The KVM was initially successful in reporting cease-fire violations and apportioning blame, and this acted as a brake on the violence. However, it was unable initially to cover the whole of the disputed areas of Kosovo, and violence continued to flare at the edges of the international presence. Incidents followed the now all-too-familiar pattern of reprisals, accompanied by a gradual escalation. After a number of successes in the first ten weeks of the mission's operation, the position of the unarmed verifiers was rendered unworkable by the massacre in mid-January 1999 of some 46 civilians in the village of Račak as a reprisal for the earlier shooting of four MUP personnel. In the words of the Chief of Operations of the KVM, Major General K. J. (John) Drewienkiewicz, 'the shocking brutality of Račak ... changed the landscape completely'. The Contact Group, the name of the international political coalition set up by the UN to monitor events in Kosovo, became convinced that military action was inevitable unless a political settlement could be achieved by one last effort, and a conference between the two sides was held in February at Rambouillet in France. The Serbs adamantly refused any solution involving a NATO ground presence in Serbia; for its part, the Contact Group was not prepared to compromise. Nor would the Serbs accept the demand of the Kosovar Albanians for complete independence. When, under pressure from NATO, that aspiration was modified to autonomy within the Yugoslav state, NATO support for the Kosovar Albanians was guaranteed. The Serbs walked out of the conference and stepped up their military operations in Kosovo: the KVM was ordered to leave, and air strikes by US warplanes started on 24 March 1999. By then a campaign of ethnic cleansing was beginning. The already dire flow of refugees became a human tide as the Kosovar Albanians trying to escape Serb reprisals, looting and the destruction of their homes now faced the possibility of being caught up in the bombing.

The air war lasted for three months, far longer than had been hoped, due partly to President Clinton publicly ruling out a

ground invasion. When, after the devastation of his country, Milošević finally agreed to the withdrawal of Serbian army and police units from the province, an international force, of which NATO was the predominant element, moved in on 12 June 1999. Their principal aim was to restore law and order to the province, paving the way for the return to normality.

Operations *Upminster* and *Agricola* (from December 1998)

As all this activity progressed, military precautions were being taken. Foreseeing the possible seizure and holding hostage of the unarmed verifiers, NATO was persuaded to set up an 'extraction force' to be based at Skopje, capital of Macedonia, another newly independent country previously part of Yugoslavia. In December 1998, 20 Field Squadron (Major D. G. (Daren) Bowyer) and 527 STRE (Works) (Captain M. P. (Matthew) Walton-Knight) deployed to Macedonia on Operation *Upminster*, Macedonia being used as a staging-post for entry into Kosovo. Strictly speaking, Macedonia should be known by its official name of the Former Yugoslav Republic of Macedonia (FYROM) to distinguish it from the Greek province of the same name. However, FYROM never caught on, and the country was invariably referred to as Macedonia in the media, as it will be in this book. Both RE units were in general support to the UK element of this force, based on B Company group of 1st Battalion the King's Own Royal Border Regiment (1 KORBR) with a troop of 11 Field Squadron in close support.

Hard-standings had to be prepared for armoured and soft-skinned vehicles, a building refurbished for the headquarters, four hardened aircraft shelters modified and repair and servicing facilities provided for the vehicles. This relatively routine work provided challenges enough but, just as the end was in sight and a date fixed for the units to return home, Operation *Agricola* was launched. This, at the start of the air war, was the concentration of the British element of the NATO ground forces, which were to prepare to enter Kosovo when conditions might allow. This British element was to be based on 4 Armoured Brigade with 5 Airborne Brigade allocated later to

support the actual entry operation (see below). A small HQRE was deployed from HQ 1 (UK) Armoured Division to command and control all engineers in theatre under the CRE (Colonel G. B. (Bede) Grossmith) and the SO2 Engineer Operations/Plans (Major M. (Mark) Hainge). The UK's HQ 4 Armoured Brigade was boosted by the addition of a Geographic Support Group (Light) from 14 Topographic Squadron supported by 21 Engineer Regiment (Lieutenant Colonel G. A. (Geoff) Nield), with 7 Headquarters, 1 Field and 26 Armoured Engineer Squadrons and 21 Field Squadron (EOD). Combat Services Support Group (CSSG) provided the logistic support to the force and was later redesignated 101 Logistic Brigade supported by 28 Engineer Regiment (Lieutenant Colonel J. G. (Jon) Mullin), with 64 Headquarters and 42 Field Squadrons from 35 Engineer Regiment and 65 Field Support Squadron. Military Works Force support was provided by CO 62 CRE (Works) (Lieutenant Colonel G. (Glyn) Taylor) who took 527 STRE (Wks) under command.

19 Feb. First engr recce parties and enabler elements deploy to FYROM in cold and snowy conditions. The Engr Park was established in a former US logistic storage site, re-named Piper Camp, a few km south of the border with Kosovo. The engineers carried out the rental negotiations themselves direct with the owners, several large men in leather coats who arrived in a Mercedes with blacked out windows. Meanwhile HQRE was set up initially by CO 28 Engineer Regiment, Lt Colonel Jon Mullin who, with admirable economy of effort, based it on a Nyrex folder, a mobile phone and a card table in the Casino of the Panorama Hotel, Skopje. Initial engineer planning and work focused on establishing our own troops in country whilst preparing routes in and locations for the first echelon forces.³⁹

62 CRE (Works) deployed to the Balkans in February 1999 and was placed under tactical control of 101 Logistic Battalion for the duration of the operation. The structure of the unit varied as events progressed and new requirements arose, providing technical support to regiments and managing the technical and financial aspects of infrastructure engineering support to British forces, including the restoration of essential services and utilities.

It comprised principally 527 STRE (Works), now reinforced and under the command of Major N. (Nick) Holland, and 521 STRE (Water Development) with reconnaissance parties from 516 STRE (Bulk Petroleum) and 507 STRE (Railway) (V), and had representatives from the UK Defence Estates organisation and the Engineer and Logistic Staff Corps (E&LSC) (V).

28 Engineer Regiment deployed ahead of the 4 Armoured Brigade group as the 'enabling force' and took 20 Field Squadron under command. 20 Squadron's work now included the reconnaissance of the entire route by which the armoured Brigade were to travel from their port of disembarkation at Thessaloniki to the Kosovo border. Checking the bridge classification and upgrading bridges became a key factor with the imminent arrival of the Challenger tanks of 4 Armoured Brigade.⁴⁰

This task fell to Captain Matthew Walton-Knight, his responsibilities in this field taking him also to Greece, Albania and Bulgaria. The work moved up a level in both urgency and nature with the start of the air war. Measures had to be taken to relocate or protect vulnerable unit locations in the immediate border areas. Then, very soon, the refugee crisis rose to the top of the agenda for 28 Engineer Regiment, whose orbat included 64 HQ Squadron (Major S. (Steve) Simonini), 1 Field Squadron (Major N. (Neill) Page), 42 Field Squadron (Major C. (Callum) Skeat), 65 Field Park Squadron (Major R. (Rob) Tomlinson) who, with manpower allocated from 21 Engineer Regiment, now undertook the construction of camps for displaced civilians in the Skopje area. The camp at Brazde, created over the 1999 Easter weekend, became the tenth largest town in Macedonia. Some statistics were:

- 25,000 refugees were received and processed over that weekend.
- RHQ 28 Engineer Regiment supervised the construction of 2,600 tents on 2 sites and; the distribution of more than 150,000 one-day rations.
- 20,000 chickens were cooked; 2.6 million litres of drinking water supplied.

- A lost-children centre was run for five days, reuniting more than 100 children.
- More than 3,000 pickets were placed; 20 kilometres of plain wire fencing, and 10 kilometres of white tape fencing were erected.
- 1,500 Cyalume chemical lights were placed.
- 390 deep trench latrine toilets were built; hundreds of tons of litter cleared.
- Two shelters were erected.
- 5,000 tons of crushed rock was laid for new roads.
- In excess of 2,500 military man-days were worked in two weeks, many of these sixteen to eighteen hours long.

The threat of more refugees led to the deployment of 28 Engineer Regiment into Albania, where they constructed two more refugee camps capable of expanding to hold up to 50,000 people between them. Not only did the camps save the lives of many refugees but also their existence relieved the precarious Macedonian government, whose support of NATO's plans was crucial, of the prospect of being swamped by this human tide. The work thus had significant strategic consequences as well as its obvious humanitarian importance.

A large amount of stores had to be transported out of FYROM and into Albania, but there was one problem. The FYROM border guards insisted on each and every vehicle having a plethora of passes and documents, all of which had to bear official NATO stamps and signatures. The Regimental clerks, renowned for their ability to adapt, improvise and overcome, set to work on a larger than average King Edward potato and before long had carved out a very authentic looking stamp that produced an almost flawless facsimile of the NATO crest. This was duly applied to each vehicle's paperwork and there were no more delays at the border.⁴¹

The timely arrival of a team from the Civil Affairs Group, a newly formed organisation specialising in nation-building expertise headed by Lieutenant Colonel A. (Alan) Edwards, and its allocation to the Brazde camp now freed the squadrons of 28 Engineer Regiment to prepare for their participation in the principal business of the NATO ground force, KFOR (Kosovo

Force): preparing for entry into Kosovo from Macedonia into what became known as a 'semi-permissive environment'. While the bombing was in progress, the Sappers on Operation *Agricola* were investigating in as greater detail as possible the routes into the province from Macedonia. The Geographic Support Group from Bosnia was much in demand in this process, working alongside the Brigade Intelligence Cell.

Engineer Operations in Kosovo

KFOR was based on the ARRC and comprised five brigade-sized forces from France, Germany, Italy, the United Kingdom and the United States. The overall commander was Lieutenant General Sir Mike Jackson, Commander ARRC, elements of whose headquarters including the Chief Engineer, Brigadier J. P. (John) Hoskinson, had been deployed in the Macedonian town of Kumanovo since early in



the crisis. Apart from the classification of the bridges, which it was assessed would accept Challenger tanks but not transporter-mounted AVREs or AVLBs, the main obstacles expected were mines laid by any of the warring factions or demolitions possibly created by the Serbian Army (VJ). A tunnel in the defile would not take AVLBs loaded with their bridges. This analysis of the routes enabled detailed planning to be made to overcome such difficulties and led to a successful deployment when the time came.

KFOR entered the province on 12 June 1999, its mission being to secure the Kačanik defile through which 4 Armoured Brigade would advance to Pristina. The leading formation was 5 Airborne Brigade, with the Tactical HQ of 36 Engineer Regiment, 9 Parachute and 69 Gurkha Field Squadrons.⁴² A Royal Engineers bridge classification specialist, Captain M. (Matthew) Walton-Knight of 62 CRE (Works) accompanied the leading troops of the road party. The early map analysis paid off but did not obviate the need for bridge classification 'on the hoof'. Captain Walton-Knight wrote:

On the evening of 11 June we joined 69 Gurkha Field Squadron, and moved with them to the line of departure just on the Macedonian side of the Đeneral Jankovi border crossing. There we spent the remainder of the night with what seemed like the world's media. In the darkness I was able to classify the bridges at the border crossing. As dawn came at 0500hrs on 12 June, the lead company from 1 Royal Gurkha Rifles started forward across the border, led by a Mamba mine protected vehicle from 21 Field Squadron (EOD) [Staff Sergeant A. (Tony) Tesar], and with the STRE detachment, initially, bringing up the company's rear. We were one of the few free-runners in the advance, and within two hours had left the company behind. Elements of both 9 Para and 69 Gurkha Field Squadrons were moved forward by support helicopter over our heads, being dropped off at key points, normally bridges, along the route. One of their tasks was to classify the bridges at their drop-off points. Many of these were difficult structures to classify without roped access equipment, and they had many other tasks to do, such as EOD clearance. A recce sergeant from 69 Gurkha Field Squadron managed to classify his bridge, the main bridge in Đeneral Jankovi before I reached him, but I classified all the others in the Kačanik defile.

I was not concerned about climbing under a bridge on demolition ladders, even when I could see the remains of a cow blown up by a mine, for I was always fixed to the bridge by a line. My main concern arose when it was necessary to walk below a bridge that was not EOD cleared. At one bridge a corporal from 21 Field Squadron (EOD) informed me that there were signs of possible mining around the bridge and that I should not go under it. Unfortunately I could not climb under the deck of this bridge: I had to walk below it. I dropped down the side of the bridge onto the ground and kept very still! I classified the bridge and then climbed back up the side of it.⁴³

5 Airborne Brigade left Kosovo in early June, their mission accomplished, but 69 Gurkha Field Squadron remained in theatre.

Sapper tasks in the immediate aftermath of the entry were aimed not only at supporting their formations but also at helping to restore normality in Kosovo. At the same time units had to guarantee their own freedom of movement, which involved route opening as well as EOD clearance, and the provision of traditional engineer close-support to the armoured battle groups as they dominated their areas of operations. All the normal needs had to be met: living and working accommodation, water supply, power and sanitation. The approaching autumn and winter lent urgency to plans to provide some sort of temporary accommodation for our own troops, and this quickly became one of the major aspects of engineer operations in the province. Meanwhile they had to work hard to re-establish not only the work forces but also the management structures in the city's utilities, such as power generation and distribution, water supply, refuse disposal and so on.

Once again the lack of any Corps-level troops in the NATO order of battle had bedevilled the planning process. Fortunately for the Chief Engineer (Brigadier J. P. (John) Hoskinson), the United Kingdom was prepared to pick up the bill for this, but otherwise he had to rely on the engineer troops of the national brigades. 28 Engineer Regiment became responsible for general support and infrastructure tasks, under 101 Logistic Brigade, while 21 Engineer Regiment provided close support to 4 Armoured Brigade. The UK also provided all the Geographic

support based on the cell in the ARRC's Engineer Branch. The national engineer units retained their national chains of command, which left the Chief Engineer – with an important coordination function particularly over mines and EOD policy – in the difficult position of having to ask for help with Corps-level tasks.

The three months of planning at ARRC level, by every branch, catered for all eventualities and, although the entry into Kosovo was unopposed and passed without major incident, this could not have been guaranteed. To their credit, the Sapper units who had been expecting a more offensive-orientated operation switched effortlessly into the nation-building role and provision of assistance to the UN agencies to manage the thousands of refugees and displaced persons.

The E&LSC (V), Corps engineer and logistics staff also provided invaluable technical engineer support throughout the Kosovo operations ranging from assessment of the two main power stations in Pristina in order to re-establish normality of power supplies to water distribution and quarrying.

Explosive Ordnance Disposal (EOD)

The EOD problem was particularly acute, with vast quantities and varieties of ordnance lying about in the aftermath of the Serbian offensive against the Albanian population and the air war. Foreseeing this, there had been considerable debate between the 33 Engineer Regiment (EOD) (Lieutenant Colonel G. K. (Graham) Gibbs) and his opposite number in 11 Regiment RLC as to the responsibilities of the two Corps. This was part of the wider debate discussed in Chapter 4, but agreeing a *modus operandi* for Kosovo was a matter of urgency. Much of it was worked out by the second-in-command of 21 Field Squadron (Captain V. F. H. (Verity) Orrell-Jones), who was attached to 4 Armoured Brigade during the weeks before deployment into Kosovo to provide EOD advice during this demanding planning phase. In line with the then current policy, all EOD and IEDD was a Sapper responsibility, as in Bosnia. However, the RLC supplied three teams and the Royal Air Force four more, all to

work under 21 Field Squadron (Major A. (Andy) Phillips). It was the first time that Army and Royal Air Force teams had worked together in this way. EOD specialists were also to deal with mines, falling back on combat engineers if necessary. Seven RE teams were provided for the advance into Kosovo on 12 June; the rest built up shortly afterwards, as they became available, to some 100 in strength. The standard EOD detachment for operations was three EOD teams with an EOD SO3 in each headquarters. During the Kosovo operation 33 Engineer Regiment (EOD) continued to provide detachments for both Bosnia and Kosovo.

Within three weeks they had dealt with more than 1,600 tasks. One-third of these was dealing with 'land service ammunition' including mines, grenades, projectiles and mortars; a quarter was for search and route-proving; one-fifth was for air-dropped weapons. Booby traps, IEDs and false alarms made up the rest. The threat from mines and booby traps led to a very heavy commitment for the squadron as the Brigades moved in, and every route and building intended for occupation had to be searched. In the words of the Squadron Commander, 'there were very few tasks during the first month for which EOD was not on the critical path'. In fact, the targets for the departing Yugoslav army were the returning refugees rather than KFOR, and soon there were widespread reports of civilian injuries. However, no help could be provided for this problem other than where resettling refugees was a matter of operational priority, as in Pristina.

Unexploded cluster submunitions were a particular hazard – it was reckoned that some 10% of those dropped in the air war may have failed to explode. Many of these would have fallen into soft ground. In this project the Squadron worked with the civilian demining agencies to locate, mark and where possible clear the strike areas. On 21 June 1999 two members of 69 Gurkha Field Squadron, Lieutenant Gareth Evans and Sergeant Balaram Rai, were killed as they were preparing to destroy a stockpile of unexploded cluster munitions near a village school – a task, accepted under operational pressure, that should have been left to EOD specialists.

Engineer Logistics

As ever in such conditions, the ability of the Sappers to deliver hung on the resources organisation. 65 Field Support Squadron, which deployed to Macedonia in February 1999, set up its base in Piper Camp near Skopje. From there the unit was responsible for providing engineer logistics support to the entire force which by July included, from the Corps, three regimental headquarters, eleven squadrons and a large proportion of the Military Works Force. During the air war they were very much in the front line, retaining a 40-strong security force while other units had to move away from the border area in compliance with KFOR security orders. Supporting the refugee camps was a major commitment at this time with the nearby site at Brazda and a later one in Albania, which entailed a 500-kilometre-long supply loop.

This operation was the first emergency deployment to test the engineer logistic resupply system since the closure of Long Marston (see Chapter 4).

Two official sources of supply existed: local purchase from within the theatre; and from UK through the recently established Single Supply Chain (SSC). Local purchase offered the most immediate source and, for construction tasks on Operation *Agricola*, normally worked satisfactorily due to the healthy local construction industry. Items not available locally had to be demanded through the Supply Chain Operations Centre (SCOC) which had replaced the functions of Long Marston in acquiring resources. HQ Land could also be approached direct, and the Defence Clothing and Textiles Agency carried out local purchase in UK on behalf of SCOC. PJHQ provided overall control and arbitrated over priorities. Communications proved difficult to start with due to a shortage of allocated telephone numbers and a single fax machine, but the plethora of private mobile telephones eased the situation until the position could be officially improved. Thereafter most communication was by fax. Secure means were almost non-existent.

Less officially, the support squadron at Split (61 Field Support Squadron at the time of Kosovo) were able to help out in a number of ways. Many of the convoys originated in the UK were

routed through Split and were able to pick up requirements for Kosovo on their way.⁴⁴

The system proved well up to the challenge even when shipping space was so limited that direct overland supply by road had to be resorted to at a cost of between £5,000 and £10,000 per truck. The established RE posts within the single supply chain controlled by SCOC were found to be invaluable in ensuring that the peculiar needs of Sappers could be properly met.

Of the other support tasks, there being no field workshop capability, individual tradesmen from 65 Field Support Squadron were deployed on a variety of assignments, which soon exceeded the capacity of the squadron. The single carpenter spent much of his tour producing timber latrines for the refugee camps and for units. Similarly, transport was found to be inadequate for the many calls made upon the Squadron. Their section of five self-loadable trucks, supplemented by a further five from 21 Engineer Regiment, were in constant demand, and each covered more than 35,000 kilometres in the tour of duty.⁴⁵

Perhaps the most daunting task of all was the production and supply of the 250,000 tons of crushed rock required to form the bases of the temporary field accommodation camps (covered later in this chapter). Quarrying equipment was eventually procured and shipped to the theatre, but the vast majority of this initial requirement was purchased in Macedonia by 65 Field Support Squadron's local purchase senior NCO. Two months of complicated movement arrangements were then needed to transfer it by road and rail through the Kačanik defile, which was frequently blocked by belligerent border guards, military traffic and returning refugees.

Utilities

Restoring the full range of utilities and essential services needed to keep a small country going after a three-month bombing campaign was a new experience. There was a need for KFOR itself to replace its own emergency arrangements for electricity, water and sewerage as soon as possible. Equally, properly

functioning utilities would be a key part of restoring some semblance of normal life to the people of Kosovo, and beginning the daunting task of bringing reconciliation and peace to the community.⁴⁶ Power and water are mentioned below, but Sappers also became involved in hospitals, prisons, the Pristina heating system, rubbish disposal, burials and fuels.

Power was a high priority. It was not that the industry had been seriously damaged in the air war but more that, because of sanctions and other factors, maintenance of the main generating stations had been neglected for many years, and the province was now dependent on imported power from its neighbours. The process by which the power industry was brought to life in Kosovo after the arrival of KFOR well illustrates the difficulties that faced the new UN-led administration, the UN Mission in Kosovo (UNMIK). Far from being simply a technological problem, the process was fraught with the political and personal tensions endemic throughout the province.

The first step, undertaken by the Commanding Officer of 21 Engineer Regiment, Lieutenant Colonel Geoff Nield, was to establish who were the key personalities in the industry. They were then brought together in a committee initially under the chairmanship of the Chief Engineer ARRC, Brigadier John Hoskinson, and later the commander of 29 (Corps Support) Engineer Brigade, Colonel J. M. (Max) Heron:

At this stage it took much persuasion to get the Albanians to enter into the same room as the Serb management who had been in charge for the previous nine years. Eventually, five Albanians arrived and timidly huddled together at one end of the table for security.

There followed a detailed and protracted negotiation to determine the conditions under which the Serbs and Albanians could return to work. The intention at this stage was to first get them to agree to an ethnic mix and second to make progress in restoring some indigenous power generation capability. It was agreed that all should look to the future and focus on the following:

- The productive operation of the facilities to provide a service to the whole community.

- The root cause of instability within the company, namely the return of the workers.
- The integration of workers throughout the company, according to their professional competence and qualification.⁴⁷

Little by little, as confidence grew, problems and priorities were identified and the workforce brought back. The aim of integration on professional competence regardless of ethnic origin went well in the early stages. Later, after the murder of two Serb managers and a general loss of confidence amongst them, virtually all the Serb workers abandoned their jobs despite strenuous efforts of KFOR to reintroduce them.

On the technical side, it became clear early on that the operation of the whole power industry was beyond the capability of KFOR's engineer troops. Expert advice was called for and provided from the UK in the form of a visit by Lieutenant Colonel R. J. (Roger) Urwin, a director of National Grid Company PLC and a member of the E&LSC (V) Engineer and Logistic Staff Corps. His valuable advice, both within theatre and on his return home, launched the process by which UNMIK were eventually persuaded to let a management contract to take over the running of the company on a temporary basis. After much wrangling over finance and procedure, this went to a team from British Trade International with representatives from Mott Macdonald and the British power industry. The aim was, within the seven-month term of the contract, to restructure the company into a shape that would enable it to run its own affairs effectively and commercially, given the necessary capital investment.

The appointment of Major J. (Joe) Fuller to oversee the restoration of the power station proved to be a lucky choice. He had no expertise in this area, but his brother was a professional in power station management in the UK, so Major Fuller derived much valuable guidance and advice from his brother via his mobile phone. Likewise, the soldiers of 26 Armoured Engineer Squadron had neither the training nor the expertise to run the power station but rose to the challenge and soon won the confidence of the returning workers, enabling vital works to restore at least part of the electricity production capacity.

There was a similar story for water supply. Here the lead was taken by 521 STRE (Water Development). The commanding officer, Major J. (Jim) Crawford, became Chairman of the Pristina Water Board, and his 'directors' were equal numbers of Serbs and Albanians. A team recruited by the Department for International Development with a representative from Thames Water gave help. The railways, too, proved to be another important service and, although the Italians agreed to take the lead on this matter, 507 STRE (Railway), a Territorial unit, produced expert advice on the condition of the permanent way.

For the activation of the airfield, 53 Field Squadron (Air Support) and 529 STRE (Air Support) joined the RAF Activation Team. NATO produced the funds for restoring the essential services, while those for the living arrangements and for the RAF infrastructure came from British national sources.

Rubbish disposal also presented a test of Sapper ingenuity. The fleeing Serbs had taken much of the expertise and some of the equipment with them, including the rubbish collection vehicles; only the vehicles that could not be repaired were left behind, and these were all that Captain F. R. (Frank) Swales, QM of 26 Armoured Engineer Squadron, took over when he assumed responsibility for getting the refuse disposal systems working again. Nothing daunted, he quickly brought the workforce back and inspired them to help his fitters and plant operators to repair the remaining vehicles. Very soon the mountains of rubbish that littered the city streets began slowly disappearing. He appointed himself 'SO3 Chief Refuse Administrator, Pristina' and had visiting-cards printed with his abbreviated title embossed on them – a universally admired position!

Temporary Field Accommodation⁴⁸

The sudden influx of a large force of troops required to exercise their professional skills in a country devoid of facilities called for special measures for their accommodation. Experience in Bosnia had proved the unsatisfactory nature of ad hoc arrangements. As planning progressed early in 1999, an urgent operational

requirement for housing 5,000 troops was drawn up. Three weeks before the entry into Kosovo, the Defence Procurement Agency, under the auspices of the Colonel Engineer Services at Headquarters Land, Colonel A. R. M. (Ross) Wilson, had issued four invitations to tender for what was to become a pathfinder project for such expeditionary force interventions. Enabling works, including disposal of unexploded ordnance, laying hard-standings, drainage and provision of untreated water to the site, would be the responsibility of the CRE (Works) and therefore outside the contract. Six weeks later the tenders had been received and assessed. Treasury approval to place the contract was given on 23 July, with an approved in-service date of 31 January 2000 on a phased programme that would provide some of the camps earlier.

Management of the project within the theatre was provided by a 21-strong Works Project Management Team comprising professionally qualified engineers, garrison engineers and clerks of works found from all over the Corps. A management accountant from Management Accountancy Services (Army) also joined to provide financial support and advice. CO CRE (Works) in theatre was provided with a Property Management and Auditing Team for the subsequent management of the camps and to ensure a smooth handover.

In the event, thirteen camps were built by the prime contractors, Hunting Engineering Limited, with W. S. Atkins as the designers.

The enabling works were completed by Sapper units in time for the first contracts to be started. At the peak of the project the contractors were employing nearly 300 expatriates and 650 local Kosovar civilians. The contract provided: living, domestic and administrative accommodation including latrine and ablution units; cookhouse and dining halls; offices, guardrooms and unit stores; laundries; sewage/waste treatment and disposal; power generation and distribution; workshops; potable water; fencing and lighting; and armouries and ammunition storage. All the units were environmentally controlled and connected to a fire detection and alarm system.

Review of the Balkan Emergency

The story told in this chapter has shown how the pattern of operations in the Balkans became a sequence of crises followed, after some political initiative, by periods of intense but relatively routine activity. By 2000 it was clear that the Balkans commitment could not be allowed to tie the Army down to the detriment of the wider demands on its services. There is no doubt that Corps' activities on *Operation Grapple* were professionally and personally fulfilling for many people, but the novelty started to wear thin with successive tours, especially for key trades. And, for all the professional experience that the situation offered, the strains on an overstretched Army began to take their toll. Recruiting and retention began to decline in the late 1990s as lifestyle outside offered greater attractions. Overstretch came to be gauged by the length of intervals between emergency tours being experienced by units throughout the Corps. In 1995 the tour interval was down to nine months. Through good staff work it was increased to eleven months, and in 1998 the EinC (A) spoke optimistically of the average tour interval increasing from eleven to seventeen months and more. At the height of the Kosovo planning, the forecast figure sank as low as seven months. Ways had to be sought to reduce the commitment and avoid becoming drawn in to an unwelcome long-drawn-out affair. To this end, the Sapper force level in the Balkans had reduced by 2000 to a single regiment based in Kosovo with a regimental headquarters, close support squadron, field support squadron, EOD detachment, CRE (Works) and STRE (Works). A further sub-unit of this regiment was deployed in Bosnia-Herzegovina, to be a close-support squadron in the winter months and mechanised or wheeled in the summer. This force level reflected similar reductions in the whole British Army commitment and, incidentally, an increase in the participation of other national armies.

The concept of living conditions while on operations altered dramatically over this period. No longer were soldiers content to put up with months on end in inhospitable surroundings and freezing weather. Camp structures took a leap forward in this era

and required the professional expertise of qualified engineers rather than a 'combat engineer solution' to the problem. Modern communications also played their part, as vivid TV images were broadcast daily to homes in the UK and Germany of British troops on operations. Mobile phones were not practical in the early 1990s but quickly took their place as an essential part of a soldiers' kit. As a result, first-hand stories reached friends and families almost as they were happening.

The various Balkans deployments had, however, contributed to the reshaping of the Army and the Corps for its post-Warsaw-Pact role – the emphasis moved slowly from the war-fighting end of the spectrum towards nation-building. This was reflected in the reduction in the number of infantry units in the Army and the expansion of the Corps to cope with demand for their skills in peace-support operations.

Civil Affairs (or G5 in military parlance, Civil-Military Affairs (CIMIC) as it was known in NATO) (see also Chapter 4), became an increasing source of work for the Corps in the Balkans and elsewhere. The activities of the military in this field caused considerable debate as to the appropriateness of such activities alongside an enforcement role. In fact, as the story unfolded in both Bosnia and Kosovo, military success could not have been achieved without such non-military involvement. Indeed, it was not uncommon for infantry units in Bosnia who did not have an offensive role to become involved in local projects for the civil communities. All through the Balkan operations the Royal Engineers' units undertook tasks large and small to help the local community. A typical example of such a job was completed by 1 Field Squadron, who refurbished a local clinic to the north of Kosovo in the town of Dumnice. Little notice was paid to this outside the town – no press or TV covered the opening of the refurbished clinic – and yet the impact on the local community was colossal. The five months of their tour were full of similar achievements by other unsung Sapper heroes.⁴⁹

The Sapper tasks of road repairs and bridge building fall very neatly into the CIMIC category: such tasks were undertaken in Bosnia from the earliest days of Operation *Grapple 1* and will, no

doubt, continue to be part of the UK's work in future operations worldwide.

Recognition

Many Sappers received commendations and awards during the Balkan conflicts and these are all shown in the lists in Annex B. However, it is interesting to note that of the sixteen MBEs awarded to Sappers during the Balkans operations, three members of the first troop to deploy into Bosnia in mid-1992 all received them in the June 1993 Queen's Birthday Honours: they were Captain McKeown, Staff Sergeant Grieveson and Corporal Till. This is of historic note because it was the first time that MBEs were permitted to be awarded to all ranks, following a change of policy by the then Prime Minister, John Major.

British Casualties

There were significant casualties among the international troops in Bosnia and Herzegovina, and the UK suffered its share. Prior to the Dayton Peace Accord in December 1995 (between mid-1992 and December 1995), eleven UK personnel were killed in action and a further thirteen died while on active service with the UN in Bosnia. Following the Dayton Peace Accord in December 1995 and until 2000, six UK servicemen were killed in action and 25 died on active service under the NATO flag.⁵⁰

During the period of 1 January 1999 to 31 December 2000 a further eight service personnel died in Bosnia as the result of injuries sustained on operations as well as another four in Kosovo. During that same period, 203 casualty evacuations of service personnel took place from Bosnia, and 308 from Kosovo.⁵¹ Included in these figures are a total of eight Royal Engineers killed during this period included one lieutenant, one sergeant, two corporals, one lance corporal and three Sappers (a list of their names is shown in Annex A). It has not been possible to identify the number of RE personnel evacuated as casualties from the operational theatre over this period, but the Corps certainly had its share, ranging from frostbite to traffic accidents, many of which could possibly have been avoided.

Reflections with Hindsight

The importance of maintaining the Corps' professional capability for camp construction and all that involved, from ground works to the finished product, cannot be over-emphasised. These skills proved invaluable throughout the various operations in the Balkans. However, deployments on a short timescale inevitably means that the right materials and equipment may not be available until some time after troops have deployed on the ground. It was in this context that the ability to improvise became such an important skill and was so ably demonstrated in each successive tour of operation from *Grapple 1* onwards.

The integration of the different components of the Corps was fundamental to the success of all the operations. It would be difficult to single out any one branch for accolades; instead it would suffice to say that it was the men and women of the Corps, whether combat engineers, bomb disposal, survey, members of STREs and TA or those other cap-badged personnel attached to the engineer units, who made such a major contribution to UK's involvement in the Balkans.

Interestingly, prior to the start of Operation *Grapple 1*, both the Ministry of Defence and the UK politicians were convinced that British involvement in Bosnia was only going to be for six months, but such is the nature of peace-support operations today that the last British troops only left Bosnia in 2007, nearly fifteen years later. Extraction from such operations can be harder than the actual commitment of troops, and this will probably remain the case for all future peace-support and peace-enforcement operations, be they under national, UN or NATO flags.

A stark reminder that military operations are dangerous was highlighted by the number of servicemen and women who died or were injured in the Balkans, as outlined above. Most were caused by accidents rather than resulting from direct military action by an enemy seen or unseen. One could argue that these would not have happened had the troops not been there, but the Royal Engineers role in 'Force Protection' must take account of the whole spectrum of things that happen to troops in peace and war.



Kosovo Bridge (Jonas).

The success in the Balkans demonstrated what could be achieved when the international community stuck together to see a job through, but even when that happened it could take years of international military help before countries would be able to 'stand on their own two feet'. The 'peacekeeping or enforcement' role for the military in this period needed to take account of the civil-military interface that was so critical to nation-rebuilding in order to ensure that a mission was successful.

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Glossary of the Balkans Operations

'Who Was Who' and 'What Was What' in The Balkans

This glossary is not exhaustive but should provide a useful reference for anyone who becomes mesmerised by the plethora of abbreviations, the politicians, the many warring factions and all the other organisations involved in the Balkan conflicts.

ARBiH (or BiH): Bosnian Army (Muslim), which entered into various pacts with the Croat Army (HVO) that subsequently 'turned sour' on several occasions, resulting in bloody conflicts between the two sides even though they were meant to be united against the Serbs.

Ashdown, Jeremy John (Paddy): Leader of the UK's Liberal Democrat Party to 2002. He was deeply involved in Bosnia in the early days of the conflict and was later made High Representative of the International Community and EU Special Representative in Bosnia Herzegovina (2002–2006). He made a 'Lord' in 2001.

BRITFOR: The British Force in Bosnia under the UN when each national contingent was known by an acronym like this.

BRITBAT: The British Battalion in Bosnia under the UN in the early days (1992–3) when the British had only one infantry battalion. Other nations' battalions were similarly known by an appropriate acronym.

BRITENGBAT: The UN term for the British engineer unit at regimental strength, known as a 'battalion' even though the Royal Engineers units were called 'regiments'.

BHC: Bosnia Herzegovina Command, the UN military headquarters for Bosnia originally based in Kiseljak but then moved to Sarajevo.

Chetniks: Derisive term for Serb nationalists used by some Croats, Muslims and liberal Serbs to denote extremism. The term refers to a Serb nationalist movement founded in the 19th century.

Dayton Peace Accord: US-brokered treaty initialled in Ohio in November 1995 and signed the next month in Paris, ending the war in the former Yugoslavia, formalising Bosnia and Herzegovina's division into ethnic states that include a Bosnian Federation (of Muslims and Croats) and a Serbian Republic, and enforcing the end of hostilities with 60,000 (mainly) NATO troops including 20,000 Americans, 12,000 British as well as French, Canadians, Czechs, Dutch, Turks, Hungarians, Malays, Spanish, German and Belgians. Included in this Accord was a provision to provide safe passage, or a right of return, to those expelled from their homes.

FRY: Former Republic of Yugoslavia comprising Serbia, Croatia, Bosnia

and Herzegovina, Slovenia, Kosovo, Montenegro and Macedonia.

FYROM: The Former Yugoslav Republic Of Macedonia, not to be confused with the Greek province of the same name.

HVO: Translated: the Croatian Defence Council (the Army of the Bosnian Croats).

IFOR: Implementation Force, the NATO-led peacekeeping force in Bosnia created under the Dayton Peace Accord.

International Criminal Tribunal for the Former Yugoslavia (ICTY): Convened in The Hague by the United Nations Security Council in May 1993 and ongoing at December 2000 to prosecute serious violations of international humanitarian law in the former Yugoslavia. It was the first such trial since those following the Second World War in Nuremberg and Tokyo. There were eleven judges, all from different countries. Unlike the tribunals in Nuremberg and Tokyo, this one was not permitted to hand out death sentences and could not try suspects in absentia. The tribunal indicted 57 suspects: 46 Serbs, eight Croats and three Muslims.

IPTF: International Police Task Force, established by the United Nations, charged with reporting human rights violations to the war crimes tribunal.

Izetbegović, Alija (August 1925 to October 2003): Bosniac activist, First President of Bosnia and Herzegovina (1990–6) and leader of the Muslim Party for Democratic Action.

Jackson, General Sir Mike, GCB, CBE, DSO: GOC 3 UK Divisions (?) (April 1994 to August 1996), Commander ARRC (January 1997 to December 1999), CinC Land (December 1999 to 2003) and later CGS in February 2003. He retired from the Army in 2006.

JNA: Yugoslav (Jugoslav) national Army, which quickly broke up in 1991 as a result of ethnic conflicts between Serbs and Croats.

Karadžić, Radovan: First President of the Republic of Srpska (i.e., the Bosnian Serb Republic, the Serbian-speaking part of Bosnia) 1992–6. In 1996 he was indicted by the war crimes tribunal for human rights violations in connection with the deaths of thousands of Muslims in Srebrenica in July 1995 and the shelling of civilians during the siege of Sarajevo. He became a fugitive from 1996 until his capture in 2008. Interestingly, he is a qualified psychiatrist as well as a poet and composer.

KFOR: The NATO's Kosovo Force, which deployed into Kosovo on 12 June 1999.

KLA: Kosovo Liberation Army. A Kosovar Albanian guerrilla group that was listed as a terrorist organisation until 1998 after it rebelled against Serbian rule. It was disbanded in 1999 and absorbed into the Kosovo Protection Corps (KPC).

Knin: Croatian rail and telecommunications hub. This city, at the centre of the former Serbian enclave within Croatia, is known to Serbs as the

Krajina and was seized by them early in the war. Croats were expelled and the region was occupied by the Serbs until a devastating military rout at the hands of the Croats in August 1995.

KPC: see above, KLA.

Mladić, Ratko: Commander of Bosnian Serb army, indicted by the war crimes tribunal on charges of directing military attacks against the Muslim civilians of Srebrenica and Sarajevo. Arrested in May 2011.

Milošević, Slobodan: President of Serbia (1989–97) and then of the Former Republic of Yugoslavia (1997–2000), proponent of Serbian nationalism, key engineer of the Serbian split with Croatia and Slovenia in 1990. He was finally arrested in Belgrade in March 2001 for war crimes in Bosnia and Kosovo.

Mostar: An historic Bosnian city on the River Neretva south of Sarajevo. When the Stari Most bridge, built by the Ottomans in 1566, was deliberately destroyed by the HVO in 1995 it attracted much international media attention. The Royal Engineers built a Bailey bridge over the river to reunite the two sides of the city, but this too was deliberately badly damaged and also had to be replaced with a second Bailey bridge. The Stari Most bridge was later rebuilt by Turkish contractors in 2004 with international funding.

NGOs: Non-Government Organisations, mainly charities who worked in different areas of relief (e.g., OXFAM, the International Red Cross (IRC), the Red Crescent, Caritas, MSF, etc.)

ODA: The British Overseas Development Agency (later renamed Department for International Development (DfID)). They provided substantial funding for engineer work to be carried out throughout Bosnia in order to enable freedom of movement as well as to re-establish such essential services as power, water and medical support for the local population.

Operation *Agricola*: The UK's name for the military operation in Macedonia, which was established following Operation *Upminster* to provide a springboard for entry into Kosovo should the right conditions prevail. This entry followed on 12 June 1999.

Operation *Grapple*: The UK's operational name for troop deployments into Bosnia under the UN flag between 1992 and late 1995.

Operation *Joint Endeavour* (December 95 to December 96): The NATO title for the deployment of troops into Bosnia in December 1995 to implement the Dayton Peace Accord.

Operation *Lodestar* (December 96 to June 98): The UK's operational name for the deployments of troops into Bosnia after Operation *Resolute* as part of SFOR.

Operation *Palatine* (June 98 to the end of 1998): The successor to Operation *Lodestar* in Bosnia; it was absorbed into the Kosovo operation (Operation *Upminster*).

Operation Resolute: The UK's operational name for troop deployments into Bosnia under the NATO flag in 1995 and 1996 as part of the NATO Stabilisation Force.

Operation Upholder: The UK's military operation in Macedonia under the NATO flag set up at the behest of the UN in December 1998; it was originally established to provide an extraction force for any unarmed verifiers of the cease-fire who might be trapped or held hostage in Kosovo.

Pale: Capital of the Bosnian Serb Republic, a former ski resort.

Partisans: The army Josip Tito led to victory during the Second World War, composed of Communist guerrillas drawn from a wide spectrum of Balkan ethnic groups but dominated by Serbs and Montenegrins.

Richard Holbrooke: Former Assistant Secretary of State, the United States' chief negotiator responsible for the Dayton Peace Accord.

Sarajevo: The capital of Bosnia. A centre of arts and education, it came under relentless siege by Bosnian Serb forces throughout the war until the advent of the Dayton Peace Accord. Before the war, Serbian, Muslim, Jewish and Croatian Bosnians lived together in Sarajevo in peace. It was the site of the 1984 Winter Olympics and the scene of the assassination of Archduke Franz Ferdinand, which led to the First World War.

Serb Republic (Srpska): The Serbian state within Bosnia, with Pale as its capital. Serbs within Bosnia and Herzegovina separated from Croatian and Muslim enclaves and declared their own republic in the spring of 1992 with the hope of fulfilling the historical dream of linking with the Serbian-dominated rump of Yugoslavia and creating a 'Greater Serbia'. The Dayton Peace Accord formally recognised the republic, also known as Srpska.

SFOR: The NATO Stabilisation Force, which succeeded IFOR in December 1996, a year after the Dayton Peace Accord was signed.

Split: Town on the Croatian coast used as a port of entry for ships and aircraft supplying British troops in Bosnia from October 1992 until the end of operations in 2007.

Srebrenica: One of many towns and cities designated by the United Nations as 'safe areas' but then came to symbolise the ineffectual nature of United Nations' military protection during the war in the former Yugoslavia. It was the scene of brutal 'ethnic cleansing' after being conquered by Bosnian Serbs in the summer of 1995. It was for atrocities committed in Srebrenica that the Serb general Ratko Mladić was indicted for war crimes.

Tadić, Dusan: A former Serbian policeman who was the first to be brought to trial by the UN War Crimes Tribunal in The Hague. He was charged on 31 counts, including crimes against humanity that involved the persecution, killing and torture of Muslims in and around Serbian-run prison camps in 1992. In 1997 he received a 20-year prison sentence, and in 1999 was convicted of further offences.

Tito, Josip Broz: Famous as a Second World War hero, Tito was the leader of partisans against totalitarian Ustashi, Chetniks and Axis powers in Yugoslavia. He was the chief architect and leader of the Socialist Federal Republic of Yugoslavia, delicately balancing the region's national rivalries until his death in 1980.

Tomislavgrad (previously Duvno): In a disused factory in this town in Bosnia the Royal Engineers established their main operating base for Operation *Grapple 1*. It was used extensively thereafter until the end of the UN operation in 1996. The stacking shelves in the factory were converted into 'multi-storey' bunk beds. The base was shelled by Serbian artillery in January 1993.

Tudjman, Franjo (May 1922 to December 1999): First President of Croatia following independence in 1991, he died in office. He was a Croatian nationalist who allowed symbols of Croatia's fascist past to re-emerge.

UNHCR: The United Nations High Commissioner for Refugees, the leading UN agency responsible for humanitarian assistance to Bosnia and the Balkan region. It had prime responsibility for logistics, transport, food monitoring, domestic needs, shelter, community services, health, emergency transition activities in agriculture and income-generation, protection and legal assistance, plus assistance to other agencies.

UNPROFOR: The United Nations Protection Force in Croatia and Bosnia and Herzegovina. This organisation was phased out when NATO assumed responsibility for the enforcement of the Dayton Peace Accords in December 1995.

Vance-Owen Peace Plan: The International Conference on the Former Yugoslavia, based in Geneva, began in August 1992 and was chaired by Cyrus Vance and Lord Owen. It included the leaders of the three sides within Bosnia – the Serbs, Muslims and Croats – as well as the six republics of the former Yugoslavia, the military commanders, the United Nations, the governments of the European Community, the United States and Russia in coordination with the United Nations. The Vance-Owen Peace Plan divided Bosnia and Herzegovina into ten cantons, or provinces, and abortively proposed using UNPROFOR to enforce peace.

Vitez: The small town in central Bosnia used as the main operating base by the successive British infantry battle groups from October 1992 at the beginning of Operation *Grapple 1* until January 1996 during Operation *Resolute*. Vitez was also the scene of sectarian fighting between the Croats and Muslims on several occasions.

Northern Ireland

Foreword

by General Sir Rupert Smith, KCB, DSO, OBE, QGM
General Officer Commanding Northern Ireland, 1996–1998

When I was a cadet at the Royal Military Academy Sandhurst I was told that, 'on operations you could never have enough Sappers'. Since I was told this by a Royal Engineer I doubted this piece of advice. But with experience I came to believe it. I have learnt to value not so much the quantity of Sappers in my command but their quality: the product of their qualities of versatility, adaptability and ingenuity. It is their versatility, the ability to do a range of things; their adaptability, the ability to adapt what they do to the circumstances; and their ingenuity, the ability to find a solution to a problem using the materials to hand, that I have learned to value highly. The pages that follow give ample evidence of these sterling qualities being employed with great success.

Outline Chronology, Political and Military Background

Introduction

August 1980 marked the 11th anniversary of the deployment of the British Army to Northern Ireland in support of the Royal Ulster Constabulary (RUC). This was known as Operation *Banner* for UK based units and Operation *Descant* for reinforcements from British Army of the Rhine (BAOR). These 'Troubles', as times of violent unrest in Northern Ireland were known, had continued unabated since August 1969 and by 1980, the beginning of the period described in this volume, there was still no end in sight. All political initiatives in the 1970s had come to naught; the violence continued with an ever-increasing death toll

on all sides. Members of the Security Forces, senior establishment figures, Republicans, Loyalists and innocent bystanders had lost their lives or been maimed. Massive damage had been caused. Political positions had become more deeply entrenched. There seemed to be no end to the brutal killings and intimidation of the population, especially those who inhabited areas where the power of the various paramilitary organisations held sway. A sinister atmosphere had developed.

This introduction provides the link between Chapter IX of Volume XI, which covered Royal Engineer activities between 1969 and 1980 and the account that follows, of Sapper operations in Northern Ireland over the ensuing twenty years. The section also summarises the major events to help set in context the military operations in which the Corps took part.

The complete story is both long and complex – indeed these most recent Troubles continued beyond the period of this volume of the Corps' history. Only a brief resumé of the headline issues can be related here, together with some anecdotes to provide a flavour of service in Northern Ireland during those times. Nevertheless, throughout the period described in this Chapter, the Corps played a crucial role in helping to minimise violence and create an environment in which a just and peaceful settlement could be achieved. The remaining years of the campaign will be related in Volume XIII.

The first phase, from 1969 to 1977

Arguably, there were three fairly distinct phases of the Troubles, none of which neatly coincides with the respective periods of the volumes of Corps history. The first was 1969–77, when civil rights marches, serious mob violence involving stoning and petrol bombing, improvised explosive devices (IEDs) including incendiaries, shooting incidents, barricades and sectarian murders were frequent; the rioter, gunman and bomber dominating. In an attempt to counter this, internment had been introduced in August 1971. As a consequence late 1971 and all 1972 proved to be periods of extreme violence and political turmoil. 'Bloody Sunday' took place in Londonderry when thirteen people were killed

during a civil rights march. Shortly after, there was a revenge bombing by the Official IRA (OIRA) of the HQ 16 Parachute Brigade officers' mess in Aldershot, killing six civilians and a Roman Catholic army chaplain; a further seventeen were wounded. This, combined with various other propaganda failures, led to the OIRA declaring a cease-fire. On 4 March there was a Provisional IRA (PIRA) attack on the *Abercorn Bar* in Belfast, described by the coroner as 'pathological murder of the most depraved kind'.¹ Then there was 'Bloody Friday' in Belfast on 21 July 1972 when PIRA detonated twenty bombs in just over an hour within a one-mile radius of the city centre, killing nine people and seriously wounding 130. The death toll during July alone reached almost 100. Direct Rule was imposed. On 31 July 1972, Operation *Motorman* was launched. The mission was to enter and re-occupy 'no-go areas'; over 21,000 troops were deployed. In that year alone PIRA detonated some 1,300 bombs, and 497 people lost their lives.

As the campaign progressed, PIRA had developed into a very effective and resilient terrorist organisation dedicated to fighting the Republican cause. Equally there had been the growth of a number of utterly ruthless paramilitary groups on the Loyalist side. By the mid-1970s, PIRA had recognised that this was developing into a long war of attrition and had begun to restructure. Its leadership, acknowledging that the formal command structure of brigades and battalions was no longer effective, had responded by preparing for the long-term armed struggle by forming small cells known as 'active service units' (ASUs). They were often three to five strong, and each employed separate quartermasters and specialists in intelligence, finance, and engineering (bomb making and development). ASUs were more difficult for the Security Forces to penetrate, and they operated on both sides of the border. PIRA also made the chilling statement that its list of 'legitimate targets' was to be extended to include police families, civilians employed by the Security Forces and businessmen.

Despite this, 1977 could be considered a turning-point. There was the collapse of the second Loyalist strike led by Ian Paisley

(the first had been in 1974), a marked reduction in both the annual death rate and the widespread confrontation that had blighted Northern Ireland. There was a drop in occupied house searching and, apart from notable exceptions such as South Armagh, the number of 'no-go areas' declined. That year also saw the introduction of the 'Way Ahead' policy by the Government in Westminster, which was designed to re-establish the primacy of the RUC, the role of which would be to establish and maintain law and order throughout Northern Ireland, with the Army in support. And, on a positive note, the Nobel Peace Prize was awarded to the leaders of the Peace People, Mairead Corrigan and Betty Williams.

The second phase, from 1978 to 1994

This phase covers the majority of the period of this Volume and could be described as a time of fluctuating levels of activity by all sides, with many appalling atrocities perpetrated by the various terrorist factions. Nevertheless, it led eventually to the 'Peace Process'.

Government and military strategic policy

The British Government's aim in the 1980s was to destroy PIRA rather than seek resolution of the conflict. The three key tenets of Army policy during that period were reassurance, deterrence and attrition. To meet this, the Army developed a sophisticated mix of operations. The bulk of the Army, both Regular and Ulster Defence Regiment (UDR), undertook visible 'framework operations' in support of the RUC. These were intended primarily to reassure the public and deter terrorist activity, while assisting with the development of intelligence. Other Army organisations, working with the RUC, were fully committed to gathering information. Given effective intelligence that could be converted into evidence, a terrorist could normally be arrested and prosecuted in court. This form of attrition might be called the 'forensic and judicial' process, the normal method for the RUC, which by the early 1980s had built up its strength to 8,000, with 2,500 part-time reservists. It was largely a Protestant force. Catholics had suffered intimidation and

were reluctant to join. On a limited number of occasions, operations took place to catch terrorists participating in serious violent offences. On fourteen or so occasions they were killed, and on other occasions arrests were made. The most famous was at Loughgall on 8 May 1987, when eight PIRA terrorists were shot dead by the SAS as they approached the RUC station intent on blowing it up. More than 40 were killed by Security Forces during such operations, including several of their most experienced operators. A combination of overt and covert operations was no doubt a key factor in persuading Republican leaders that they would not win by violent means.

By 1980, six Regular battalions were stationed in Northern Ireland on two-year tours. Three further battalions undertook roulement tours of four-and-a-half months. Although this was reduced to two battalions, and tours were extended to six months, this broad pattern of deployment applied through the 1980s and into the mid-1990s. The roulement battalions operated in the areas where PIRA had strongholds and were most active: South Armagh and West Belfast. The UDR operated across wide areas of Northern Ireland where, in general, there was less terrorist activity. In 1980 there were eleven battalions, largely consisting of part-time soldiers, but the proportion of full-time, permanent cadre increased steadily as absolute numbers declined. By the end of the decade there was a force of eight battalions. Sapper deployments varied to meet the changing threat.

By the early 1990s, the Security Forces' operation had developed to the point that, while PIRA almost always had the initiative. This was a consequence of Whitehall's earlier strategic decision to operate strictly within the law. The Security Forces reaction was so comprehensive that the ASU involved was frequently arrested or at least so compromised that they were no longer viable. This led to frequent and significant reverses for the Republicans. When the cease-fire eventually broke down, the Security Forces' operation continued on the base of the very firm foundation already established and, always mindful of the political delicacy of the situation, they were able to arrest 118 active terrorists.²

Republican terrorist organisations

At the beginning of this period, PIRA's strength was fairly stable, with a hard core of approximately 30 leaders and 200–300 active terrorists operating in ASUs. It broadened the nature and scope of its activities with new weapons, new concepts of operation and new areas. It obtained some Russian heavy machine-guns and a small number of SA-7 anti-aircraft missiles. PIRA also introduced increasingly sophisticated IEDs, including the command wire version and, to increase their operational flexibility, they used radio-controlled IEDs. It also successfully employed victim-operated IEDs, bombs placed under vehicles and held in place by magnets. In addition to attacks using straightforward blast bombs, sometimes incorporating incendiary material, booby-traps and shooting attacks, PIRA also steadily developed other ingenious methods of killing, including improvised home-made mortars and rocket-propelled grenades (RPGs). These developments had a marked effect on the employment of Sappers in Northern Ireland, as this Chapter will relate.

PIRA tactics and internal security were by now very effective and continued to improve. It enjoyed some foreign support, notably from the Gaddafi regime in Libya and Irish-Americans living in the United States. The bombing campaign was reintroduced to mainland United Kingdom, which had always been a potential target and then spread more widely to include continental Europe, with attacks on Army and RAF targets in West Germany, the Netherlands and Belgium. That was the practical limit of its reach, but it was unable to sustain such operations for long. A proposed attack on the residence of the Governor of Gibraltar during a guard-mounting ceremony in March 1988 was potentially the most spectacular. It was thwarted by the SAS and three terrorists were shot dead.

The Irish National Liberation Army (INLA) had developed out of the OIRA. It was much smaller and less effective than PIRA: INLA members were neither as skilled nor as disciplined as those in PIRA but nevertheless managed to perpetrate a number of major atrocities, including the bombing of the *Droppin' Well* near Ballykelly and the assassination of the Rt. Hon.

Airey Neave MP at the Palace of Westminster in 1979. For much of the 1980s, INLA was preoccupied with an internecine leadership struggle which made it unstable and limited its operational effectiveness. But the threat from this set of vicious criminals remained.

Eventually, out of the rump of PIRA would emerge two dissident Republican groups determined to maintain the military campaign: the Continuity IRA (CIRA) and the Real IRA (RIRA).

Loyalist organisations

Loyalist paramilitaries continued to operate against the Republican community, claiming to act as protectors of the Unionist people. They were often little more than a collection of gangsters and criminals who were involved in racketeering, extortion and other forms of serious crime. They perpetrated a number of vile atrocities and murdered a significant number of people. The Ulster Defence Association (UDA) was perhaps one of the marginally less disreputable organisations, with a membership of some 2,000 at its peak, while the Ulster Volunteer Force (UVF) was the most dangerous, with approximately 1,000 members. There were others.

The campaign continues

There were numerous events, both political and military, that changed the course of the campaign and set the operational framework within which units of the Corps of Royal Engineers were required to operate. 1978 started very badly when 12 people were incinerated and 23 injured in the PIRA firebombing of the *La Mon* Hotel on the outskirts of Belfast. There was widespread disgust at this callous act. In March, Republican prisoners at the Maze Prison launched their 'dirty protest', designed to reinstate Special Category Status, by smearing their cells with excrement; at its height in July this involved some 250 prisoners. Forty female Republican prisoners in Armagh jail joined in with equally foul behaviour and those on remand in the Crumlin Road Jail also lent support. Of major significance, PIRA tactics changed: they began to strike softer targets, such as off-duty

RUC, UDR soldiers, senior establishment figures, politicians and the judiciary. On 27 August 1979, PIRA showed its merciless determination by murdering Lord Mountbatten, together with members of his family and their boatman, while they were on holiday in the Republic of Ireland.

That same day, in a very sophisticated two-phase attack involving two massive, remotely controlled bombs and supported by gunmen, PIRA killed a total of eighteen soldiers and a civilian. Most were serving in 2nd Battalion The Parachute Regiment, and they were travelling in a convoy of three vehicles from Ballykinler to Newry. The first IED was detonated as the last truck passed a trailer loaded with hay and straw, while PIRA gunmen opened fire on the remaining vehicles, and in the exchange of fire a young tourist was killed. The Commanding Officer of 1st Battalion The Queen's Own Highlanders, Lieutenant Colonel David Blair, in whose Tactical Area of Responsibility (TAOR) the attack had taken place, immediately flew by helicopter to the scene accompanied by his radio operator. While he was assessing the situation with the Parachute Regiment officer who had led the convoy, the second IED, consisting of some 500 kilogrammes, was detonated, and a further twelve men, including Lieutenant Colonel Blair, were killed.

In 1980 the prison protest developed into widely publicised hunger strikes. During the following year, considered to be a watershed in the Troubles, ten died including Bobby Sands, who, a month before his death, was elected as the Sinn Féin Member of Parliament in Westminster for Fermanagh and South Tyrone. He never took his seat in Parliament. In the by-election that followed his death, his political agent, Owen Carron, was elected. Thus the Republican movement, which previously employed an almost exclusively military strategy, found itself drawn into mainstream politics, and Sinn Féin became poised to become the leading political party to represent the Nationalist and Republican positions in Northern Ireland. To emphasise this important change of direction, the editor of the *Republican News* (*Am Phoblacht*) stated at the Sinn Féin Ard Fheis in November 1981:

Who really believes that we can win the war through the ballot box? But will anyone here object if, with a ballot paper in one hand and an Armalite in this hand, we take power in Ireland?³

The combined strategy of the Armalite and the ballot paper developed from this point. In the long term it proved to be most effective. The next significant step for Sinn Féin was in 1983 when at the General Election the President of Sinn Féin, Gerry Adams, became the Member of Parliament for West Belfast. For the first time it placed the full reins of power of both the political and military wings of Republicanism in the hands of inhabitants of Northern Ireland.

During late 1981, 1982 and through into 1983, PIRA returned to its campaign of murderous attacks on mainland United Kingdom. A bus full of Irish Guardsmen returning from duty at the Tower of London, Oxford Street, Harrods, the band of the Royal Green Jackets and the Blues and Royals on ceremonial duties were among the numerous targets. The 'Brighton Bomb', directed against Prime Minister Margaret Thatcher and her Cabinet, was detonated on 12 October 1984 during the Conservative Party conference: five people were killed. This was a ruthless attack, which led to a significant widening of RE responsibility in the fight against terrorism, deep-search operations being mounted to counter long-delay timing mechanisms. The attack was followed by an IRA statement that included the remark:

Today we were unlucky, but remember we only have to be lucky once – you will have to be lucky always. Give Ireland peace and there will be no war.⁴

Just over a year later, on 15 November 1985, Margaret Thatcher signed the Anglo-Irish Agreement, which established the Anglo-Irish Intergovernmental Conference made up of officials from the British and Irish Governments. This body was concerned with political, legal and security matters in Northern Ireland as well as the promotion of cross-border cooperation. It had a consultative role only. This enflamed the Unionist population, as they regarded the involvement of the Irish Government as a major

threat to the Union. 'Ulster Says No' and 'No Surrender' were slogans behind which they united; massed protest marches took place, and Loyalists attacked some 350 RUC and UDR families in their homes, citing the excuse that they had betrayed their community by facing up to the anti-Agreement protests. But this action was ultimately to no avail as dialogue between the Republic of Ireland and the British Government was openly underway. As subsequent momentous events would prove, it turned out to be another crucial change of direction on the political front.

Meanwhile the vicious military campaign continued in Northern Ireland, mainland UK and Europe. In March 1987, PIRA detonated a car bomb containing almost 150 kilogrammes of explosive during the evening, close to the officers' mess at Rheindahlen in West Germany. A total of 31 Germans and British were injured and there was extensive damage caused to nearby parked cars, the road and surrounding buildings. There were attacks by PIRA against the Security Forces, who in turn retaliated with highly successful operations, such as that already mentioned at Loughgall in May 1987. In November 1987 a bomb detonated by PIRA at the Remembrance Sunday service at the war memorial at Enniskillen attracted widespread condemnation. In January 1988, just after this appalling atrocity, a meeting took place between Gerry Adams and John Hume, leader of the Social Democratic and Labour Party (SDLP), which represented a more moderate Nationalist view than the hard line Republican stance taken by Sinn Féin. Hume attempted to persuade Adams to give up the armed struggle – the main thrust of his argument being that the Anglo-Irish Agreement indicated that the British Government was prepared to negotiate. His efforts were unsuccessful at this stage, but they eventually led to the Peace Process. In late 1990, Peter Brooke, the Secretary of State for Northern Ireland, made the landmark announcement, in the context of the end of the Cold War, that:

Britain had no selfish strategic or economic interest in the Union.⁵

But the armed struggle continued unabated. PIRA again launched high-profile attacks on the mainland: on 7 February

1991, Downing Street was struck by mortar bombs fired from an abandoned van in Whitehall; the Baltic Exchange in the City of London and an important flyover complex in north London were bombed in 1992. In 1993 a lorry-bomb was detonated in Bishopsgate in the City of London causing millions of pounds worth of damage. It was becoming clear that a bomb on the Mainland was worth ten in Northern Ireland. A further atrocity was perpetrated by PIRA on the Mainland when, in March 1993, bombs placed in litter bins in Warrington exploded. Two boys, one aged three and the other aged twelve, died of their wounds.

However, during this period secret negotiations were beginning between Sinn Féin and the British Government and in late 1993 the British Prime Minister, John Major, announced the Downing Street Declaration. This affirmed, among other things, the right of the people of Northern Ireland to self-determination and that the Province would be transferred to the Republic of Ireland if – and only if – the majority of the population was in favour of the move. American involvement became important when, in 1994, despite vigorous British objections, Gerry Adams was granted a visa to visit the United States.

The 'Path to Peace' between 1994 and 2000

The third and final phase of the campaign then commenced in 1994 and is best described as the 'Path to Peace'. Resulting from highly effective Security Forces' operations, PIRA suffered a succession of significant reverses and on 31 August 1994 announced a complete cessation of military operations in order to enhance the democratic peace process. This was followed a month later by the main Loyalist terror groups' declaration of a cease-fire that was conditional on PIRA's. British officials and Sinn Féin met for the first time at Stormont (the Northern Ireland Parliament buildings) in December. But the two Unionist political parties were deeply suspicious of the British Government and many difficult obstacles had yet to be overcome. The immediate challenge was the decommissioning of PIRA weapons. Indeed, the Loyalist movement was angry, and this

manifested itself in the violence that broke out from 1995 during the annual Orange Order march at Drumcree, near Portadown. Sappers were heavily involved then and in successive years during the public order operations to keep the opposing groups apart.

There were subsequent arguments over the very contentious issue of the decommissioning of PIRA weapons. Then, in February 1996, PIRA broke the seventeen-month cease-fire by detonating a massive vehicle bomb at Canary Wharf in London's Docklands, killing two people and causing millions of pounds worth of damage to this prestigious site. Although there was widespread condemnation of the attack, Republicans blamed the government of John Major for wasting the opportunities offered by the PIRA cease-fire. Another massive bomb followed, this time in Manchester city centre. On 7 October 1996, two car bombs were detonated within the perimeter of Thiepval Barracks in Lisburn, fatally wounding a REME warrant officer. This was a direct attack on Headquarters Northern Ireland. On 12 February 1997, Lance Bombardier Restorick was shot dead by PIRA at a checkpoint at Bessbrook, South Armagh. He was the last soldier to be killed before PIRA declared its second cease-fire in July. During the continuing violence, at the British General Election of May 1997, the Labour Party was elected to power with a huge majority, and Tony Blair became the new Prime Minister. However, during this period the Security Forces continued to achieve major successes in disrupting Republican operations, leading Gerry Adams to recognise that physical force was no longer a viable option – he wanted to resume the political process. On 20 July 1997, PIRA stated that

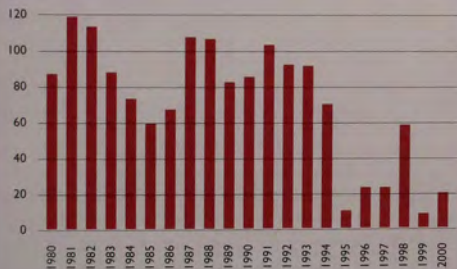
the leadership of Oglai gh na hEireann are announcing a complete cessation of military operations from 12 mid-day on Sunday 19 July 1997. We have ordered the unequivocal restoration of the ceasefire of August 1994. All IRA units have been instructed accordingly.⁶

This inevitably caused a reaction among the most determined Republicans, who continued the armed struggle under the banner of the Continuity IRA (CIRA). However, the desire for

peace among the majority of the population was not to be thwarted and on 10 April 1998, after tortuous negotiations, the Good Friday Agreement, after referenda in both north and south, established the Northern Ireland Assembly. The ensuing referenda in Northern Ireland and in the Republic recorded an overwhelming majority in favour, although the Unionist vote was split equally. In response, the Irish Constitution was amended to declare that the aspiration for unity should be based on consent.

But the campaign was not over yet. In May 1998 another Republican splinter group emerged: the Real IRA (RIRA). They were responsible for a 250-kilogramme car bomb that exploded mid-afternoon on Saturday 15 August 1998 in the largely Roman Catholic town of Omagh, County Tyrone. This was the single worst atrocity in the Ulster conflict – 29 innocent people were killed. It finally discredited violent Republicanism, and there was widespread disgust and anger. Two weeks after the atrocity in Omagh, on 1 September 1998, Gerry Adams made the announcement that was the nearest the Republican movement had come to admitting that the armed struggle was over for good:

Violence must be a thing of the past – over, done with ...⁷



Total number of deaths 1980–2000

Data from McKittrick, D., Kelters, S., Feeney, B., Thornton, C. and McVea, D., *Lost Lives*, Edinburgh, 1999

ROYAL ENGINEER DEPLOYMENT IN NORTHERN IRELAND, 1980

Legend:

- Brigade Boundaries (dashed line)
- International Boundary (solid line)
- County Boundaries (dotted line)
- Built up Areas (shaded area)

Units and Locations:

- HQ 8 INF BDE**: Londonderry
- BAOR FD SQN**: Ballykelly
- 3 INF BDE AREA**: Tyrone
- 39 INF BDE AREA**: Belfast
- 31 INDEF FD SQN**: Lurgan
- ENGR PK**: Lurgan
- HQ NORTHERN IRELAND**: Lurgan
- HQ 39 INF BDE**: Lurgan
- UKLF FD SQN**: Portadown

Counties: LONDONDERRY, ANTRIM, TYRONE, FERMANAGH, ARMAGH.

Scale: 0 10 20 30 40 KILOMETRES

Inset: LONDONDERRY (INSET)

Inset: BELFAST (INSET)

The 'Peace Process'

Progress towards a lasting settlement continued slowly and erratically. The Peace Process continued through the turn of the millennium and eventually led to Operation *Banner* closing on 31 July 2007, days short of 38 years after the initial deployment. During that time more than 3,700 people lost their lives. Almost 300,000 members of the Armed Services, including the UDR, took part in the campaign. More than 600 soldiers died or were killed as a result of terrorist action, of which, up to the millennium, 31 were Royal Engineers.

Roles

The roles filled by units, subunits and individuals of the Corps in this campaign from 1980 to 2000 were many and varied. They included the final regimental deployment as infantry. RE operations involved construction tasks designed both to protect Security Forces' bases from attack by a variety of terrorist weapons and enable the RUC and the Army to live in safe, tolerable conditions in certain vulnerable locations; building observation posts for surveillance operations on remote sites close to the border with the Republic; Search with an emphasis on High Risk; providing support for public order operations; barricade clearance and making safe the scenes of certain terrorist atrocities; border closures; boat operations and shallow-water diving; logistics; survey; technical consultancy; and community relations. Individuals served in 22 SAS Regiment, 14 Company, Tasking Coordinating Groups, as Military Intelligence Officers, the UDR and in non-RE staff appointments. A short description of each role is given in the paragraphs that follow.

Royal Engineers last deployment in the infantry role at regimental level, 1979–1980

Reflecting the versatility of the Sapper, who combines the skills of soldier, combat engineer and tradesman, regiments of the Corps completed fourteen tours of duty in the infantry role throughout the 1970s. An account of those deployments and the training undertaken by units is given in Volume XI. The

last time this occurred at regimental level was from October 1979 until February 1980, although thereafter some Sapper subunits were deployed as infantry, both independently and at times to reinforce battalions. On this occasion, 2 Armoured Division Engineer Regiment (2 ADER) from Osnabrück



Plant team moving out, Castledillon, 1980.



16 Field Squadron Base in 1979/80, showing the typical layout of an infantry company base and accommodation.

deployed to the Monagh TAOR, south of Andersonstown in West Belfast. This was a strongly Republican part of the city, which over the previous ten years had witnessed rioting, bombing, shooting attacks and numerous other major terrorist incidents. The local population was very largely hostile. The Regiment, commanded by Lieutenant Colonel G. B. (Graham) Fawcus, comprised 16 Field Squadron (OC Major A. J. (Tony) Reed Screen) based at Glassmullin; 39 Field Squadron (OC Major S. C. (Scott) Grant) at Woodburn with a troop detached to North Howard Street Mill towards the centre of Belfast and then for the final part of the tour to Crumlin Road Jail. 43 Field Support Squadron (Echelon Commander Captain R. (Dick) Tracey) was deployed to Musgrave Park Hospital. The role was to provide operational support to the RUC and collect information on terrorist activity.

This deployment illustrates the pressure felt by individuals and families during this period. 2 ADER was returning to Belfast in the infantry role only 12 months after their previous deployment in 1978, when the Regiment had been based in the Grand Central Hotel in the city centre. Concurrently, 43 Squadron had deployed in its Sapper role to Ballykelly. Sappers were trickle-posted, so an individual could find himself undertaking almost back-to-back operational tours if he happened to be posted out on completion of one tour to then join another squadron that was imminently due to go to Northern Ireland.

By this stage of the campaign, the training provided prior to deployment had developed significantly. Built upon the sound foundations laid during the experiences of the previous ten years, it was both demanding and comprehensive. Basic infantry urban drills took place initially in barracks followed by intensive packages on the ranges and specialist training areas, in this case as a BAOR unit, at Sennelager. Skill at arms inevitably was afforded very high priority with basic marksmanship followed by live fire and manoeuvre and fire-discipline exercises. Progressive tactical training was accomplished in Sennelager's special training area known as 'Tin City'. Foot and mobile patrol procedures and techniques were developed, as were those needed for riot

situations, including those required when acting as the 'snatch squad'. The search teams undertook the All Arms Search Course. The Northern Ireland Training and Advisory Team (NITAT) played a very important role in the build up: they gave briefings and then conducted tactical training designed to fit out the teams within the squadrons. All ranks were reminded of the importance of the Yellow, Blue and White Cards that set out the rules of engagement for weapons and instructions for making arrests. Of particular importance was the contact made at this stage with RUC officers who participated in the work-up; the RUC had primacy on operations, a concept established from the outset.

Because of the improving security situation, the Regiment was not to be replaced in this TAOR. Nevertheless, during the tour much effort was put into patrolling in support of the RUC, but the military presence was gradually reduced thereby enabling the police to take on this role without overt Army support. This was the start of the policy of 'RUC Primacy' with its constables patrolling in pairs rather than, as previously, as part of a military 'brick' (section or half-section). However, military 'multiple patrols', consisting of four bricks of four men, operated separately in a covering role not far away, supported as required by armoured vehicles and helicopters. This strategy was entirely successful and allowed the RUC to re-establish their presence and authority on the streets.

Constant foot and 'mobile' patrolling, the latter mounted in vehicles, together with 'pub checks', early morning 'lifts' to bring in terrorist suspects after incidents in Belfast and elsewhere in Northern Ireland and 'touts' (informants) for questioning, caused the Regiment to be heavily committed. Vehicle registration numbers were painstakingly collected and fed into the RUC database. These operations and the inevitable guard duties became a way of life. A multiple patrol of 16 Squadron came under fire during its second task of the tour as PIRA often tested the skills of a newly arrived unit. The terrorists escaped by vehicle, and there were no casualties. A variety of incidents took place, including assisting the RUC with controlling massed Republican marches held in protest over the 'dirty campaign'

being waged in the Maze Prison. There were no major casualties during the tour.

This tour demonstrated once again how confidently Royal Engineers adapted to the infantry role. They were very flexible; they understood the changing nuances of relations with the local population and were quickly able to adapt their posture as circumstances demanded. This undoubtedly helped in the battle to attempt to win over the 'hearts and minds' of the people in the TAOR.

Engineer role, training, deployment and operations, 1980-1982

The new decade started with an encouraging reduction in terrorist activity after the mayhem of the previous year and, although 86 people died including nine RUC officers and 20 soldiers, 1980 proved to be the least violent year for a decade. This trend was not to continue: 1981 and 1982 saw a marked increase in the death toll.

Sapper force levels remained as a field squadron to each of the three brigades, all under the command of a lieutenant colonel CRE based with a small staff, the DCRE Works and a Search Cell, at HQNI Lisburn. 33 Independent Field Squadron, permanently stationed in Antrim, supported 39 Infantry Brigade. The other two squadrons were provided on roulement by UKLF and BAOR on four-month unaccompanied tours. They were located respectively at Castledillon, a country house outside the city of Armagh, and at Ballykelly, an old RAF airfield in County Londonderry. 325 Engineer Park was co-located with 33 Squadron at Antrim.

Survey was represented in HQNI by a Survey Adviser with a small section. A department within the Mapping and Charting Establishment RE was dedicated to Northern Ireland requirements. By 2000 this representation had increased considerably with the rationalisation of some of the functions in the Headquarters (see Chapter 10).

All roulement squadrons had to prepare for their Northern Ireland tour by ensuring that their manning levels, tactical and trade skills and overall operational capability would meet the challenging requirements of serving there. This was particularly

difficult for BAOR squadrons, which were normally heavily manned with first-tour, combat-trade Sappers who generally lacked individual artisan experience and commanders at all levels whose operational focus was normally on Cold War soldiering. The training package designed for those roulement squadrons deploying in the engineer role was similar to that described earlier for 2 ADER. Inevitably there were differences. It took longer because officers and tradesmen attended refresher training at RSME Chatham and, if time permitted, undertook projects in order to practise their skills. For UKLF-based subunits, the NITAT training was based at Lydd and Hythe Ranges in Kent. The search advisers (RESA) and search teams (REST) were to be employed on High Risk Search (HRS) operations (searches when it was indicated that terrorist devices were likely to be found and where advanced technical search equipment was required) and therefore attended more in-depth training at Field Engineer Wing (from July 1990, the newly formed Counter Terrorist Search Wing) RSME and at Sennelager. Continuation training was undertaken at Ballykinler.

In 1980, 33 Squadron, under the command of Major D. J. (David) Martin, was still based at Antrim in the now re-named Massereene Barracks, which it shared with 325 Engineer Park. The Squadron continued to be deployed on the now traditional range of operations, focussing on Belfast. The construction of the then standard design of observation posts, both single and double-storey, consisting of high-density blocks, mounted if required on Braithwaite towers, was a significant commitment, as were cover-from-view screens, blast walls and anti-rocket mesh to protect sangars. In 1980 a major operation was mounted to construct Whiterock Camp on waste ground adjacent to the Springfield Road and work continued through until 1982. This was the largest Security Forces' base in the city with a perimeter of more than 500 metres. Meanwhile, Fort Monagh, also in West Belfast, was largely demolished except for one platoon's worth of accommodation and fortifications and the land was returned to civil use.

The structures built by the Sappers during the previous decade were beginning to show their age. Efforts were made to reduce

the visual impact of the Troubles by removing unsightly corrugated iron cover-from-view screens and getting the Sappers to replace them with plastic coated cladding (often referred to as 'button-on-fencing') in Belfast, Londonderry and at Security Forces' bases elsewhere. Also, with the reduction in force levels and general improvement in the security situation, many of them had become redundant. Thus many temporary structures in Londonderry were removed by 37 Field Squadron based at Ballykelly; this provided a 'facelift'. The redundant Creggan Camp was reduced by 90%, barbed wire was removed from the famous city walls, and the sangars were removed from the historic Guildhall. The old city gates were also tidied up with profile sheeting that fitted the arches. At border crossings the vehicle check points were replaced with removable road humps to prevent long tailbacks during holiday periods.

During the period of the 1981 Hunger Strikes in the Maze Prison, 33 Squadron was fully stretched including deployments to various Security Forces' bases in Belfast to support hard-pressed units. An upsurge in urban violence saw the return of street barricades and, during a two month period, Squadron plant teams removed barricades and burnt-out vehicles – 850 truck loads – often at high risk to the soldiers involved.

The pressure for Sapper support throughout Northern Ireland remained high. The 3 Infantry Brigade roulement squadron was fully committed during this period to the major construction works in South Armagh. With 33 Squadron under severe pressure in Belfast, the 8 Infantry Brigade roulement squadron from BAOR found itself deployed on tasks in the other brigade areas, proving once again the value of keeping Sappers under central engineer command from HQNI. One interesting task successfully completed in early 1980 by 7 Field Squadron (OC Major E. (Eric) Tait, MBE) was the replacement of an historic, but rotten, pedestrian suspension bridge connecting two Security Forces' bases in Omagh; all components were made in 325 Engineer Park (OC Major A. (Alex) Montgomery).

Between April 1981 and March 1982 Sapper operations continued apace in Belfast. 33 Squadron, now commanded by

Major P. J. (Peter) Mackie, completed some 420 tasks, including removing the base at Glassmullin, previously occupied by 16 Squadron during the infantry tour already described, the demilitarisation of the Grand Central Hotel in the heart of Belfast city centre, work at Moyard, Girdwood Park, RAF Aldergrove and road construction at HMP Maze. In September 1981, 33 Squadron was also given a challenging construction task at Carrickmore, County Tyrone, where PIRA had created a 'no-go' area for the RUC. This was known as Operation *Sheba*. The requirement was to convert a burnt-out country house into a fully protected Security Forces' base in seven days, with only one convoy carrying their required materials. To the Squadron's great credit, this was achieved on schedule and with no casualties. Meanwhile operations continued in Belfast with development work continuing in Whiterock base and improvements to New Barnsley.

The load increased with the departure of the UKLF roulement field squadron in September 1982. 33 Squadron was already supporting 8 and 39 Infantry Brigades. It then took responsibility for all engineer support, including HRS, across Northern Ireland. The well-established criteria for the construction of both temporary and permanent facilities by Royal Engineers continued to be sites where civilian contractors would not work, where the facility was required more quickly than the Property Services Agency could provide, or in situations where it would be undesirable to employ civilians.

Mortar Protection in South Armagh, 1979–1982

Background

South Armagh had been notorious for ambush and outrage since the late 18th century, the Crossmaglen area having gained particular notoriety. Since 1969 the locality had become a focus for Irish Nationalism and a hotbed of Republicanism providing succour to PIRA. The proximity to the Eire border and a sympathetic populace had made it the ideal area for terrorist operations. The country lanes between Bessbrook, Crossmaglen and Forkill, which twist and turn through the inhospitable South

Armagh countryside, provided first class opportunities for terrorist strikes. Movement by police and military vehicles of any sort in South Armagh became unsafe. Even civilianised military vehicles were often recognised by terrorists and ambushed by bomb, bullet or both. Security Forces were therefore forced to use helicopters as their main mode of transport. Repeated attacks on the RUC stations at Crossmaglen and Forkill in the early 1970s required the Army to move in to protect the RUC and thereby assert law and order. In response to the variety of terrorist threats, Royal Engineers had been undertaking protective works in South Armagh since 1971, but in the late 1970s, to combat the increasingly effective methods of attack employed by PIRA – particularly home-made improvised mortars – a crucial decision was taken to apply a more sophisticated engineering solution to the problem of providing protected accommodation in the Security Forces' bases under threat, especially at Forkill and Crossmaglen.

PIRA improvised mortars

Thus far throughout the campaign, PIRA had sought repeatedly to enhance its ability to strike hard at the Security Forces and other targets. In addition to the usual range of small arms, which it employed very effectively, PIRA developed its 'bombing' capability from an early stage, including variations on the IED theme. These consisted of bombs delivered by vehicle; small bombs fixed to the undersides of vehicles designed to kill individuals; and blast incendiaries. They also emplaced massive culvert bombs detonated by radio-control or by command-wire with booby traps intended for the unwary or curious. Arguably, at that time PIRA had developed into the world's most proficient terrorist bomb-makers. One system in particular that demonstrated its ingenuity and thus provided a major challenge for Security Forces was the home-made mortar. As bases throughout Northern Ireland became more heavily fortified, so PIRA placed increased emphasis on this stand-off form of attack. Inevitably, Sappers were called upon to provide additional physical protection for troops and RUC alike; this had to be

steadily enhanced as PIRA increased the sizes of explosive charges in successive marks of warhead.

However, by 1979 PIRA had developed the Mark 10, a mortar that could be fired from the back of a flatbed lorry, tipper truck or from the inside of a specially modified delivery van. The optimum range was generally 60–100 metres. The terrorists often used the radio mast within the Security Forces' base as an aiming mark as they parked the vehicle at the carefully chosen location for the baseplate. There could be as many as ten tubes, each approximately one metre in length and made from modified oxyacetylene cylinders. These were mounted on the vehicle, bolted to the floor and the charges to fire the bombs were connected by detonating cord. The size of the charge in each mortar bomb varied from 20 kilogrammes upwards and was made of home-made explosive. The first occasion this variant was employed was on 19 March 1979 when PIRA attacked the joint RUC and Army base in Newtownhamilton: a soldier from 3rd Battalion The Queen's Regiment was killed, and there were eight casualties including two women civilians. Fortunately the Sappers from 32 Field Squadron who were extending the blast walls and replacing the nearby Helicopter Landing Site (HLS) escaped uninjured. On this occasion the mortars had been mounted on the back of a lorry parked approximately 80 metres from the perimeter wall. Not all the mortar bombs detonated, but seven landed inside the base, which was extensively damaged. The local hotel and nearby shops were also hit. The Mark 10 was not a precision weapon. Nevertheless it was effective in causing Security Forces to commit additional resources to mitigate the significant threat it posed, particularly in the inhospitable environment of South Armagh. Until this time the protection at these sites had largely depended upon extensive blast wall systems.

The requirement

At the Crossmaglen Security Forces' base, soldiers lived in a crude reinforced concrete shelter dubbed the 'concrete submarine', which had been rapidly constructed following a Mark 9 mortar

attack in 1976. At Forkill the situation was even worse. The military accommodation consisted of a rapidly deteriorating collection of timber huts packed into a yard behind the RUC station, overhead protection for which was the familiar screen of chain-link mesh. This offered little protection against the heavier Marks 9 and 10 home-made mortars. At both bases the RUC buildings themselves were of traditional masonry construction reinforced with sandbags and overhead protection, but very vulnerable to the new threat. The Bessbrook base, which housed the battalion HQ responsible for the South Armagh TAOR, was an old mill, which was equally vulnerable to attack; as the helicopter hub for South Armagh, it constantly required Sapper support with protective works. There were other vulnerable Security Forces' locations in the vicinity, notably at Newtownhamilton (mentioned above) and Newry, which was to suffer a Mark 10 mortar attack in February 1985 causing the deaths of nine RUC officers.

Crossmaglen

The first of the new South Armagh protective works projects was the RUC station at Crossmaglen. Conscious of the ever-increasing danger to the policemen in their antiquated building, the Northern Ireland Department of the Environment Works Service developed a design for a three-storey building with an unoccupied (sacrificial) top storey. This was conceived by Peter Rhodes, the Chief Structural Engineer (and a former prisoner of war in Japan during the Second World War), who had been advising the Security Forces on protective works since the beginning of the Troubles. He maintained that buildings should be designed to prevent the heavier Mark 9 or 10 mortars penetrating through the roof or walls. Detonation would be constrained to occur either on the roof, with the sacrificial top storey preventing injury to the occupants, or on the ground beside the building, where a thick reinforced-concrete blast wall would provide protection for the occupants. Normally the DoE would use civilian contractors to construct police buildings, but in the case of Crossmaglen no contractors were prepared to risk



Development of the Security Forces' base at Crossmaglen, showing the sequence of design, aerial view of XMG square and Borucki Sangar. Right: Borucki Sangar construction.





their businesses and probably their lives working for the Security Forces, so the DoE requested that Royal Engineers carry out the work. The design responsibility, however, remained with the Department of the Environment, which made the final inspection before accepting the building.

Successive squadrons faced a range of challenges. For example, it was ironic that, while the infantry lived in blast-proof accommodation, during much of the construction works the troop of Sappers and section of Royal Pioneer Corps that had deployed to build the safer accommodation for the infantry had to live in wooden sheds tucked in a corner behind the helicopter landing site. Initially none of these was protected from the effects of mortar blast and shrapnel and there was no overhead protection. The former was rectified as the highest priority; prayers were said frequently to reduce the risk from the latter! Once the early phases of construction were complete, with much of the tedious excavation done by hand, the erection of a permanent steel-framed building was an exciting prospect. This was not within normal field squadron experience, so the

combined benefits of extensive pre-deployment training on a major building site and the constant presence of the clerk of works from the DCRE Works were immediately evident. It was gratifying that the building was accepted with a minimal snag list, proving that the Sappers could work to the highest civilian standards despite severe operational and logistical constraints. However, civilian plasterers needed to be recruited temporarily from the UDR for the rendering of internal walls to the required finish and accuracy.

Following the completion of the new RUC building, the old police station was demolished by the Sappers to allow the construction of a new Army accommodation block on the vacant site. The project, known as Operation *Troutflies*, comprised a steel-framed, three-storey, mortar-proof building to provide a kitchen, dining rooms, a junior ranks' club, toilets, showers and ablutions for a company group. The building was designed in-house by the DCRE Works incorporating the sacrificial top storey concept. Work started in September 1980 and the building was handed over to the Property Services Agency, who would maintain it, on 4 February 1982. For the first time during the South Armagh operations, a civilian tower crane was hired, and this proved to be an invaluable aid to construction on such a restricted site. Because of the ever-present threat from snipers, this crane was controlled from the ground. A civilian specialist was flown over from the UK mainland to supervise its erection and was lucky to escape serious injury when he was shot in the backside while checking some electrical connections near the boom just before he was due to return home. The troop electrician from 9 Parachute Squadron (Lance Corporal Hall), who was with him, caught him before he fell and brought him down safely, earning Lance Corporal Hall a well-deserved GOC's Commendation.

Forkill

At Forkill, the original plan for the Security Forces' base (known as Operation *Consult*) envisaged the construction of a new fortified RUC station in two phases: the first for the Army and the

second for the RUC. This would have extended the South Armagh projects by another two years. However, in the autumn of 1980 the GOC became impatient with the time and effort needed by both the infantry and the Royal Engineers for this further work and asked the CRE, Lieutenant Colonel R. M. (Mike) Stancombe, to come up with a more economic plan; indeed, he would have preferred it if the construction work could be stopped completely. However, with the DCRE Works being in theatre and under command, the CRE could respond, and so a rapid redesign of the part-constructed building was undertaken to house both the Army and the RUC. This satisfied the GOC's demand, and work continued on site uninterrupted.

Started in January 1979 and the last major building of the South Armagh projects, the Forkill accommodation block was handed over to the PSA on 24 February 1982, with maintenance supervision provided mainly by Sapper clerks of works attached to the PSA. From the outset, as in Crossmaglen, the operation was challenging: tactically, technically and logistically. Stockpiles of the bulk materiel and plant to get the work underway were built up by 3 Field Squadron (OC Major C. C. (Chris) Galloway). 32 Field Squadron (OC Major R. J. D. (Robert) Reid) took over in early February 1979. The construction of the cover-from-view (button-on) fencing, together with the sangars, were initially the top priorities. The threat from terrorist attack on the worksite was very high – the most probable in the early stages was a shooting. While the infantry would 'hard target' patrol out of the Security Forces' base, the Sappers were inevitably required to work out in the open in a field dominated by Bleary Bungalows, an unfriendly housing estate immediately adjacent. A Saracen armoured vehicle with a mounted Browning machine-gun was the only infantry cover that could be provided, while the Sappers had their own self-loading rifles in stacks ready for immediate use. The weather was foul. Snow, sleet and rain beat down daily on the Sapper troop and Royal Pioneer Corps section as they battled to build the concrete bases in the near-saturated ground. Living conditions were very cramped and exceptionally basic. The bid for an immediate supply of arctic clothing for the troops



Forkill Security Forces' base, showing the development of the site and the development of sangar design. The original RUC station is on the left, with Bleary Bungalows on the right.

in both Crossmaglen and Forkill was fobbed off by a somewhat remote staff officer in HQNI with the reply that 'Bids for winter 1979-80 should be submitted in August!' This was met by a blunt response, and hours later the appropriate clothing was en route by helicopter.

A few weeks after completion, on 17 April 1982 the Forkill Security Forces base was attacked by PIRA firing Mark 10 home-made mortars. Five bombs exploded within the perimeter, virtually demolishing the recently vacated RUC station but causing only superficial damage to the new mortar-proof accommodation. There is little doubt that a number of casualties would have occurred without the protection provided by the new buildings. This was a complete vindication of the decision to build such sophisticated structures in this inhospitable setting.

Command and control of Sappers

The four years of construction tasks in South Armagh provided first-class experience of operational force protection work for commanders and tradesmen alike. The squadrons involved over



Above: Forkill sangar design. Below: Operations centre, showing sacrificial roof.



the period were 3, 4, 8, 9, 11, 32, 34, 48 and 59 with assistance from Sappers in other squadrons on occasions. Many lessons were learned – or perhaps relearned. Principal among these was the need to keep Sappers under central engineer command, i.e., by the CRE at HQNI. That said, the field squadrons in Northern Ireland were put in direct support of each of the three infantry brigades, leading to strong-minded brigade commanders and their staffs believing that the allocated squadron was 'theirs', which required much tact and diplomacy on the part of CREs and OCs to maintain control. However, work on the major projects in South Armagh was so complex that an amicable, pragmatic solution was always achieved.

Operation *Tonnage*

The challenges caused by movement restrictions cannot be over-emphasised. Only men, minor items of equipment and some materiel could be moved by helicopter. All major stores, such as bulk materials, pre-cast concrete panels, structural steelwork and construction plant, had to be transported by road and stored until needed in the already grossly overcrowded bases. Equally, redundant materiel and plant had to be removed.

A resupply operation, known as Operation *Tonnage*, usually took between two and four days to complete. It was essentially a brigade operation and required a minimum of two infantry battalions, ten specialist RE High Risk Search teams, several support and light helicopters and up to 80 vehicles: dump trucks, low loaders and plant as well as the usual squadron soft-skinned vehicles. They were organised into as many as 12 'packets', each consisting of six to eight large vehicles in addition to the Land Rover escorts. Squadrons were reinforced by approximately 100 personnel, mostly drivers and some RPC for loading duties at Castledillon. The Royal Army Ordnance Corps (RAOC) Ammunition Technical Officer (known affectionately as 'Felix') and his team, with their sophisticated equipment, were on immediate standby. The concept of operations required the materiel to be stockpiled at Castledillon over a period of weeks to avoid unusually high levels of vehicle movement immediately

prior to the launch of the operation. This helped to maintain surprise.

On D-Day, infantry were deployed by helicopter to picquet the high ground south of Bessbrook along the routes to be taken by the vehicle convoys both in and out of Crossmaglen or Forkill; the roads did not have a two-way capacity. Helicopter top cover was 'on call' throughout. The HRS teams would then deploy under the control of the Brigade Search Coordinator. They meticulously searched the roads, verges, culverts and any other potential IED sites, calling for Felix and his specialists to respond by helicopter in the event of teams locating anything suspicious. It was painstaking, dangerous work, and, as events were to prove, members of PIRA were watching every move. Meanwhile the vehicles to be involved in the convoys had concentrated at Castledillon. Once the route was declared clear, the order was given for the convoys to roll, and the operation continued 24 hours per day until all the material had been safely delivered to site. Castledillon was floodlit by night and was an eerie sight at dawn. The 'chogie shop' there, which dispensed refreshments, did a roaring trade. Such operations could only be mounted every two or three months when as much as several thousands of tons of materials and equipment were moved to site. The importance of accurate forward planning was very quickly appreciated by all those involved.

There was a constant threat of roadside and culvert bombs; the massacre at nearby Warrenpoint in August 1979 being perhaps the most horrific example amongst many in the Campaign.

Appropriate routes in South Armagh for the heavy road convoys during Operation *Tonnage* operations were very limited. In early 1981 and shortly before a major resupply of stores to Crossmaglen and Forkill, 9 Parachute Squadron, commanded by Major I. D. T. (Ian) McGill, received a report that there was a partial collapse of the road between Bessbrook and Camlough. If true this would necessitate a reconnaissance of a different route and a diversion with all the additional planning for High Risk Search and picqueting the new route. The Squadron 2IC (and Operations Officer) and the Search Team Coordinator

(who was also the 3 Infantry Brigade's Search Advisor) undertook a covert reconnaissance using a car brought in from Enniskillen and therefore unknown in the local area. 1st Battalion The Queen's Lancashire Regiment, the infantry battalion covering the South Armagh TAOR, required all drivers to book in and out of Bessbrook under their Standard Operating Procedures. This was to confirm back-up arrangements with a Quick Reaction Force on standby in a Wessex helicopter at Bessbrook Mill. Shortly after checking out of Bessbrook, the 2IC, who was at the wheel, noticed in his rear-view mirror that a black Ford Granada was following close behind them. By this stage, they were committed to driving down a typical South Armagh road with high stone walls on each side and the occasional entrance to small fields. It was an uncomfortable situation. The 2IC, having warned his colleague, forced the Granada to overtake by suddenly braking hard and turning into a field. Almost immediately there was a massive explosion, which threw up a large amount of debris. The 2IC, fearing an ambush linked to the explosion, immediately reversed out of the field and along the road heading back towards Bessbrook, his car being struck by falling debris – its bonnet was dented and rear window shattered. During the follow-up operation over the next few days, while the Operation *Tonnage* operation was still under way, it became apparent that a local man who ran a small business near Crossmaglen had been driving the black Granada. His car had been sent flying nearly 200 metres by a culvert bomb consisting of an estimated 400 kilogrammes of explosive. The command wire from the culvert was traced to a firing post on a hillside, and HRS teams discovered there was a well-planned escape route for the terrorists. Fortunately for the 9 Squadron officers, the high walls on the section of the route approaching the culvert made them invisible from the firing point. The bombers, who had been warned by the PIRA OP overlooking the Bessbrook Mill base that the 'next car' was the target, therefore mistakenly detonated the bomb under the Granada, which at the critical time had just overtaken the 'target car'. As an aside, due to lack of qualified drivers during Operation

Tonnage, the CRE was the driver of one of the heavy goods vehicles in a convoy from Castledillon to Crossmaglen in the early hours of the morning.

There were occasions when, not every eventuality being foreseen, an urgent operational requirement would develop requiring the movement, for example, of a piece of plant to either Crossmaglen or Forkill. With the blessing of the brigade commander, a swiftly executed operation, known as a 'flit', would take place. A small convoy, often led by the OC, would move rapidly down the narrow lanes in the dead of night to deliver the crucial equipment to site. There was sufficient firepower within the vehicles to ensure that, should any PIRA illegal vehicle checkpoint be encountered en route, the terrorists would be given a very sharp shock.

The Closure of Castledillon

Following the completion of the South Armagh projects, in line with the GOC's policy of normalisation, brigade responsibilities were reallocated, resulting in the disbanding of 3 Infantry Brigade, so the UKLF RE roulement was reduced from a squadron to a troop in August 1982. As the last full squadron, 32 Field Squadron (OC Major J. E. (Jim) Snape), had a very busy tour closing down the Castledillon base while finishing off the South Armagh projects and building two houses at Ballykinler for search training, together with other more routine tasks in support of 3 Infantry Brigade. The closure of Castledillon included the removal of the wrought-iron gate decorated with the emblems of each of the squadrons that had served there. The idea had been conceived during 8 Field Squadron's tour of October 1975 to February 1976 (OC Major R. I. (Robbie) Reive). Sappers Jones and Barnard constructed the gate with assistance from 325 Engineer Park and it is now in the RE Museum at Chatham.

The skill and determination displayed by successive squadrons in South Armagh during these operations was well recognised. One squadron commander recalls Brigadier David Thorne, the highly charismatic commander of 3 Infantry Brigade, standing

on the steps of Castledillon in June 1979 addressing the officers and soldiers before they returned to the UK Mainland at the end of their tour. His stirring words included the remarks: 'Be very proud of what you have achieved here; go back home and tell everyone – your families and all your friends what you have done.' Everyone immediately grew inches in height – they had all succeeded, and it had been noticed.

Waning Press Interest

During first part of 1982 and for some time thereafter, the Falklands War caused operations in Northern Ireland to be squeezed off the front pages of national newspapers, which irritated soldiers serving in Northern Ireland who were risking their lives daily. By this point the Troubles had been going on for 13 years, but inevitably the public's attention was drawn to this new conflict taking place in the South Atlantic.

The Droppin' Well bar atrocity

1982 ended on a low note with the horrific bombing by INLA of the *Droppin' Well* bar in Ballykelly in December. Seventeen soldiers and civilians were killed in that atrocity. 33 Squadron immediately deployed search, plant and combat engineer support for two days to assist in the recovery of bodies and making the area safe.

During 1982, 112 people died including 12 members of the RUC and 39 soldiers, including UDR.

1983–1984

The next two years saw a steady reduction in terrorist activity. The escape of 38 Republican prisoners from the Maze Prison in September 1983 was a setback, but 19 were recaptured almost immediately. 1984 ended with more hopeful prospects. The total number of people killed in Northern Ireland during that year was 72, compared with 87 in 1983 and 112 in 1982. (As a further comparison, there were 29 victims of the Troubles in 1970, 180 in 1971 and 497 in 1972.) Worrying trends were the increase in sectarian murder and the ongoing punishment

beatings, which were numerous, virtually all by Republican gangs.

During this period the RUC increasingly took primacy in Security Forces' operations, but the Sapper workload never seemed to reduce. The reason was that there were fewer Sappers to deploy, there having been a steady rundown of RE squadrons, and DCRE Works was temporarily disbanded. The last roulement squadron had left in 1982. There remained only 33 Squadron and 325 Engineer Park, both of which were resident, supported by a roulement troop from BAOR and UKLF alternately. This troop, trained specifically for HRS operations, comprised 40 all ranks. 33 Squadron consisted of an HQ Troop, three field troops, a support troop and its own REME workshop, which amounted to some 250 all ranks. Major G. (Gordon) Macdonald took command in early 1983. By this stage, construction designs and methods to improve protection were developing as the realisation dawned that there was no foreseeable end to the campaign. Pre-cast concrete components were introduced and the standard high-density-block mortar-protection walls were replaced by concrete slabs slipped between vertical rolled-steel joists. The high-density block sangars were superseded by ones of a concrete slab design, often built around armoured-plate shells.

An establishment proposal to remove the post of CRE was implemented in 1984 despite being resisted by almost everyone except the Establishment Committee. In that Spring the CRE, Lieutenant Colonel F. A. F. (Francis) Daniell, departed leaving the SO2, Major A. A. (Alasdair) Wilson at HQNI with OC 33 Squadron, Major G. (Gordon) MacDonald, and OC 325 Engineer Park, Major D. M. (Stan) Holloway to form a triumvirate of RE command and control. But eventually sanity prevailed: the CRE role was reinstated, and some months later Lieutenant Colonel J. G. (Jim) Barber arrived.

Attack on Andersonstown RUC station

On 24 May 1983, PIRA attacked the rear of the RUC Station in Andersonstown, West Belfast. This report, by Colin Brady, appeared in *The Daily Telegraph* the following day:

14 CATHOLICS HURT IN IRA BOMB BLAST

Fifteen people, all but one of them Catholics, were injured yesterday in a huge bomb blast on a heavily fortified Belfast security base by the IRA. Two shops were ruined and more than 100 houses damaged in the explosion which happened during a busy shopping period.

A baby, a woman of 85, a man of 73 and one policeman were among the casualties. The policeman was the only non-Catholic. Police said the 350kg bomb was one of the largest to go off in Belfast for more than a year. The bomb had been loaded on board a van at gunpoint. The driver was told by the terrorists that he would be killed if he did not follow their instructions to ferry the explosives to the joint police-army centre at Glen Road. On arrival at the centre, a target for many previous attacks, the driver yelled a warning and the police began evacuating the district. Within five minutes, however, before the operation could be completed, the van exploded. The centre's car compound was devastated. A water main burst, flooding streets. A row of houses, abandoned because of previous IRA attacks on the security centre, was demolished. At least two shops, including their contents, were ruined.

One eye-witness said: 'There was smoke and dirt everywhere and people were rushing about and screaming. A few people fainted and several others were shocked and crying.' Another said: 'Doors were blown off their hinges and window panes just disappeared. Younger people were helping old people to get out of their homes, including an old lady who was using a walking frame.' A woman whose shop was destroyed said: 'Everyone in the area is mad, just mad, that these crazy people should bring this bomb into the area.' Assistant Chief Constable William McAllister said: 'This is not necessarily connected with the election at all. The distress, injury and upset caused to people who live around here is indescribable.'

There was very extensive damage to the base as well as to the local properties. No one was killed, the blast wall system playing a crucial role in preventing Security Forces' deaths. 33 Squadron was tasked with the demolition of the five terraced houses that had been largely destroyed in the blast, clearance of rubble from site and the immediate construction of a temporary security perimeter. The location and importance of that RUC Station in the heart of this strong Republican area, with Sinn Féin offices some 300 metres away, dictated that the facility should be reopened at the earliest opportunity. The Squadron enabled this

to happen; it was open for business the following day and continued to operate throughout the period of the rebuild, which also provided the opportunity to extend and improve the base, including the erection of a 'super-sangar' overlooking the junction of the Falls and Glen Roads. This was known as Operation *Historian*, which ran from 13 June until 27 October 1983. A troop of Sappers, augmented by a platoon of RPC, worked continuously to complete the task.

Meanwhile 33 Squadron continued to be involved in a range of other operations. A high priority among these was the requirement to upgrade protection against the increased threat posed by RPG attacks. Designs were modified to enhance stand-off, and there was an increase in prefabrication at Antrim. Partially completed sangars, for example, were transported to site by vehicle or under-slung from support helicopters. They also undertook large-scale modernisation tasks at Fort Whiterock in West Belfast and Fort George in Londonderry.

Further operations in Crossmaglen

On 2 and 3 August 1983, 33 Squadron with an HRS search advisor and search teams from 16 Squadron undertook Operation *Joust* to refurbish the HLS within the Security Forces' base in Crossmaglen and to replace the Borucki Sangar. This had originally been installed in 1977 to keep the village square under surveillance after the baseplate used for a mortar attack on the nearby Security Forces' base, had been set up there. (The sangar was named after 19-year-old Private Borucki, Parachute Regiment, who had been killed on 8 August 1976 by a radio-controlled IED strapped to a bicycle left in Crossmaglen Square.) However, at 2213 hours during the evening before a two-day Operation *Tonnage* to move the prefabricated sangar to site and complete that task, PIRA mortared the Security Forces' base from a baseplate not far from the village square. There were no casualties and minimal damage had been caused, so it was decided to go ahead with the operation as planned. A troop was flown in by helicopter at first light and began stripping the sangar. But at 1006 hours there was a further explosion: an



Above: Andersonstown RUC Station, Belfast. The super sangar/lowloader, linked to the rebuild after the 1983 VNIED. Opposite page: Design development after seventeen years.

attempt by PIRA to kill the search teams clearing the area of the firing-point used in the mortar attack the previous evening. The operation was delayed for a couple of hours, but by mid-afternoon it resumed; the existing sangar was dismantled. The final phase of the operation involved the move of the new prefabricated sangar, initially by road from Antrim and then by Chinook to Crossmaglen. This was successfully completed, and the sangar was installed with no further PIRA interference. Meanwhile the plant team undertook the resurfacing of the HLS. The full details of the linked High Risk Search operations are told later in the Chapter.



Border closures

Border crossing points continued to be on the list of commitments, and numerous operations were launched to keep them closed, either by demolition and cratering or by placing obstacles to deter traffic. However, there was an overall drop in the number of operations from the 1970s as it became clear that they were largely ineffective unless covered by observation. They

also totally alienated the local population, and in many cases the ingenuity of the locals (sometimes for purely legitimate commercial reasons but more often for smuggling or other illegal purposes) soon overcame the road blocks. For example, a border crossing 'closure' in Fermanagh was open again 48 hours after Sappers had spent 24 hours or so emplacing two massive concrete barriers. The CRE had to explain tactfully the outcome to 'the powers that be' within HQNI.

33 Squadron had a similar experience closing a crossing near Castlederg. After battling in poor weather conditions to emplace a Braithwaite tank full of ready-mixed concrete and protruding sections of rail, the team withdrew. Two days later, a group of local residents appeared, accompanied by radio and TV crews. They were equipped with a tracked excavator, which proceeded to prepare a large pit into which the obstacle was tipped. They then backfilled the hole, compacted the ground and their route was reopened.

On another occasion, the demolition of one border crossing over a narrow stream caused an international incident when Eire claimed to own half of the simply supported bridge and refused permission for it to be removed. The solution was to build a pier in the middle and only knock down the northern half. A senior Sapper had to brief the Secretary of State on this solution and was ordered to fly down to ensure that it happened. While on site, he crossed the border to the south to relieve himself beside a bush. He was interrupted by a sergeant in the Garda Síochána who had been sent to ensure the compromise was fulfilled. When seeing what was going on, he solemnly intoned: 'Typical of the British Army which has done nothing but p*** on Ireland for centuries.' He then burst out laughing and an amicable afternoon was passed by all. The demolition went to plan but was repaired by the locals the following week.

The construction of the hilltop OPs in South Armagh later in the decade were to be of greater operational effectiveness than the successive attempts to close the border crossing points by means of physical obstacles. Surveillance did indeed prove to be a more useful tool.

Planning guides

In 1983 a guide for Royal Engineers in the planning and design of defensive works for the internal security situation in Northern Ireland was published by HQRE. It was followed the next year by Captain J. R. (John) Durance's handbook entitled *Materials and Structures for Protection Against Blast and Penetration Weapons in Northern Ireland*. Both of these reflected the documented experience and the considerable amount of experimental work that went on throughout the campaign, both in theatre and elsewhere, much of it by Sappers.

Hijackings

The threat of vehicle hijackings by Republican gangs, often during periods of rioting at times of various anniversaries, was ever present. To illustrate the role of Sappers in minimising the effects of this on the rest of the population by keeping main routes clear, in August 1984 over the period of the 13th anniversary of internment, 33 Squadron deployed plant teams to Fort Whiterock and North Howard Street Mill in West Belfast. As rioting broke out on 8 August, with stoning and petrol bombing of Security Forces, vehicles were hijacked and set on fire. Buses were particularly attractive targets for the lawless mobs; RE plant teams cleared them. During that year the rioting continued until 19 August, ten days after the anniversary itself.

1985–1986

The Anglo-Irish Agreement

The overall level of terrorist violence during 1985 had fallen to the lowest point for 15 years, and in November that year a major political milestone was reached with the signing of the Anglo-Irish Agreement. For the first time, it gave the Irish Government a significant say in the affairs of Northern Ireland. However, even by that stage, there were worrying signs of a new PIRA campaign of bombing and mortaring RUC stations and detonating landmines. With 13 stations being attacked and 11 policemen

killed, including nine during a Mark 10 mortar attack on Newry RUC station on 28 February 1985, the intimidation of contractors also delayed a number of Security Forces' construction operations. Public order problems increased throughout the year, due largely to unease and frustration among Loyalists about the Anglo-Irish talks. Altogether 260 police officers were injured as a result of public order incidents.

A notable but brief Sapper task in support of the Anglo-Irish talks was the fencing of Stormont during the night of 10 December 1985. The GOC was concerned that the proposed meeting on 11 December, the first between the British and Irish governments in Northern Ireland, was likely to be disrupted by Loyalist sympathisers, so he asked the CRE to fence off the area. The CRE called a meeting to plan the operation on the morning of 10 December. Present were OC 20 Field Squadron, Major P. (Philip) Lilleyman, recently arrived in theatre for Operation *Niccola* (described later) and OC 325 Engineer Park. The task was to construct 2,500 metres of Type 4 modified highwire fence during that night and it was agreed that this could be achieved by the complete Squadron if access and supplies of materiel were not disrupted. The plan was to begin work at midnight and complete the task by 0630 hours, when the first locally employed workers were due to arrive. HQNI was to provide infantry as security, but no major deployment was to be obvious until all local staff had vacated the area. It took time to concentrate 20 Squadron from their various Operation *Niccola* working locations into Armagh Barracks, but this was achieved by 2000 hours. Orders were given and the Squadron briefed, fed and rested in the early evening; then the convoy deployed from Armagh to arrive at Stormont by midnight. Concurrent with their arrival were vehicles delivering the defence stores from 325 Engineer Park. These were dumped at pre-agreed points around the perimeter. The task had been completed by the deadline, and national television showed Ian Paisley, somewhat thwarted, and several hundred supporters unable to gain access to disrupt the talks. The subsequent signal to 20 Squadron and 325 Engineer Park from the GOC read:

'From GOC, CLF joins me in thanking you for carrying out such an efficient Op last night. Your sound organisation, professionalism and flexibility! are most appreciated. Well done ...'⁸ Most of the engineer activity during this period was dominated by the need to counter PIRA attacks on bases involving the use of home-made mortars, RPGs and IEDs. The frequency of attacks rose each year from four in 1984, 18 in 1985 and 30 in 1986; there were 12 RUC and two Army fatalities in these attacks. Additionally, in Londonderry, improvements were made to the Security Forces' bases at Rosemount, Masonic and Fort George.

More mortar protection

1985 was again the year of the PIRA Mark 10 mortar and the threat widened. Thwarted by the creation of mortar-proof bases in South Armagh, PIRA predictably launched attacks on other bases across Northern Ireland. There was a significant increase in the use of the single-tube portable version and an eighteen-tube model was used to attack RUC Enniskillen on 4 September. The workload for 33 Squadron inevitably increased sharply in the wake of these successful PIRA attacks. 1985 also saw the beginning of an intimidation campaign directed against the senior management of construction and building supply firms that carried out work for Security Forces. Both the RUC and Property Services Agency lost contractors on major projects and many small firms refused to deliver resources direct to site.

In mid-1985 the CRE was tasked by the GOC to conduct a survey of all Security Forces' bases to review the mortar protection and to recommend improvements at more than a hundred locations. His three main recommendations concerned improving protection using blast walls, increasing the shatter-proofing of windows and the repositioning of incoming mortar alarms in sangars. All these recommendations were accepted and the programmes for window shatter-proofing and mortar alarms were passed to the Priority Services Agency. The task of blast-wall construction became a Sapper responsibility known as

Operation *Niccola*. The MOD pressed for early action and a roulement squadron, 20 Field Squadron, was warned for a four-month emergency tour starting in November, supplementing the work already started by 33 Squadron, which was commanded by Major S. R. (Steve) Lewis. The work was undertaken at 30 Security Forces' bases, including RUC and UDR sites, assessed in priority of threat. Other work, of lower priority, was passed to the PSA. Local adaptations of the blast wall designs were well within the capability of the two squadrons, and the pre-tour training at RSME ensured that 20 Squadron was well versed in the necessary construction techniques. Reinforced concrete slabs were obtained from a local manufacturer, who did his best to meet the stated requirements, but there were inevitable delays because he would not deliver to site and would not allow collection from his works. In the end a 'dead letter box' system was used, trailer loads of slabs being left for collection in lay-bys. In the event, the operation went according to schedule and finished at the end of March 1986; in five months the two squadrons had laid a total of 3.1 kilometres of blast walls in those 30 bases.

In the first two weeks of December 1985, three RUC stations were destroyed by terrorist action. At a meeting at the Northern Ireland Office, the CRE was asked if Royal Engineers could construct a bomb-proof, two-storey police station at Ballygawley as quickly as possible. The Police Authority of Northern Ireland wanted a replacement station. Based on experience with the recent Operation *Niccola*, the CRE pointed out that obtaining materials would be crucial to the time schedule; however, to short-cut this it would be possible within two months to build a simple structure protected by a blast wall; this would be capable of defeating a Mark 10 mortar detonating on the roof or nearby on the ground. It was quickly appreciated that the initial design should be done by the Department of the Environment (NI), who were the agents for PANI and therefore in the best position to 'sell' the configuration to the RUC. On 17 December the Secretary of State, Tom King, gave his approval for RE assistance for the rebuilding of RUC Ballygawley (Operation

Jole 1) to be followed by RUC Toomebridge and other RUC stations (*Operation Jole 2*).

It was clear that the extra workload was much too great for the CRE and his SO2 to handle, so HQ EinC (A) agreed to re-establish the DCRE Works post with Captain J. F. (Jan) Harper arriving on 2 January 1986. Because of the short timescale between design completion and the start of the work on site, modifications had to be made to the plan to ensure that only resources known to be available were included in the purchase list. Changes were also made to the original design to bring the methods of construction into line with RE construction procedures. All amendments to the original plan were made by the Design Cell of DCRE Works. The CRE had to resist all but the most minor changes in order to achieve completion by the end of 20 Squadron's tour.

Some difficulties were experienced with roof design. The CRE had been assured that the thickness of armoured plate would defeat the kinetic energy of a Mark 10 mortar round, but he had some reservations with this theory, and the RUC had even greater difficulty, so he persuaded them to sponsor a trial at the Royal Armament Research and Development Establishment (Fort Halstead). Using an old 25-pounder field gun, they fired a shell of the correct weight to simulate a Mark 10 mortar round. It was deemed to be so dangerous that only the Commander Ammunition Technical Officer (CATO) was entrusted to fire it. The final trials took place at the Magilligan ranges and proved the effectiveness of the steel, until the CRE requested an oblique-angled firing. The round passed straight through the armoured plate. What ultimately proved effective was a sandwich of timber and steel: the outer skin of timber was found to reduce significantly the cutting action of the mortar bomb. It also allowed smaller steel sections to be used. This became known as the *Operation Widgeon* type roof.

The provision of resources for this task tested to the full the ingenuity of 325 Engineer Park, (OC Major D. M. (Stan) Holloway). Due to the intimidation of suppliers, several devious methods of supply had to be instigated to ensure work was never

held up including the setting up of 'front' companies (complete with VAT registration). The use of 'dead letter boxes' for stores collection became the norm, and armour plate had to be delivered from Germany and the Channel Islands. Inevitably, because completion of a six-month task was being attempted in only eight weeks, some of the materials had to be ordered before the design had been approved by PANI. The most critical resource was ready-mixed concrete. No supplier was prepared to deliver this to site, and the majority of local firms would not allow collection of it from their plants even using the Sappers' civilianised concrete delivery vehicles. More than 40 deliveries were made from plants as far away as Omagh and Antrim with each vehicle being escorted by civilian cars. Because such movements were being scrutinised, the registration number of each vehicle was changed after every run and the cars resprayed a different colour once a month.

The project at Ballygawley was completed on 26 February 1986, just two days before 20 Squadron left Northern Ireland at the end of its roulement tour. The Parliamentary Under Secretary of State at the Northern Ireland Office, Nicholas Scott, opened the station and in a subsequent letter to the CRE said that

the Sappers did a great job providing the RUC with a secure and morale boosting base from which to work ...⁹

Yet again the versatility of the Sappers was shown when, in the midst of this already challenging tour, Squadron HQ and a troop of 20 Squadron were redeployed into Armagh as infantry immediately following the murder of two RUC constables by a command-wire IED at one minute past midnight on New Year's Day 1986.

Operation *Jole 2*, undertaken by 42 Field Squadron, commanded by Major A. S. (Andy) Craig, primarily consisted of the construction of a new police station at Toomebridge, the building of 750 metres of perimeter and cover from view fence at RUC Enniskillen and the enlargement of two helipads at Bessbrook Security Forces' base, complete with a new perimeter fence. All the pre-planning had been completed by DCRE Works.

Each troop had carried out construction training at the RSME based on the drawings that had already been produced and using resources and specialist equipment similar to those found in Northern Ireland. Construction troops were therefore fully conversant with Acrow, a modular formwork, button-on fencing and concrete pumps as well as having had general construction practice refresher training.

The building at Toomebridge was three times larger than that at Ballygawley and incorporated all the improvements gleaned from 20 Squadron's experience. DoE(NI) found a contractor who was prepared to fit out the interior, so 42 Squadron was required to construct the protective shell to Mark 10 mortar blast-protection standard. The task involved the construction of protective blast walls with cover-from-view fencing around the perimeter and the demolition of the existing station. Work started immediately on the perimeter walls and went according to plan; double-skin blast walls were filled with concrete rather than sand because it was easier to pump concrete than lift sand to the required level. The placing of the concrete roof was completed in one 135-cubic-metre pour lasting 24 hours, using the fleet of five concrete delivery vehicles from 325 Engineer Park.

Additionally, 42 Squadron repaired the damaged RUC stations at Coalisland, Belcoo, Enniskillen and Bessbrook. Meanwhile 33 Squadron repaired RUC Carrickmore. This entailed the deployment of a troop for four months and included four major resupply operations, all entailing the commitment of infantry as picquets, RE Search Advisers and Search Teams. All these tasks were technically difficult and presented many operational and logistic challenges such as those described earlier. The ability of the BAOR-based roulement field squadrons to complete such work ahead of schedule and to a very high standard was a fine example of Royal Engineers' flexibility and resourcefulness.

The repair of RUC Coalisland included the installation of a mortar-proof roof. This was the first of the Operation *Widgeon* designs developed in-house by the DCRE Works. These roofs were the natural follow-on to the Operation *Nicola* blast walls



Mortar protection development in 1986. Coalisland. Operation *Widgeon* structure.

and together they provided a complete envelope of protection to temporary buildings. Between June and November 1986, 30 Field Squadron from BAOR (OC Major J. A. (John) Pinel) erected 21 Operation *Widgeon* roofs and completed other tasks at Army bases across Northern Ireland, including Armagh, St Angelo, Kinawley, Coalisland, Clady Permanent Vehicle Check Point (PVCP), Fort George in Londonderry, Newry, Rathfriland, Kilkeel, and Woodburn in Belfast. The scale of the operation is indicated by the fact that the roof at RUC Newry incorporated 160 tonnes of steel. 33 Squadron's contribution to this operation took from August 1986 until February 1987.

A troop from 30 Squadron rebuilt the permanent vehicle check point at Clady (Operation *Foil*) as it had been totally destroyed by a large vehicle borne IED. The Squadron also constructed more Operation *Nicola* blast walls at Coalisland, and while the troop was deployed there, initially erecting cover-from-view screens, two shots were fired at the base. The troop took cover – including

the driver of a fork-lift, leaving his mate stuck up in the air in a wooden crate suspended on the forks. All survived, but the fork-lift driver's credibility took a beating. The Squadron also established a concrete batching plant and aggregate storage bins on the airfield at Ballykinler to reduce the effects of contractor intimidation.

A section and plant operators were also attached to 33 Squadron during the summer of 1986 to remove obstacles and barricades. Back in the 8 Infantry Brigade area they closed roads and bridges during the Apprentice Boys' march. All 30 Squadron's tasks were completed before they redeployed to BAOR. They were awarded three MIDs and eight GOC Commendations.

Other operations

In 1985, 33 Squadron rebuilt permanent vehicle check points in the 8 Infantry Brigade area including Killyvilly, Buncrana and the Muff. In Belfast there were intensive operations at the Crumlin Road Jail with the construction of new sangars and a cover from view fence. This was followed during 1986 by the continued refurbishment of the PVCs at Lacky Bridge, Buncrana and Clady. Again during that year, the Security Forces' base at Crossmaglen was upgraded. All the sangars and part of the perimeter wall were replaced by 33 Squadron under the



Muff VCP – Victor 3 – permanent VCP, showing the range of Sapper talents and capabilities.

codename Operation *Dundee*. This demanded a seven-day resupply operation with 1st Battalion The Prince of Wales Regiment and a company from 1st Battalion The King's Own Scottish Borderers providing the picquets from Newtown-hamilton to the work site. In 1986, 33 Squadron reacted to terrorist attacks on RUC stations at Cloughmills, Clady, The Birches, Newry and the PVCs at the Hump, Buncrana and Kinawley.

Tributes

The enormous amount of work carried out by the Royal Engineers to combat the threat from the PIRA campaign to attack RUC and Army bases received public recognition in 1987 from Sir John Stanley, the Minister for the Armed Forces, who paid a special tribute when he opened the Parliamentary debate on the Army by saying:

If any year in Northern Ireland deserved to be called the year of the Sapper it was 1986. By the end of last year the Sappers had completely rebuilt two police stations and increased protection at 30 other police stations and Army bases. In addition the Royal Engineers themselves designed new forms of blast walls, a new design of protected accommodation for police stations and a new type of roof to overcome the effects of a mortar bomb. In the past year there is no doubt that lives have been saved and injuries prevented as a direct result of the additional protection provided by the Royal Engineers.¹⁰

And in a letter from the Secretary of State for Northern Ireland to the Defence Secretary, copied to the Prime Minister and senior members of the Cabinet, he said:

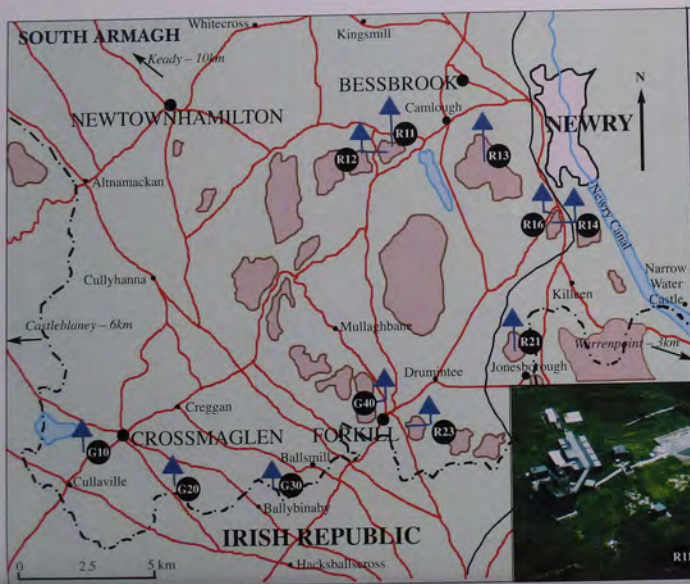
I must take this opportunity to put on record for you and your colleagues to whom I am copying this letter my profound gratitude for the efforts that the Sappers have so far made and are still making in support of the Police. There can be no doubt that their flexibility, capacity for hard work and ingenuity in procuring materials in the face of the Provisional IRA threats is an inspiration and a very significant boost to the morale of every policeman in the Province.¹¹

Hilltop Observation Posts in South Armagh, 1986–1987

PIRA operations launched from across the border continued to be a constant threat, and, as mentioned above, attempts to close the routes never achieved any long-term success. In the mid-1980s it was decided on the recommendation of the CRE, Lieutenant Colonel D. P. (David) Stephenson, to erect a series of permanent hilltop fortified observation posts (OPs) on isolated sites in South Armagh. The initial concept had been heliportable patrol bases, each consisting of a nine-man accommodation unit and basic sangar. These would be moved frequently in support of patrol operations. This developed into a series of static bases on hilltop sites, designed to gain intelligence through observation. The concept was subsequently re-examined, the operational requirement developing into the provision of an observation platform and sangar in which a GPMG would be mounted. There was to be accommodation for cooking, eating and sleeping plus



South Armagh observation post.



OBSERVATION POSTS

- | | |
|-------------------|------------------|
| G10 Creevekeeran | R13 Camlough |
| G20 Drummuckavall | R14 Cloghogue |
| G30 Glassdrumman | R16 Cloghogue |
| G40 Croslieve | R21 Jonesborough |
| R11 Sturgan | R23 Foxfield |
| R12 Sugarloaf | |



G10



R11



R12

space for stores and ablutions. The sites were to be both weather and bullet proof. All access would be by helicopter and each base had to be self-supporting.

33 Squadron, commanded by Major G. R. C. (Guy) Munnoch, undertook the construction of the OPs. The first sites in the programme were constructed in the Forkill area under Operation *Condor*. They were known as the 'High Romeos' because of their callsigns. An additional three OPs were constructed elsewhere in South Armagh under Operation *Magistrate*. The initial phase, Operation *Entirety 1*, involved bringing in some 1,600 tonnes of materiel. In seven days the Sappers completed the erection of three temporary elevated sangars, underground living accommodation



South Armagh observation post and helicopter landing strip.

with overhead protective cover, connecting trenches, a temporary water supply and the grillages for the main towers. Under Operation *Entirety 2* in July 1987, the towers were constructed and the other components were flown to site. The fortifications were reinforced and mains electricity installed before the onset of winter. Ultimately there were interlocking arcs of surveillance from Bessbrook to Crossmaglen. They were manned by rifle companies and provided Security Forces with the significant advantage of permanent surveillance capability and the ability to coordinate operations more effectively. Inevitably these OPs were very unpopular with the local people and Sinn Féin constantly called for their removal, but as noted above they were more effective than the physical border closures.

The need to develop and refurbish the hilltop and other Security Forces' bases in South Armagh was an ongoing and challenging responsibility for 33 Squadron. During 1987 a series of operations was mounted including Operation *Bullet*, commanded by 39 Infantry Brigade, lasting for three weeks. There were three engineer tasks, which ran concurrently. The first, preceded by the usual High Risk Search route clearance and picqueting, involved a troop constructing major enhancements to the OPs at Creevekieran, Glassdrumman and Drumakavall. The sangars were upgraded and underground accommodation protected by overhead cover was enhanced. Meanwhile, a troop completed the reinforcement of the roof of the accommodation block in the Crossmaglen base and the third troop yet again replaced the Borucki Sangar in Crossmaglen square. This was of three-storey, steel construction, complete with mains water and electricity. In the latter part of 1987, the original Operation *Condor* sites were refurbished with newly designed prefabricated accommodation units, and the helicopter landing sites were upgraded. The continuing need to work on these crucially important installations was evident through 1988. Detachments of 33 Squadron deployed through the summer to improve a total of five.

During such operations an important lesson in design was learnt. The OC, Major G. R. C. (Guy) Munnoch, recalls:

Landing a helicopter at a location where metal CFV screens are being fitted would not, on first reflection, seem to pose a hidden problem. It only does where the site is relatively small and the Sapper section completes the erection of the all-round screens in the time between the helicopter landing and before it takes off again. The pilot therefore was dumb-founded when he found that he could not get airborne despite having landed without a problem. Many hours of mechanical and aviation checks later revealed that what was missing was air-flow. The site screens had been dutifully built from the ground up and no Sapper handbook had ever mentioned that helicopters need a circulation of air to take-off. That is what learning is all about!¹²

1987-1988

The continuing requirement to provide protection to RUC and Army bases required further reinforcements. 51 Field Squadron commanded by Major G. M. S. (Graham) Talbot, which was due to fly to Cyprus on exercise in early 1987, was warned in the preceding October that instead they would deploy to Northern Ireland between February and June 1987. After the full NITAT package, together with specialist construction training, they deployed with more than 210 personnel, including an RPC platoon. The majority of the Squadron with one field troop was based at Ballykelly; the other field troops were at the RUC stations Rosslea and Plumbridge. The resources element was split between 325 Engineer Park at Antrim and a forward base at St Angelo. At Ballykelly, on Operation *Gala*, the troop constructed a steel-framed, single-storey operations building in the high-security compound, a task that demanded the full use of Sapper artisan skills and a high quality finish. Meanwhile at Rosslea, located in a hostile area and close to the border, the second troop constructed a prefabricated, steel-framed and reinforced concrete station for use by the RUC. This was adjacent to the existing building. They also provided the standard cover-from-view fencing and an elevated sangar. The operation did not include the internal fittings, which were undertaken by civilian contractors who were flown in. For fear of identification and subsequent reprisals they remained within the base, protected by the shell of the building,

until they had finished. As in South Armagh, the issue of logistics demanded careful planning and skilful execution. Materiel was moved in a similar fashion to that described for Operation *Tonnage*, initially from either Ballykelly or Antrim to St Angelo, where it was stockpiled before being transported to Rosslea via Enniskillen and Lisnaskea. Concrete pours were done during these operations and required long hauls by ready-mix trucks. These had to be coordinated into the overall plan. A further challenge was to move a ten-wheeled crane into the base in order to lift a prefabricated sangar into position at the front of the new building.





Operation Amulet, 1987, before, during and completion of operations, showing the range of activities in rebuilding an RUC station at Rosslea.



These operations were successful despite just one narrow route in and out, which was picqueted by infantry in the time-honoured way. At Plumbridge the third field troop had to demolish the old, large, two-storey RUC station before commencing the build of the new prefabricated building similar in concept to that at Rosslea. The rubble produced exceeded expectations and enabled a new HLS to be created in the field adjacent to the site. Operation



Above: Operation *Amulet*, 1987, Plumbridge, undertaken by 51 Field Squadron. The old RUC station before reconstruction. Below: Pumping concrete during construction.



Tonnage procedures were employed here, although the threat level did not demand the same level of picqueting.

Sapper versatility came to the fore in an unusual civil aid task. A request was received by 51 Squadron to drag the carcass of a ten metre long dead whale washed up on the beach at Magilligan Point to above the high-water mark where academics wanted to study the bone structure. Unfortunately, on the sand no amount of available plant power could shift the deadweight, and it was left to a Squadron diver dressed in full suit and mask to overcome the stench and gore and cut the beast into smaller chunks with a chainsaw. All in a day's work!

As the operational workload in Northern Ireland continued to exceed the capability of 33 Squadron, a further one-off roulement was planned. Having been 'on the bus, off the bus' for a variety of tasks, 37 Field Squadron commanded by Major J. F. (John) Crompton, deployed in February 1988 to Ballykelly for Operation *Gala 2*. Detaching an HRS troop to 33 Squadron, the remainder, some 130 strong including a small RPC platoon, was tasked with the construction of a modular accommodation block on the airfield. In typical Royal Engineers fashion, they had to build their own living quarters within an empty storage shed before they could commence. Significant ground works were required, and in order to ease the logistic load the old concrete batching plant, which stood proudly in the middle of the main runway, was re-commissioned. It did sterling service for both *Gala 2* and a variety of other construction tasks to the west. The accommodation units with their attached kitchen and dining facilities were designed by the Military Works Force to fit in 40-foot containers prefabricated on the mainland. These were then transported by 325 Engineer Park and assembled at Ballykelly, where the whole site was surrounded by cover-from-view screens. The complex was luxurious by Northern Ireland standards and required a considerable amount of 'finishing' by all the tradesmen who, as always, rose to the challenges and produced an excellent standard of work. On completion, the Squadron was visited by Commander Land Forces (CLF) and

the opening of the new kitchen and dining room was appropriately celebrated. Needless to say, no one was allowed to occupy the rather comfortable single rooms, returning instead from the festivities to double bunks in the storage shed.

During the deployment, 37 Squadron also provided further support for 8 Infantry Brigade. Tasks were undertaken at both troop and section level. They included sangar refurbishment, rocket propelled grenade screen construction on the walls of Londonderry (which was a challenge for those with a dislike of heights) and the inevitable border closure operations. One of those will remain forever embedded in the troop commander's memory. Having led his convoy into a potentially dangerous area, he met up with his local UDR guide for the final approach to the cordoned area of the border. This guide proceeded to lose his way and led the convoy into a narrow lane; the crane, which was to be used to locate Braithwaite barriers at the crossing, proved too much for the soft verge at the corner and toppled over. The troop commander's professionalism then came to the fore – he had a contingency plan with the TA to provide, if needed, a suitable replacement crane, none being available from 33 Squadron. To add to his anguish, during the incident the gear lever in his Land Rover sheared off at the balljoint, leaving him in first gear for the next 36 hours. Nevertheless, the closure was accomplished on time.

Finally, in June 1988 a roulement squadron from BAOR was reintroduced. The first squadron selected was 64 Amphibious Engineer Squadron. The highest priority task was the development of border OPs in South Armagh.

Throughout 1988 there was relentless pressure on 33 Squadron. A high-profile task included the deployment of a troop to the vulnerable permanent vehicle check point on the A1 road south of Newry. The accommodation required to be hardened with enhanced blast protection, new sangars and an elevated OP on a nearby feature.

Under the codename Operation *Danite*, work continued with further Operation *Widgeon* design roofs and blast walls being constructed in UDR bases at Cookstown, Belleek, Magherafelt and Rockwood. This was a major commitment, lasting from June 1987

until April 1988. A further four months that year were spent constructing similar protection at Clogher UDR base. During 12 Field Squadron's tour from November 1988 to March 1989 (OC Major N. A. (Neil) Sutherland), a troop was deployed to Cookstown UDR base on Operation *Dalrymple*. This was a major construction task. On 14 November 1988, during a PIRA mortar attack, two soldiers were wounded.

In Londonderry, the RPG threat required the erection of screens at the Masonic and Rosemount bases. After attacks on married quarters, temporary sangars, fences and road closures were erected. Fort George and the permanent vehicle check point required rocket screen protection. Enhancements were also provided at a number of locations along the border and in Londonderry against the threat of PIRA attacks with 12.7mm machine-guns, which they had recently acquired.

In the 39 Infantry Brigade area, operations were undertaken in Belfast. These included Fort Whiterock, where enhanced mortar protection was installed. Work was done on the Belfast roulement battalion base in North Howard Street Mill in September 1988 but had to be followed by urgently needed improvements following a vehicle-borne IED attack in November. During the annual Orange Order marching season, barriers were provided to enable the RUC to control crowds.

There was further engineer work at Bessbrook Mill and numerous other sites throughout Northern Ireland.

NI works organisation

The intimidation of building contractors was by 1987 seriously affecting the RUC building programme. The Royal Engineers were stretched to provide even emergency repairs and clearly could not possibly tackle the major building projects. The Northern Ireland Office therefore set up its own works organisation headed by a retired Sapper brigadier to execute the more difficult (in security terms) elements of the Police Authority programme. This organisation, always Sapper-led and supported initially by RE officers on secondment, was finally disbanded at the end of 1996 following the paramilitary cease-fires, by which

time 91 projects had been completed at a cost of nearly £100m. The establishment and successful operation of this new branch also removed most of the pressure on Sapper units to provide construction support to the RUC.

Terrorist atrocities

1988 continued as a period of murderous inhumanity. PIRA had intended a year of escalating violence, continuing to target, murder and maim service personnel in Europe, mainland UK and Northern Ireland. Three RAF aircraftsmen were killed during shooting and under-vehicle IED attacks in the Netherlands, nine were wounded in Duisberg, three Royal Engineers were injured in a blast in Dusseldorf, and two gunmen shot dead the RSM of 1st Battalion The Royal Regiment of Wales in Ostend, Belgium. There were terrorist atrocities in Northern Ireland. Amongst them were two NCOs from the Royal Corps of Signals, who were beaten, stabbed and then shot dead when they were caught by PIRA as their unmarked car drove into a funeral cortege being followed by many hundreds of Republican sympathisers in West Belfast. Six soldiers were killed when a PIRA under-vehicle IED detonated after they had participated in a YMCA charity fun event in Lisburn. Eight soldiers from 1st Battalion The Light Infantry were killed when a radio-controlled IED placed by the roadside detonated as the civilianised bus carrying them back from Belfast to their base in Omagh, County Tyrone, passed by. A further 28 people were wounded in that incident. A total of 34 soldiers were killed in 1988; 14 police stations were attacked, and four construction workers were murdered.

Bombing of Inglis Barracks, London

On 1 August 1988, Inglis Barracks in Mill Hill, which housed the Postal and Courier Depot RE, was attacked by PIRA. The IED detonated at 0655 hours. Lance Corporal M. F. J. Robbins was killed, and nine others were injured. The bomb also caused extensive damage to the accommodation block, which had to be demolished and subsequently rebuilt. This was the first successful PIRA attack on the mainland since the Tory Party Conference

when the Grand Hotel in Brighton was bombed. Mill Hill was in Mrs. Thatcher's constituency.

1989-1990

Major efforts by the Security Forces reduced the violence in 1989. Public order continued to improve as did cross-border cooperation between the various security agencies. Generally it was a more peaceful year, although as ever there were some savage killings. During 1989 a Royal Tank Regiment NCO was killed and his wife and four children wounded in Hannover when an under-vehicle IED detonated; 11 Royal Marines were killed and more than 30 people were injured when a PIRA bomb exploded at the School of Music at Deal in Kent; another RAF airman, together with his six-month old baby, were shot dead at a petrol filling station at Wildenrath near the Dutch border. In 1990, two Australian tourists living in London were gunned down in Roermond, Holland. They were mistaken by PIRA for British soldiers. Shortly afterwards an off-duty recruit from the Royal Regiment of Wales was murdered at Lichfield railway station, and two of his comrades were wounded. A day later a Gunner major was shot dead outside his married quarters in Dortmund. Punishment shootings increased to 161 incidents, the highest for 15 years. On the positive side, there were some successes in combating racketeering, but much was still left to do.

East Midlands Airport crash

A British Midland Boeing 737 aircraft departing Heathrow for Belfast on the evening of Sunday 8 January 1989 was statistically bound to be carrying soldiers returning from leave on the mainland; this flight was no exception. Tragically, the aircraft developed engine failure and, having been diverted to East Midlands Airport for an emergency landing, crashed just short of the runway, killing 47 passengers and injuring 74. The death toll included several members of the Security Forces, including two from 325 Engineer Park. A number of soldiers from 33 Squadron were among those with serious injuries. One young Sapper was

among those who found himself hanging upside down by his seat belt when the aircraft finally came to a halt. Despite his relative youth, he remained 'cool under pressure' and his military training kicked in. It was dark and he felt liquid dripping onto him. Fearing that the aircraft might burst into flames at any moment, he quickly searched in his pocket for his RE clasp knife (allowed in an aircraft in those days) and started to cut through his seat belt. This was not an easy task as it held the weight of his body. Releasing himself, he discovered that he had suffered severe damage to both his legs. Despite his injury and with total disregard for his own safety, he turned his attention to rescuing the unknown woman who had been sitting beside him, who was now unconscious. Both survived to tell their tale. This is typical of the calibre of so many young soldiers who are trained to think and act quickly and who selflessly consider others before themselves.

Bombing of Quebec Barracks, Osnabrück

During the early hours of 18 June 1989, PIRA attacked Quebec Barracks, Osnabrück, where 23 Engineer Regiment, commanded by Lieutenant Colonel P. J. (John) Russell-Jones, was based. A German civilian night watchman on the railway line adjacent to the barracks spotted the armed terrorists as they gained access. He was assaulted by them as he tried to stop them planting the bomb outside the WO's and Sergeants' Mess. There was an explosion shortly afterwards, which caused major structural damage, but fortunately there were no casualties. The night watchman was subsequently decorated for his bravery but died before the award was presented.

Operation *Springer* in BAOR

The upsurge in violence in north-west Europe by PIRA resulted in the launch of Operation *Springer* in September 1989, by which 25 Engineer Regiment, commanded by Lieutenant Colonel A. T. (Adrian) Brett, was tasked with the enhancement of the physical security of barracks throughout the 1 British Corps area. A full account of this is given in Chapter 4.

Engineer operations

30 Field Squadron's tour between August and December 1989 provided a range of challenges. In addition to troops deployed to improve the permanent vehicle check points at Mullen Bridge and Annagmartin, they constructed cover from view fences at Lisanelly Barracks, Omagh, undertook a variety of tasks on the hilltop OPs, operated at St Angelo, Clogher, Hump check points and closed a number of border crossing points. During 8-17 August the Squadron also reinforced 42 Commando Royal Marines with 17 four-man bricks. This was a sensitive period – the 20th anniversary of the deployment of troops on the streets of Northern Ireland. They were used on security duties with the Royal Marines operating from the Belfast bases of Fort Whiterock, North Howard Street Mill and Girdwood Park.

Two other significant engineer operations in 1989 under the new CRE, Lieutenant Colonel S W (Sam) Hesketh, were Operations *Scurvy* and *Tantalus*. Both in their own way were important projects and were very different types of operation, neatly demonstrating the enormous range of skills and methods of operation needed by Sapper units supporting Army operations in Northern Ireland. Operation *Scurvy* was a straightforward building construction task within a secure perimeter at Aldergrove military base using portable accommodation units to provide living and catering facilities for 36 men.

Refurbishing border OPs

Operation *Tantalus*, though superficially a similar requirement, was operationally at the other end of the spectrum. The series of observation posts built in 1985 to cover the border areas of South Armagh were originally designed as temporary structures but they proved to be so operationally successful that the decision was taken in 1988 to refurbish the posts. Between April and June 1989, 4 Field Squadron (OC Major R. D. (David) Richards) undertook the construction of underground accommodation at three of the sites in the Crossmaglen area. The detailed design for each location, produced by DCRE Works (OC Major R. N.

(Richard) Cobbold), consisted of ten portable accommodation units encased in a concrete shell with a number of access points. The site works were extensive, with major remodelling of the hill profiles to enable the new slots to be excavated and the construction of expedient roads to enable vehicle access. The structures were required to withstand a direct hit by a Mark 10 mortar. To minimise valuable helicopter hours, the structures had to be maintenance-free for five years, so a full range of self-contained services were provided to each site including a 100kw power supply and complete domestic systems, including washing-machines.

As always in South Armagh, the operational situation strongly influenced the construction work, permanent protection for the sites being provided by Gunner subunits deployed in an infantry role. Logistic resupply continued to present a challenge, and operations similar to those carried out ten years previously (Operation *Tonnage*) were required. Once the initial, heavily guarded convoys that ran over two weeks had brought in the materiel, with several infantry battalions deployed to picquet the route, all resupply was by air. There was the constant threat of attack: a soldier from 1st Battalion The Worcester and Forester Regiment on patrol near Crossmaglen as part of the operation





Operation *Tantalus* – the refurbishment of sites, showing observation posts, accommodation, operational kit of the 1980s and, below, a High Risk Search team on route clearance.



was killed by the blast of a PIRA roadside IED. Full protective equipment had to be worn at all times. During the operation PIRA mounted six attacks against the sites employing a variety of methods including a radio-controlled tractor, several explosive devices, a Mark 13 mortar and fifty rounds of small-arms fire, which were returned with interest. After three months, despite the attacks by PIRA but aided by good weather, the work was completed four days ahead of schedule. These operations were not without some light-hearted moments. In one site a local farmer's pigs ate the entire stock of specially selected grass seed set aside for landscaping and on another occasion, one quick-thinking troop commander reported that the only casualty after the mortaring was the destruction of his troop's entire stock of Gore-Tex clothing – those days only on loan and highly prized as personal acquisitions.

Further PIRA attacks

At the end of 1989 PIRA made a number of concerted attacks on border-crossing points, killing soldiers manning them. The Royal Engineers reacted to the threat by installing drop-arm barriers manufactured by 325 Engineer Park on all border crossing points. These barriers were kept in the upright position until needed and could be triggered by an explosive charge to lower them into position.

Two British soldiers were killed in a sustained and unusually large attack on 13 December 1989 by PIRA on the PVCP at Derryard on the Fermanagh-Monaghan border near Rosslea, which was manned by soldiers of 1st Battalion The King's Own Scottish Borderers. Two dozen or more PIRA terrorists were believed to have been involved. Just after 1600 hours a high-sided truck was backed into an enclosed area of the checkpoint. When the driver sounded the horn, two soldiers approached the vehicle. Terrorists who had been hiding in the back of the truck opened fire with assault rifles and threw grenades. The assault involved the use of two 12.7mm DShK machine-guns, eleven AK-47s, various kinds of grenades and, for the first time, a flamethrower. To ensure widespread destruction, PIRA planned

to detonate a vehicle-borne IED after the initial surprise assault. After launching a number of grenades (either rocket propelled or horizontal mortar rounds), PIRA managed to break into the compound, supported by automatic fire and the flamethrower. In the process they killed two British soldiers, and another was severely wounded, subsequently being airlifted for treatment. The PIRA unit left a van loaded with 180 kilogrammes of Semtex explosive inside the perimeter: fortunately it failed to explode. The attack was finally repulsed by a KOSB section patrolling nearby, with the support of a Wessex helicopter. The PIRA gang, at risk of being surrounded, then fled in the truck, possibly towards the border.

On 31 May 1991 a large truck-bomb attack was carried out by PIRA against a UDR base at Glenanne outside Markethill, County Armagh. At 2330 hours a truck loaded with 1,200 kilogrammes of home-made explosive was left on the slope of a hill at the rear of the barracks. Then the truck was set to roll down to the base. The vehicle crashed through the perimeter fence and came to rest against the main building, where the bomb detonated. The entire compound was shattered by the explosion, which could be heard over thirty miles away. The blast shook windows as far as Dundalk, well inside the Irish Republic. Some 40 people were injured, and three UDR soldiers were killed. Cattle were killed in nearby fields, and 50 houses in the village of Glenanne were damaged together with the primary school. After the attack the Sapper task was to make the site safe by demolishing the remaining buildings and assisting with the recovery of forensic evidence.

Attack on bridging hard, Hameln

On a Sunday afternoon in June 1990, PIRA attacked the M2 bridging hard on the outskirts of Hameln in Germany, used by 28 Amphibious Engineer Regiment. The Regiment had previously deployed on exercise. It was at first thought that some gas bottles had exploded. The German fire service arrived on the scene almost immediately and in the process of ensuring the scene was safe destroyed forensic evidence, but the distinctive smell of

plastic explosive was still evident when CO 35 Engineer Regiment, also based in Hameln, arrived at the hard some 30 minutes later. There were no casualties, but the explosion destroyed a store.

The rebuilding of border Permanent Vehicle Check Points

The CRE's staff and HQNI had already devised a five-year plan to rebuild eighteen vehicle check points including ten major border crossings. It was agreed with the UK Government that construction would meet international standards and be there for the long term. The permanent vehicle check points would double up as patrol bases to enable a more pro-active control of the border. The speed of construction and intensity of work required led to the conclusion that the overstretched Sappers would need massive reinforcements of both skilled tradesman and a significant force of infantry to provide cover. The CRE, Lieutenant Colonel C. W. (Charlie) Crawford, was tasked with approaching commercial construction companies in Northern Ireland to determine whether they had any appetite for taking on such work. Together with staff from HQNI G4 Quartering, he assembled a heroic group consisting of four local construction companies to carry out much of the work, with a huge amount condensed into a 22-week period following several fatal attacks. The dedication of these civilians demands the highest of respect. They worked almost as Sapper squadrons, sharing resources when required without complaint and for limited profit. There was nevertheless a fear in some quarters of MOD that the use of civilians in this manner could undermine the argument for a resident Sapper regiment in Northern Ireland.

The Europa Hotel, Belfast

Another illustration of the security threat elsewhere in Northern Ireland was provided in an anecdote from the CRE of the time about his attendance at a fund-raising dinner held by a construction industry charity at the Europa Hotel in Belfast is as follows:

I was invited to a fund raising dinner hosted by the Lighthouse Club, the construction industry charity in December 1991 at the Europa Hotel, Belfast. My housemate who was head of MI raised

his eyebrows when I told him of my destination and suggested I wait a week or so. Being a guest I was in no position to change the date or the venue, so off I went. The first two courses and the speakers were great, but before pudding and coffee we were asked to leave the building. Being seasoned construction industry professionals born and bred in Northern Ireland they and I ambled casually out onto the street. Conversations continued some yards from the building; until a young police officer shouted 'for god's sake run', we hadn't got more than a yard or two before we were forced to the ground by the overwhelming pressure wave from a VBIED hidden in a van just around the corner from where we had been standing. We finished our dessert in a local Italian restaurant, where much to the amusement of my fellow guests the waiters were wearing black tie with brick-red cummerbunds, an exact match of my Sapper mufti. Two bombs in one tour was getting personal.¹⁵

1990-1994

Leading up to the paramilitary cease-fires in August 1994 was a period of unrelenting pressure by Republican terrorists on the Security Forces and the commercial infrastructure of Northern Ireland. Concurrently there was a marked increase in Loyalist terrorism throughout the period. The continuing horrific death toll tells the story: 102 in 1991, 91 in 1992, 90 in 1993, 69 in 1994; in the last two of those years the Loyalist factions were responsible for the majority of murders. Some Security Forces' successes followed the introduction of legal authority for road closures under the Emergency Powers Act 1991 with a series of border checkpoints being set up in Fermanagh causing terrorist failures at Annaghmartin, in the Clogher Valley and elsewhere.

The PIRA bombing campaign in Belfast in 1991 and 1992 caused millions of pounds worth of damage and major disruption to the city. The institution by the Security Forces of a complex series of checkpoints, known as the 'ring of steel', around Belfast during the Christmas period of 1992 is credited with preventing even worse widespread destruction. Notable incidents in 1992 included the murder of eight Protestant construction workers in January when their van was blown up by a 250-kilogramme PIRA landmine at Teebane, between Omagh and Cookstown. They

were employed by a firm still taking on Security Forces work. Five Roman Catholics were murdered by Loyalist gunmen in a Belfast bookmaker's in February, in retaliation for the killing of the Protestants three weeks earlier. The killings went on relentlessly.

The PIRA threat develops – the Mark 15 Mortar

One major preoccupation of the Royal Engineers in Northern Ireland during this period was the deployment in the early 1990s of the most powerful weapon yet in the PIRA armoury. The Mark 15 mortar, known in the popular press as the 'barrack buster', was a development of the Mark 10 mortar that had been in use since the late 1970s. The sheer size of the new single-salvo weapon represented a quantum jump in the threat posed to Security Forces' bases. It consisted of a large gas container a metre in length and 36 centimetres in diameter, filled with up to 80 kilogrammes of home-made explosive, with a range of 100–150 metres. It demanded a carefully planned response from the Corps.

Trials by the Royal Armaments Research and Development Establishment (RARDE) of simulated bombs and analysis of the results of terrorist attacks soon showed that Security Forces' buildings designed to combat the Mark 10 weapon, both permanent and temporary, would not provide anything like sufficient protection against the Mark 15 variant. It became the private nightmare of ministers and commanders that a lucky strike by a Mark 15 mortar bomb would result in carnage inside a base. There were several narrow escapes – notably at Kilkeel in 1993 where a UDR platoon base was flattened minutes after the soldiers had vacated the temporary buildings.

The Army led the Security Forces' response to this threat. Defence Works Services produced criteria for the 'Design of Hardened Structures' including the vital weapons effect assessment for the Mark 15 mortar and any feasible upgrade of that weapon. Three main Security Forces' contractors in Northern Ireland were then invited to design permanent protective buildings against these criteria. Between June 1993 and January 1994 all three competing designs were subjected to

full-scale live trials by the Royal Armaments Research and Development Establishment at its Kirkcudbright ranges. The DCRE Works, once again the HQNI Technical Authority for Hardened Structures, played a major role advising and assisting the contractors during the design process, subsequently supervising the technical trials and finally recommending to commanders and the G4 Quartering staff acceptance of the contractors' designs.

The buildings, known colloquially as 'cubes', were windowless structures. They had the same general design principles of strongly reinforced, thick concrete walls and roof both protected by a kinetic energy screen to stop and possibly detonate an incoming missile at an appropriate stand-off distance from the main structure. Blast proof, air-lock-type entrances completed the formidable degree of protection afforded, and a complex array of electrical and mechanical services provided excellent living conditions despite the lack of natural light. Later modifications to the RUC buildings saw the incorporation of removable window plugs, allowing window assemblies to be inserted in times of peace, and a finish to the kinetic energy screen of glass-reinforced concrete, which presented a pleasing external appearance.

Following the successful conclusion of the trials, both the Army and the RUC commissioned a number of Mark 15 mortar-proof buildings in vulnerable areas. The buildings were constructed by the contractors responsible for the designs, the RUC projects being procured and managed by the Sapper-led Northern Ireland Works Organisation. The Army building programme was managed by Defence Works Services, with the DCRE Works continuing to act as the Technical Authority.

The effect of *Options for Change* – 'the Sapper plan'

The 1991/92 reorganisation of the Army known as *Options for Change* had important implications for the Sappers in Northern Ireland. Attempts over the years to reduce their strength in the theatre to the level of the resident units had always failed. As soon as the reduction had been implemented,

some new construction imperative had inevitably arisen, requiring immediate reinforcement by roulement subunits. This constant and continuing series of deployments imposed a heavy training burden throughout the Corps and exacerbated separation levels already deemed to be unacceptably high. It was recommended that the establishment of a resident engineer regiment in Northern Ireland would recognise the reality of the long-term force-level requirement and arguably strengthen the position of the CRE, who would be the commanding officer of the regiment. It would also remove the need for the debilitating roulement arrangements. There was some disagreement about this, particularly from HQNI, where the role of the CRE was deemed important enough to be retained separately from the regimental command. However, it was finally agreed that a new regiment, 25 Engineer Regiment would be formed in August 1992, based at Antrim. It would consist of the RHQ, 12 (Nova Scotia) Field Squadron, 43 Field Support Squadron (formerly 43 Plant Squadron) and a REME Workshop. The Regiment would also take under command the existing resident units: 33 Independent Field Squadron (which would lose its independence) and 325 Engineer Park would be subsumed into 43 Field Support Squadron. The DCRE Works would come under the command of the Regiment. The order of battle would consist of 550 military personnel plus 115 civilian staff, with an annual budget amounting to £18m. The CO would take over the CRE role and move to Antrim but retain a staff at HQNI consisting of three SO2s (Engineer, Search and Geo) plus an SO3.

The implementation of this plan was not entirely successful. Although by August 1993 the new regiment was firmly established, manpower pressures had prevented the move of the second field squadron that continued to be provided on a roulement basis. A year later the situation had not improved, and the decision was taken, primarily for manpower reasons, to disband 12 Field Squadron and transfer the number to the HQ Squadron of 25 Regiment. Therefore, for the foreseeable future,

25 Engineer Regiment would continue to have one of its field squadrons found from roulement sources.

25 Engineer Regiment: the reality, 1992–1994

The formation of 25 Engineer Regiment in Antrim was seen by many in the MOD as a regimental move from Osnabrück. However, the reality was rather different as only six individuals actually made that move (including the second in command and the regimental sergeant major). Some, including the new CO, Lieutenant Colonel A. C. (Andy) Mantell, were posted in from elsewhere, while others who had previously been serving in Northern Ireland were cross-posted to positions in the new Regimental structure. There were some members of the 'old guard' who regretted the loss of the independence of 33 Field Squadron, which now came under the command of the new Regiment (marked by a parade on 1 August 1992), but this was not allowed to prevail for long.

The decision that 12 HQ Squadron was not to become the Regiment's second resident field squadron had an important advantage that was not widely recognised. The CO was concerned that, had the Regiment become entirely resident and the roulement of a squadron had ended, then there was a danger that RE operations in Northern Ireland would become a speciality niche. RE work was based on exactly the same principles as elsewhere, and the roulement squadron's continued successes, including both an armoured and an amphibious engineer squadron, was clear evidence of this.

33 Squadron supported both 3 Infantry Brigade and 39 Infantry Brigade. The roulement squadron, based in the grounds of the Maze Prison, supported 8 Infantry Brigade. The CO lived something of a 'Jekyll and Hyde' existence, balancing his dual responsibilities as CO in Antrim and as CRE within HQNI at Lisburn.

During 1992 and 1993 the major construction operations centred on the provision of blast and ballistically protected buildings and sangars in the harder areas of Northern Ireland. The threats posed by the Mark 15 mortar and the 0.5-inch

Barrett sniper rifle drove these priorities. The operations included a great deal of work in building and upgrading a number of hilltop patrol and observation bases in South Armagh. Following an attack by PIRA that destroyed a permanent vehicle check point just south of Newry, a three-month operation was launched in August 1992 to construct a much larger and better-protected patrol base close by (Operation *Transitive*). High Risk Search operations also continued to be a priority, and efforts were made to coordinate operational procedures with the army of the Republic of Ireland for focusing on the border itself. Several border-closure tasks were also mounted.

The Downing Street Declaration

In the wake of spiralling violence when a PIRA IED killed ten people including the bomber in a fish shop in the Shankill Road, Belfast, there followed a spate of Loyalist retaliatory killings. The landmark *Downing Street Declaration* was released in London in December 1993 by the British Prime Minister, John Major, and the Taoiseach, Albert Reynolds. This promised that the people of Northern Ireland would decide their own future. It led to a three-day ceasefire by PIRA, but the process was stalled in the short term by the demand for clarification by Sinn Féin. Nevertheless, this step forward eventually paved the way, after 25 years of appalling violence, for a declaration of a cessation of Republican military operations in August 1994. This was followed by Loyalist terrorists, conditional on PIRA. All forms of violence reduced except punishment assaults. This eventually led to the 'Peace Process'.

25 Engineer Regiment's operations continue

Despite the breakthrough of the Downing Street Declaration, the new Regiment as a whole was to be tested under the most demanding operational conditions during the first half of 1994. Against a background of an increasing number of Mark 15 mortar attacks against the Crossmaglen Security Forces' Base, in December 1993 the CO was tasked by the Commander Land Forces to review the robustness of the structures there and to make recommendations. He flew with a small reconnaissance party

direct from Massereene Barracks to Crossmaglen on the Saturday before Christmas. This was unusual, as it was normal practice to drive to Bessbrook and fly from there. Shortly after Christmas, the CO briefed the Commander Land Forces and the Deputy Chief Constable at HQNI. He offered two options. First, to render the buildings proof against a near-miss by a Mark 15 mortar would take three months of planning and three months on the ground. Alternatively, to make each building withstand a direct hit from a Mark 15 mortar would take six months to plan and a further six months to execute. Had this latter option been selected, the nature of the work would have included covering every structure within the base with a heavy steel mesh stand-off screen at least one metre from the building. It would have been obvious to PIRA that very few of our other buildings in South Armagh could withstand a direct hit. In addition, an analysis of the Mark 15 attacks against Crossmaglen suggested that the helicopter landing site was often the target. The CO recommended the first course of action: to harden Crossmaglen buildings so that they would withstand a near-miss by a Mark 15 mortar. This was agreed by the GOC and the Chief Constable. Operation *Rectify* was born.

The operation started with the construction of six permanent vehicle check points controlling all the routes into the village. These all had to be mortar-proof. The main operation would involve the hardening of the buildings, the replacement of four of the five sangars and the Borucki Sangar in the village square. Two of the sangars were to be built upon a sixteen-metre tower, the highest ever built in Northern Ireland. The old Borucki sangar had been attacked on two occasions by spraying it with a large quantity of a petrol-based flammable liquid from a modified muck spreader and igniting it. Neither attack had resulted in the death of the soldiers in the sangar, but it had been a close-run thing. The new Borucki sangar was to incorporate a pressurised water-dousing system to thwart any such attack in the future. Three convoy periods would be needed to transport the 7,000 tonnes of stores, each being preceded by a cordon and an High Risk Search operation.

During January 1994, the DCRE Works operated a shift system to design the works that were necessary for Crossmaglen. In

February the Regimental main effort moved to 43 Squadron for the procurement of materiel and the provision of transport and plant. 33 Squadron was to be responsible for the construction phase of the operation. The CO had informed HQNI that he would be ready to start by 1 April, but for reasons of operational security he wanted only 72 hours' notice of the commencement of the operation.

The operation started on 11 April. The CO and tactical headquarters of 1st Battalion The King's Own Scottish Borderers were deployed to command the operation. Crossmaglen, usually an infantry-company-sized tactical area of responsibility, would have up to seven infantry companies on the ground during the operation, totalling 1,100 troops. During the ensuing operation there were only two attacks pressed home by PIRA, each an attack using a Mark 15 mortar. One was against one of the six permanent vehicle check points that had been constructed during the preliminary operation, while the second, on 25 April, was targeted at an RE section constructing the base of a sangar. Although the mortar detonated only three metres from these soldiers, there were no serious injuries, as a bund of earth separated the soldiers from the explosion. This attack caused a delay of just two hours.

Operation *Rectify* finished on 19 July 1994. It was an undoubted success: 25 Engineer Regiment had come of age. While there is no evidence that there is a linkage between this operation and PIRA's first cease-fire, which came into effect on 31 August 1994, it must have been humiliating for the South Armagh PIRA to have been unable to cause any serious casualties during such a lengthy operation.

1994–2000: the tortuous path to peace

Following the paramilitaries' cease-fire announcements in the summer of 1994, HQNI's mission remained unchanged, although its emphasis inevitably altered. The main adjustment was the emergence of community relations operations, which were deemed to help the peace-building effort, in particular by improving civil/military and cross community relations. At the

same time, the need for improving and developing military bases and OPs continued, while public order operations emerged once more as a high priority for Sappers – Drumcree, in particular, became a focus for effort at the high-point of the Orange Order marches. Equally, the requirement for High Risk Search operations remained, these being deemed essential by HQNI.

1994–1998

While major operations were being conducted in South Armagh, during March to September 1994, 26 Armoured Engineer Squadron deployed from Germany on roulement to operate on the western side of Northern Ireland. This was the first time this Squadron had deployed to Ulster since Operation *Motorman* in July 1972, and it was the first armoured squadron to deploy in the construction role – Royal Engineer flexibility! Their responsibilities included works at Rosscor Bridge, RUC stations at Kinawley, Rosslea and Lisnaskea, and Security Forces' bases at Strabane, Fort George, Gortmullan, Clady, Magherafelt, Clogher, Rockwood and the Muff patrol base.

Elsewhere, the emphasis had changed from standard-design fortification work to one-off design-and-build projects such as the rebuilding of the Magilligan training area, developments at Ballykinler, a new post office in the Omagh barracks, upgrading guard towers at the Maze Prison and anti-vandal measures in Crossmaglen. Work also continued at Newtownhamilton between September 1994 and February 1995 with the construction of three-storey accommodation designed to withstand a Mark 15 mortar attack. This policy was vindicated when, on 2 August 1994, the Sappers building the protective works and new elevated sangars were subjected to an attack by that weapon; fortunately there were no casualties. In Belfast, the North Howard Street base was demolished. The same fate awaited the permanent vehicle check points at Clady and Aughnacloy together with the search centre at Middletown and buildings at Fort George and Ballykelly. Overall, from April 1994 until March 1995, 25 Engineer Regiment completed a total of 327 tasks throughout Northern Ireland.

In the shift away from direct support for operations to community-relations projects, some of the work undertaken became high profile. 8 Armoured Engineer Squadron as the roulement engineer squadron from March until September 1995 under the command of Major J. M. (Mark) Ruddy, built the Foyle Search and Rescue Station on the south side of the river, which was intended to provide a centre to enable rapid rescue operations. The design, a complex consisting of pontoons and temporary accommodation, was carried out by the DCRE Works. An additional objective was to encourage cross-community relations among the people of Londonderry.

Other notable tasks were the River Laggan project, the construction of a footbridge across the River Bush to physically link two communities, a new demolition area and improved facilities at Ballykinler and the dismantling of the patrol bases at Kiltirk and Clady.

Mortar attack on Quebec Barracks, Osnabrück

At 1850 hours on 28 June 1996, PIRA attacked Quebec Barracks, Osnabrück in Germany, where 21 Engineer Regiment commanded by Lieutenant Colonel A. D. (Tony) Harking was based. Three mortar bombs were fired from a van parked near the rear gates. One bomb detonated on the regimental square, damaging cars; a second partially detonated on the fence line, and the third remained in the tube. It was subsequently removed and fortunately there were no casualties.

25 Engineer Regiment's Change in Operational Focus, 1996–1998

Structure

By 1996 the Regiment consisted of 12 (Nova Scotia) HQ Squadron, 33 Field Squadron, a roulement engineer squadron, 43 Field Support Squadron (comprising workshops, stores, plant and motor transport, the DCRE Works and a REME Workshop. The DCRE Works, commanded by a major and integral to the Regiment's role, was responsible for design, advice and super-

vision of engineer construction tasks. They also undertook research into the effects on fortifications of blast and projectiles. The roulement engineer squadron was based for the initial part of this period at the Maze. In addition to contributing to the construction programme, it provided the majority of the High Risk Search effort. In addition, and co-located with the Regiment in Massereene Barracks, were a Royal Marine detachment for operations on Lough Neagh and a Royal Logistics Corps EOD team, complete with an Ammunition Technical Officer. During this period the barracks underwent a substantial reconstruction that included new accommodation for the roulement engineer squadron, new workshops, squadron administrative accommodation, the messes and RHQ. This replaced the 'temporary' facilities that had served the Corps in Northern Ireland for so many years and finally allowed the resident engineer squadron to move from the Maze to co-locate with the Regiment formed five years earlier.

33 Squadron supported 3 Infantry Brigade and 39 Infantry Brigade, while the roulement squadron supported 8 Infantry Brigade. 43 Squadron provided support as necessary but also supported 39 Brigade for public order operations.

In his advisory role as CRE to the General Officer Commanding (GOC), the CO, Lieutenant Colonel I. M. (Ian) Caws from January 1997, retained the planning staff based at HQNI in Lisburn consisting of an SO2 and SO3 Operations, SO2 Geo and an SO3 Search. The relationship worked very effectively; there was a strong link to the GOC, engineer resources and effort being controlled at the highest level and brigades advised on the ground by squadron commanders.

Roles

By 1996 the Regiment had changed its operational focus. HQNI's mission was to support the RUC in the defeat of terrorism in order to assist the British Government's objective of restoring normality. The GOC's concept of operations continued to be based on three pillars: reassurance to the community, deterrence of terrorist activity and causing attrition whenever the

opportunity arose. He sought to reduce framework commitments, which consumed too much of the dwindling Security Forces' resources, and enhance mobility and general surveillance. As a result the Regiment found itself responding both to the resumption of terrorist violence after the first PIRA cease-fire and the upsurge in public disorder centred around the marching season. It now had three main roles: support for public order operations, construction operations and the provision of High Risk Search support.

Public order operations

The Orange Institution, more commonly known as the Orange Order, is a Protestant organisation based predominantly in Northern Ireland. It was founded in 1795 in County Armagh and takes its name from the Dutch-born King William who defeated the army of King James II at the Battle of the Boyne on 12 July 1690. Traditionally the Orange Order is affiliated to the institutions of Unionism and is made up of 'lodges'. Parades form an important part of the Orange culture and are held annually, the high-point being the celebration of the '12th July', when lodges participate in major marches held throughout Northern Ireland. They are colourful events. Marching men, each with an orange sash, bowler hat and rolled umbrella, are led by bands playing well-known tunes. Although they often passed without significant trouble, these parades were often considered by Nationalists and Republicans to be provocative, particularly as they went close to Catholic areas, and tension between the two communities would rise.

In Londonderry, the Apprentice Boys exist to commemorate the siege of that city in 1688–9. They march to celebrate the successful closing of the city gates in December 1688 by the 'apprentices' in the face of Lord Antrim's Catholic army. Their rallying cry of 'No Surrender!' continues to the present day. Equally, on the Nationalist side there are various dates in the calendar that are remembered annually, the Easter Rising being of particular importance. However, from 1995 it was the annual Orange Order march at Drumcree, near Portadown, that was a

regular source of violent protest, and this in turn led to significant Royal Engineers' involvement in support of the Security Forces.

Clashes at Drumcree

August 1994 had seen the declaration of PIRA's 'complete cessation of military operations' to enable talks to take place. This was followed by certain of the Loyalist groups declaring a cease-fire conditional on PIRA maintaining theirs. In February 1995, the British and Irish governments unveiled the 'Framework Documents' covering future arrangements for Northern Ireland. This was welcomed by Sinn Féin. Loyalist factions claimed at that stage not to feel threatened, despite Unionist politicians condemning the plans, but they perceived that the Republicans were making significant progress. These grave concerns manifested themselves in the summer of 1995 during what started as a local dispute with the RUC over the demands of the Orange Order to march from Drumcree Church after their service past a Catholic enclave on the Garvaghy Road en route back to Portadown. During the two-day stand-off, thousands of Orangemen arrived to add weight to the protest, and eventually some were allowed to pass. This was seen by them as a victory. Such a challenge to authority was to recur annually throughout the late 1990s, often with large-scale disturbances in other parts of Northern Ireland. The catalyst was always Drumcree. 1996 saw widespread protests across Northern Ireland: Loyalists built barricades and roadblocks in towns and villages, and in areas of Belfast there was wholesale intimidation, burning and looting when the authorities first banned the parade. But then they allowed it through and the RUC removed the Nationalist protestors to allow the Orangemen to pass. Again in 1997 the march was allowed to take place, but in 1998 the newly instigated Parades Commission banned it, sparking further widespread Loyalist disturbances. On that occasion the Orange protests finally collapsed when three Catholic children, the oldest aged ten years, were killed in a vicious sectarian attack when Loyalists petrol-bombed their home in County Antrim. The Parades

Commission continued to ban the Drumcree march in 1999 and through into the new Millennium.

Regimental role in public order operations

The 'marching season', during which the commemoration of major anniversaries took place, ran from Easter to September. Maintaining public order (Operation *Crichton*) was a major focus for HQNI and for the Regiment from 1996 to 1998. The GOC's mission for public order operations during those months was:

To support the RUC in maintaining public order in order to assist HM Government to restore normality.¹⁴

His 'Guiding Principles' for that first year, and only amended slightly thereafter, were expressed in terms of the outcomes he sought:

The worst fears of people had not been realised.
There was less inter-community polarisation.
Extremists were more isolated.
Security Forces had acted even-handedly and with sensitivity.
The democratic process not to be compromised.

In turn, CO 25 Engineer Regiment's mission as stated by Lieutenant Colonel I. M. Caws was:

To provide engineer support to Security Forces' ops to maintain public order and assist the RUC in restoring normality. REF

The Regiment was re-roled accordingly for the period of the marching season each year. Sapper support was a key enabler to the GOC's mission, and Sapper ingenuity did much to defuse the confrontation and stand-off between the RUC and the Orange Order, assisting them to localise confrontation to ground of the Security Forces' choosing.

Thus the Regiment's concept of operations might best be described in typical RE terms as: force protection; mobility support; and counter-mobility support. With the terrorist cease-fire rescinded, the Regiment had to maintain its specialist

capabilities in support of possible counter-terrorist operations. These included the High Risk Search teams and Specialist Search Teams (including Diving and Working in Confined Spaces teams); a Construction Quick Response Force, a field troop able to deploy at short notice to provide protection and cover from view; and a Bomb Damage Assessment Team (provided by the DCRE Works to support the RUC at the scene of any explosive attack). All the Regiment's remaining assets were then task-organised to provide support to Security Forces' public order operations. Heavy and Light Plant Teams were created to keep routes open and remove barricades. The same teams were used to enable the RUC to stand back from face-to-face confrontation with both the Orange Order and Nationalists, channelling parades and marches as necessary. To do this they were equipped with DROPS-mounted obstacle packs (demountable rack offload and pickup systems) and, to block major routes, Crowd Control Obstacles (CCO) made from concrete-filled containers with deployable wing walls.

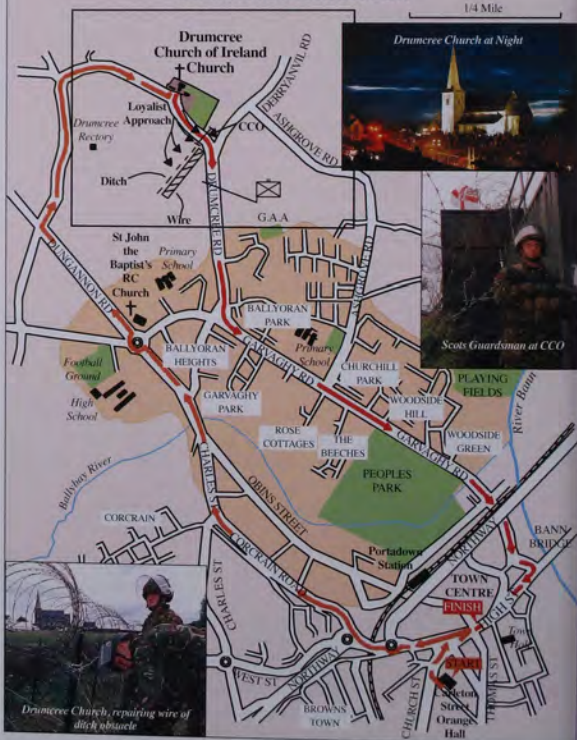
Each brigade could call on a mixture of Heavy and Light Plant Teams depending on the perceived priority of the



Crowd control was a major role in 1990 during the marching season. This picture shows RE/RUC cooperation and the size of crowd control obstacles in an urban setting, Ormeau Bridge.

brigades' operations. The latter teams consisted of a light wheeled tractor mounted on a trailer with prime mover and a section of Sappers with defence stores for wiring and a cover from view pack. A typical Heavy Team would deploy with an

PORTADOWN ORANGE ORDER MARCH, DRUMCREE: OPERATION CRICHTON



armoured medium wheeled tractor, which would be escorted to any task site. In addition the teams could be reinforced with dump trucks and Royal Logistics Corps DROPS vehicles loaded with either crowd control obstacles or pre-configured obstacle packs consisting primarily of defence stores and cover from view. Each brigade would typically be able to call on up to four obstacles. Commanders called for support during periods of rioting, so that a typical Heavy Plant Team task would require the medium wheeled tractor operator to clear barricades of burning vehicles and tyres, often while being petrol-bombed. In the event of a tractor catching fire, the operator was equipped with a smoke hood and oxygen, which had to be used on occasions – a frightening experience for the operator but invariably dealt with calmly and only when the task in hand had been accomplished.

The Regiment's ability to localise confrontation by creating obstacles in a very short period of time – often just the time required to deploy a DROPS rack – was particularly important, especially at Drumcree where tension year after year was very high and the world's media looked on. Drills and personal discipline had to be without reproach and all actions irrespective of provocation had to be even-handed and undertaken with sensitivity. At Drumcree, where the route for parading Orangemen would pass the Nationalist enclave along the Garvaghy Road, the route was blocked in 1998 using one crowd-control obstacle. The RUC were then able to address the marchers, halted on the road, from an elevated position on top of the obstacle without a face-to-face confrontation. This helped to defuse a tense situation, but the Regiment was also required to support the infantry battalions deployed to stop the Loyalist protestors from trying to outflank the obstacle on the route as the marchers endeavoured to come down from the church at Drumcree on the high ground, over the fields and across the stream at the bottom. Sappers advised on the emplacement of low-wire entanglements and barbed wire concertina fences along the alignment of the stream. The stream itself was widened and deepened using plant to make it more difficult for anyone to

break through. The GOC, General Sir Rupert Smith, said that bearing in mind his guiding principles, the obstacle:

With its layers served to separate the hooligan element of the crowd from the rest. You might risk your trousers on the wire, but not a soaking in the ditch and more wire.

With its massive crowd control obstacle it provided a focal point for all the demonstrators and cameras; which together with the first point meant that when the hooligan element did climb onto the the crowd control obstacle they had self-elected themselves in full view of the cameras for a good hiding from the RUC to the evident approval of everyone!

The crowd control obstacle became a 'safe' symbol held in common: for the people on the Roman Catholic housing estate it stopped the march, for the Orange Order it was so big it was insurmountable and so allowed them to stop the march, for the media it gave them something to film that told the story and for the Security Forces it worked with least violence.

Send for the CRE!¹⁵

The CO, Lieutenant Colonel I. M. Caws, recalls:

The scene at dusk looking almost medieval, with Orangemen and Loyalists seated around campfires in the fields beneath the church, occasionally making forays down to the ditch and wire to try to force a breach, verbally abusing the Security Forces in positions on the other side of the stream and on occasions firing at the Security Forces with improvised weapons. Yet none managed to cross the obstacle belt.¹⁶

In Londonderry a different version of the same concept was employed in support of the RUC. The arches in the city walls were blocked when necessary either by using crowd control obstacles or preconfigured obstacle packs designed to fit specific locations. On one occasion a Royal Logistics Corps female driver showed particular calm and restraint in the face of considerable provocation when she was surrounded by a baying mob, which tried to get into her cab after she was isolated from the remainder of the team and the infantry support. She calmly closed the gap using a crowd-control obstacle and then drove off, taking particular care to avoid casualties. It was brave act and entirely in line with the GOC's objectives.



Public Order, Londonderry. Sapper 25 Field Squadron using cutting equipment.

Despite periods of high tension, there were inevitably periods of inactivity during the marching season. Much emphasis was put on preparation for operations, and commanders at all levels in the Regiment had to manage the inevitable frustration felt by everyone when they were not deployed. It was fortunate, too, that terrorists did not exploit the marching season to attack the Security Forces and there were no serious casualties. Overall, the Regiment could be proud of its contribution to the outcome of Operation *Crichton*: it was highly regarded by the RUC and commanders at all levels.

Command and control

It was found that combining command of the Regiment with the role of CRE advising the GOC worked very effectively, aided in no small measure by the GOC's understanding of Royal Engineers' roles and capabilities and his very clear statement of intent. For public order operations, the CO mirrored his own role at HQNI of advising the GOC by embedding officers commanding in the brigade HQs and insisting that all the public order battalions had Sapper advice embedded, too. These were

usually squadron operations officers, mirroring the battlegroup engineer concept of armoured/mechanised brigades. This delivered timely Sapper advice, not only for public order operations but also for the counter-terrorist operations when necessary.

Force protection operations

During the earlier part of this period (1996–8) the Regiment continued to be involved in construction work in support of operations, although by now the tempo was decreasing. An important command and control base was constructed at Ballykelly by 33 Squadron, commanded by Major D. L. (David) Strawbridge. This took some six months to complete. The task comprised a steel-framed building, appropriately protected, with all the finishing done by Sappers as well. Meanwhile in South Armagh, the requirement continued to upgrade the hill-top sites to provide appropriate protection against the increased threat from the Mark 15 mortar and to enhance general surveillance. Two new sangars were flown in by Chinook helicopter and other refurbishment of the accommodation was completed. The challenge to provide the appropriate level of protection in sangars from higher calibre weapons and greater explosive threats demanded that they should be upgraded in every respect, including their glass. A new design was produced to replace sangars on a number of vulnerable sites after a review across Northern Ireland. Meanwhile, sensitivities resulting from the ongoing political process necessitated that one new sangar, which had been installed at the Crumlin Road Jail in Belfast at the start of the CO's tour, be removed before the end of his tour. By October 1998, and with the PIRA ceasefire once more in place, the Regiment was being tasked with a significant number of demilitarisation jobs consistent with the GOC's intention to reduce framework operations. Most involved the removal or reduction in scope of patrol bases and permanent vehicle check points in Fermanagh. The scale of construction operations during this period was such that there was no need for the

major logistic resupply needed earlier in the decade on operations such as Operation *Tonnage*.

Research and development

Increased PIRA capability and its proven ability to strike at Security Forces' bases made it imperative that they should be protected against the increasing threat, particularly from mortars and vehicle borne IEDs. A series of annual trials were run by the DCRE Works. There were two objectives: the first being to prove that existing fortifications worked against the new generation of terrorist weapon systems including the Mark 15 mortar; the second to test new concepts and designs for blast protection in order to keep one step ahead of the terrorist. A higher priority was given to such new developments. By 1997 the concept of a new modular concrete and steel composite blast protection panel had been tested and validated in live tests against the increased threats, proving capable of defeating both vehicle borne IEDs and the Mark 15 mortar bomb. This new system (*Redline*) was then subsequently installed at three vulnerable bases and permanent vehicle check points before being halted by the changing political situation.

The Good Friday Agreement

Seismic political changes were wrought by the Good Friday Agreement declared on 10 April 1998 followed by the subsequent 'Yes' vote in the simultaneous referenda held in Northern Ireland and the Republic in May 1998. Nationalists and Republicans were overwhelmingly in favour, but there was much agonising in the Unionist community, with a split down the middle developing. At the elections to the new Northern Ireland Assembly in June that year, there was a solid majority in favour of the agreement. Sinn Féin and the Nationalist SDLP did well, but the Unionist vote was again split. July brought more violence at Drumcree, but after several days of roadblocks and rioting the disturbances petered out when three Catholic boys died at their home in an arson attack caused by Loyalists. It was at this stage that the breakaway Republican group, the Real IRA (RIRA), became active, their

leadership declaring that Sinn Fein and PIRA had sold out on their traditional standpoint. RIRA was responsible for the carnage in Omagh on 15 August 1998, when a 250-kilogramme vehicle borne IED exploded and killed 29 people out shopping on a Saturday afternoon.

1998–2000

In 1998, CO 25 Engineer Regiment, Lieutenant Colonel C. R. J. (Chris) Sloane, instituted further organisational changes with the intention of developing the operational effectiveness of the Regiment. 12 HQ Squadron was disbanded, and 43 Field Support Squadron became an HQ and Support Squadron, while 33 Squadron increased from three to four field troops. The Regiment's technical support capability was retained. This team was particularly important at the time when sites were being stripped out and the highest standards of environmental control were demanded. The squadron affiliations, which had changed slightly, were: 33 Squadron to 3 Infantry Brigade, 43 Squadron to 39 Infantry Brigade, and the roulement engineer squadron to 8 Infantry Brigade. HQRE at HQNI was disbanded, but two staff officers, one of whom retained responsibility for search issues, remained. They reported to G3 Operations. Geo stayed in situ but did not report to the RE chain of command. The Regiment had concentrated in Massereene Barracks in Antrim, and the Engineer Park moved to RAF Aldergrove from the Maze.

On the operational front, there was good liaison with the RUC through the respective brigade HQs. A high priority was given to support for public order operations, but no serious incidents took place during the marching seasons in either year. Crowd control obstacles were constructed and put in place; Light and Heavy Plant Teams were deployed. Assets were tasked as required. The principle of moving in quickly, operating efficiently and discreetly, then finally withdrawing rapidly paid dividends.

In 1999 the Regiment began operations to dismantle the hilltop OPs in South Armagh. The pressure to remove them quickly increased through 2000 because of the Peace Process. The

Borucki sangar in Crossmaglen was stripped out in early 2000 by 33 Squadron (OC Major A. G. (Gary) Jackson). A major operation was planned; all was effected efficiently, and the last vestiges of the structure were removed before the press arrived. A potential Sinn Fein media coup was therefore thwarted.

Normality was returning to Northern Ireland. The atmosphere was improving, and this enabled the CO to develop a tempo of operations to be found in any other regiment in the Army. There were increased opportunities for sport, adventure training and a battlefield tour to Monte Cassino, while integration with the local population was encouraged. The Peace Process had proved to be a success, thus far.

After 1999 the Northern Ireland Operation *Descant* commitment became rear based under operational command of GOC Northern Ireland, although this commitment relied upon the continuing cease-fire and the ability to meet surge increases in requirements during the marching season.



Crossmaglen: Borucki Sangar stripping out, 2000.

Search Operations

Background

Search concepts, procedures, skills and equipment were developed during the early stages of the Troubles in the 1970s. All aspects evolved as the threat changed and experience accumulated. Training to meet the operational requirement was delivered at Field Engineer Wing (from July 1990, Counter Terrorist Search Wing), RSME and at Sennelager. Continuation training facilities were also built by Sappers at Ballykinler.

Search is described as 'the systematic procedure for finding terrorist munitions, documents and other equipments in addition to locating their bombs and booby traps'. It was designed initially to inhibit the supply of terrorist arms and equipment at the operational as well as the tactical levels. Unlike many other Security Forces' operations, which were often reactive, search was regarded in principle as 'offensive'. This crucial difference enabled the RUC and the Army to take the initiative, provided the appropriate level of clearance had been obtained prior to deployment. By the 1980s, effectively planned search operations enabled Security Forces to investigate and seek out what had been suspected or identified by intelligence. Tasks could often be undertaken in a pro-active manner at the time of Security Forces' choosing and therefore to significant advantage. By contrast, there were also many occasions when search had to be employed in a reactive mode as a result of a terrorist-initiated incident. Effective searching, both pro-active and reactive, could provide evidence to enable prosecution in court, deprive the terrorists of munitions, gain intelligence and protect potential targets from attack by enabling the Royal Army Ordnance Corps (later Royal Logistics Corps) Ammunition Technical Officer to gain access safely to undertake 'render safe procedures'. It also helped to deter the terrorist from moving weapons and explosives from deep hides into urban ones. It played a crucial role prior to each Operation *Tonnage*: not only did the Sapper teams clear the routes but they provided reassurance to those participating and deterred the terrorists.

The various environments to be searched also posed differing hazards and a range of techniques and equipment was employed. There were procedures for searching occupied as opposed to unoccupied or derelict buildings. In the latter, the terrorists could place booby-traps to catch the unwary soldier or RUC officer. In addition different measures were taken when searching areas of land, or routes or vehicles and people. All types of task were covered by the Northern Ireland (Emergency Provisions) Act.

Evolution

In the early years of the campaign, with very little high-grade intelligence available to enable units to focus their activity, house searches were a major component of operations. Security Forces routinely undertook searches of complete streets of houses and blocks of flats. They were normally conducted on the basis of information received, which was often of limited reliability. Occupied house searches were a somewhat 'blunt instrument' and were hugely unpopular with the population due to the invasion of privacy and damage that accompanied them. They tended to focus on Catholic households, largely because there were more Republican suspects than Loyalist. This was perceived as evidence that the Army was biased, so they probably contributed significantly to the alienation of the bulk of the Catholic population in the early 1970s. Although occupied house searches were unpopular, Security Forces could not let terrorists hide weapons and explosives with impunity.

Search evolved. As the threat and terrorist *modus operandi* changed, so did the response. For example, it was Second Lieutenant M. D. Winthrop, of the Royal Regiment of Fusiliers, who in 1974 developed his 'terrorist appreciation' of how and where munitions might be hidden. This involved putting oneself in the mind of a person going to hide something and returning to find it: trees, houses, hedges, etc. could be used as markers, and by intelligent deduction the logical place to bury objects could be identified. It was a successful breakthrough and was incorporated into training for generations of teams. During the 1970s, PIRA employed both deep and shallow

hides for their munitions, on occasions protecting them with booby traps. The former were used primarily in the rural areas and the latter in the cities in preparation for their operations. During the 1980s, this led increasingly to the employment of RE High Risk Search teams. The background of the Sapper, firstly as a soldier trained to deal with mines and booby traps and secondly with his understanding of building construction principles linked to technical or artisan trade training, placed the Corps in a unique position. The role of High Risk Search widened into the clearance of routes, derelict buildings, deep hides and reaction to IED incidents. This was in the face of a significantly increased and sophisticated threat. It forged the beginning of the close relationships with the Royal Army Ordnance Corps (later RLC) ATO teams: there was a mutual dependency for personal safety.

High Risk Search

Because of the operational importance of Search, all ranks irrespective of role were given search awareness briefings prior to deployment to Northern Ireland. This raised the profile. However, because of the inherent dangers and the necessity for preservation of evidence, formal operations could only be undertaken by qualified personnel. Royal Engineers specialised in High Risk Search when there was either an increased chance of finding terrorist munitions or specific intelligence leading to a high probability threat of an IED. This demanded the clearance of the route up to the seat of an incident, for example a mortar baseplate. By contrast, the All-Arms teams, primarily infantry, undertook a shorter course that qualified them for Low Risk Search tasks, which tended to be the more routine work of vehicle and body search, occupied buildings and 'rummaging' over areas of land. It became the norm for each infantry company to have a trained Search Adviser, normally the CSM, and a Search Team. At battalion level there was a Unit Search Adviser, typically the RSM or assault pioneer platoon commander.

A field squadron organisation varied over time but usually consisted of a Brigade Search Coordinator (captain) and up to

four RE Search Advisers (captain/lieutenant/SNCO). There could also be as many as eight six-man RE Search Teams. The deployment of teams varied. In the particularly high-risk tactical area of responsibility of South Armagh during the early period of the 1980s, there were a Royal Engineers' Search Adviser and two Royal Engineers' Search Teams permanently based at Bessbrook. They were on immediate standby and frequently worked out of Crossmaglen and Forkill. In these circumstances, where the threat was constantly high and the commanders and teams lived with the infantry, very close personal relationships developed and, in turn, a very strong team ethic. This was invaluable as it ensured that intelligence was shared, coherent plans were made and, in the midst of a potentially dangerous clearance operation, each component of the deployed force could rely on the other. In other parts of Northern Ireland, they were held ready in their various squadron bases for deployment. For much of the period, a roulement troop was provided specifically for such operations.

Productive search operations

Many searches were undertaken and a significant number were productive, with important finds as their outcome. This maintained the pressure on PIRA by directly reducing their arsenal, potentially providing forensic evidence as well as making operations for terrorist Active Service Units more difficult to conduct. Area and route searches predominated, both occupied and unoccupied buildings also providing successful outcomes for the High Risk Search teams. There were other categories including searches of derelict buildings, railway lines, areas around Border Crossing Points, vehicles and vessels. The pressure was maintained on PIRA until the mid-1990s, when the effort reduced as the political initiatives started to take effect.

To illustrate the success of these offensive operations, during a twelve-month period in the mid-1980s, 33 Squadron High Risk Search teams and the Roulement Search Troop, which was under command, expended 825 search team days on 472 operations. They found seven rifles, four pistols, 2,000 rounds of

ammunition, some 7,000 kilogrammes of home-made explosives, 26 kilogrammes of commercial explosives, 100 kilogrammes of home-made booster charges, explosives accessories and three unexploded mortar bombs. During 1987–8, teams from 33 Squadron undertook 326 searches and clearance operations, finding one rocket-propelled grenade, six rifles, two shotguns, a submachine-gun, four pistols, four improvised anti-armour grenades and 3,500 kilogrammes of various types of explosives. In one four-month period alone in early 1987, the Roulement Search Troop from 5 Field Squadron was involved in a range of challenging tasks including follow-up operations after the mortaring of Bessbrook Mill and a number of route clearances in South Armagh. They also had a find in West Belfast of a rocket-propelled grenade, two rifles, including a sniper rifle, and grenades. They were involved in the immediate follow-up to the murder of Lord Justice Gibson and his wife, when a 250-kilogramme IED was detonated under their car at Killeen close to the border. On another operation they located a command-wire IED in West Belfast. During a clearance operation near Aughnacloy they located a 200-kilogramme IED. So High Risk Search teams continued to deny PIRA the freedom to operate as they would have wished and, even by the mid-1990s, they were still on the offensive across Northern Ireland. For example, at this stage of the campaign, several Mark 15 mortar baseplates and bombs were seized in South Armagh, Londonderry and County Tyrone. There were successes with numerous finds including weapons, clothing and command wires. A large command-wire IED was located in County Armagh and another in a house in Belfast. Details of two clearance operations in South Armagh are given later in this chapter; they illustrate the threats the soldiers faced and the bravery they displayed undertaking their duties.

Each operation was recorded on a specially designed form, the Northern Ireland Search Report (NISR). Copies were completed and submitted after each operation, based upon the notes taken as the search was being conducted. Supplementary reports were also filed by the Royal Engineers.

Training

Training designed to meet the operational requirements was essential for both effective results and to minimise risk to all involved. Details of the evolution of Field Engineer Wing and Counter Terrorist Search Wing at the RSME is given elsewhere in this volume. Suffice it to say that the conditions under which the commanders and their teams operated were replicated as far as possible in specialist search facilities constructed at both the Lodge Hill training area, RSME and the Search Training Wing at Sennelager for BAOR-based squadrons. The latter was set up in the late 1970s and continued through the 1980s when BAOR continued to provide roulement squadrons. At Chatham, the 'Cupar Street' complex was the core, and an Security Forces' base was constructed nearby. Sapper tradesmen built hides, which reflected the use made by the terrorist of the opportunities open to them, both urban and rural. There were two-way mirrors in the houses to enable directing staff to observe teams while they conducted 'occupied' searches. To enable route, area and 'unoccupied' searches to be undertaken in realistic conditions, special facilities were set aside.

To enhance the joint approach, RUC officers also attended training at RSME; by the mid-1980s, after the Brighton Bomb, these had formally become the Police Search Adviser (POLSA) courses, open to all police forces. Both centres of excellence were staffed by experienced officers, WOs and NCOs who were heavily committed throughout to providing high-quality training that replicated the conditions in Northern Ireland with the ever-changing threat posed by the terrorist groups and their modus operandi. There were close links also to the Northern Ireland Training Teams (NITAT), which were based in UKLF and BAOR.

Clearance operations

There are numerous examples of the skill and bravery shown by Royal Engineers Search Advisers and search teams, and some individuals were decorated for their actions. They were placed under great pressure in a wide range of circumstances, often operating in challenging physical conditions and under mental



HIGH RISK SEARCH OPERATION, CROSSMAGLEN



stress. They were constantly required to concentrate on the task in hand and anticipate the threat of the 'unexpected' as PIRA terrorists developed increasingly devious ways of luring soldiers into traps, using different 'come-ons' and cunning methods of attack. There were secondary devices, booby traps, remote-controlled and command-wire IEDs and, as the teams often worked in exposed situations, the constant threat of the gunman. The incidents summarised below illustrate some of the work they undertook and the dangers they faced.

As described earlier in this chapter, in early August 1983 the Borucki sangar in Crossmaglen Square had to be replaced by a more secure and effective version. On 7 May 1983, Security Forces had noted that a truck carrying mortar tubes had been parked briefly in an estate close to the base. No attack was mounted by PIRA on that occasion; it may have been a trial run but it alerted military commanders. This was followed during the evening of 22 June by a real mortar attack from the same area, all ten tubes being fired. They exploded outside the base, missing a helicopter that was landing within the perimeter at the time. However, in the follow-up clearance to that attack, led by the 16 Field Squadron RESA (Staff Sergeant S. P. (Steve) Simonini), a booby-trapped battery pack was located at the remote firing-point. It was dealt with safely, and on this occasion PIRA failed largely due to the alertness and skill of the commander and his team. The next part of the story involves Operation *Joust*. This was planned for 3 August 1983 and was designed to deliver the new Borucki sangar. However, on 1 August a truck and car were stolen from a resident of Crossmaglen. Later that evening the next mortar attack on the base took place, using the stolen lorry. The Search Adviser together with his teams had already deployed to Crossmaglen in preparation for the following morning's deliberate route-clearance operation. It was decided that until the mortar baseplate was cleared the main resupply operation had to be postponed. While clearing the route up to the baseplate, a battery pack, which appeared to be a 'come on' and was possibly booby-trapped, was spotted by a member of one of the search teams a short distance from the baseplate. At this stage

it was just noted and avoided: they planned to deal with it later. Shortly afterwards, a device containing 25 kilogrammes of home-made explosive detonated in a house immediately adjacent to where the team was operating, wounding one JNCO. Fortunately the remainder were under cover and were uninjured. The house in which it had been hidden was largely demolished, and significant damage was caused to surrounding property. After a short break, the teams resumed the clearance operation. They confirmed that the battery pack was not booby-trapped, but as the direction of the blast from the IED in the house was towards it, no doubt PIRA had planned to kill the ATO as he dealt with the 'come on'. Operation *Joust* continued, and the mission was accomplished.

A second incident in October 1983 involved the same Royal Engineers Search Adviser and teams. In the early afternoon two men, one armed with a handgun, stole a car from outside the home of a resident of Newtownhamilton in South Armagh. Before taking the car they spoke to the owner's wife and told her that they were escapees from the Maze Prison. Minutes later they deliberately crashed the car into an earth bank at the side of the road just outside the village and abandoned it. They then hijacked a van and made good their escape. A cordon was placed round the vehicle, aerial photographic reconnaissance tasked. The clearance operation was planned for the following day, but in the meantime, however, the owner was taken by the RUC to identify the vehicle, and he noticed an unfamiliar black object in the back of his car. Suspicions were raised that there was an IED on board. Combined with the story of the escape from the Maze, there was concern that this was a 'come on', designed to catch unwary RUC officers. When the clearance operation was completed, an IED consisting of a pressure pad, timing and power unit and a 5-kilogramme charge of commercial explosive was found. Vigilance, suspicion and carefully enacted drills by an experienced Search Adviser and the teams prevented loss of life. Staff Sergeant Simonini was subsequently decorated for his outstanding service. There were others who received awards.

Not all such operations were successful. In 1988, a rural High Risk Search task was mounted using both the residential and roulement teams. It involved clearance of a large area including several farm complexes. With infantry protection moving up in parallel with the search teams, each area was searched and declared 'clear'. After one particular farm was confirmed 'clear' and the troops on the ground had moved forward, there was an explosion from one of the barns in that complex. A milk-churn device, with a hidden mercury tilt switch, had exploded. The farmer was very seriously injured, and the OC visited him in hospital a few days after the incident. The innocent man, who had suffered horrific injuries involving the loss of an arm and a leg, stated in a remarkably selfless way: 'I am so relieved that it was me and not one of your young soldiers that has suffered.'¹² It was a stark reminder of the dangers faced by Security Forces in Northern Ireland.

By 1996, during the tenure of Lieutenant Colonel Caws, the roulement engineer squadron provided the High Risk Search troop with four teams, and they were supported when necessary by three further teams from within the Regiment. The troop was initially based at the Maze but then moved with the roulement engineer squadron to Massereene Barracks, Antrim, on completion of the rebuilding there. In addition to the four RE Search Teams there were two specialist teams responsible for the explosives particle-detection equipment. The Search Troop also had Working in Confined Spaces trained members and there was a close operational link to the diving team. They supported the six Northern Ireland-wide RE Search Advisers, who worked from Antrim, Armagh, Belfast, Bessbrook, Londonderry and Omagh. 33 Squadron maintained operational continuity with two Search Advisers and three search teams. By this stage of the campaign there were two main roles. The first was the time-honoured support for counter-terrorist operations, and the second was the deep search of venues, led by RUC Police Search Advisers. In the three months leading up to June 1998 the six RE Search Advisers reported sixteen high-risk searches conducted across Northern Ireland, including finds and the decommissioning of four Mark

17 mortars, one Mark 18 mortar and one landmine, which had been targeted against hilltop sites and Security Forces' bases (including Forkill and Belleek RUC station) and against the railway.

1999 saw a generally low level of activity. There were no major searches or IEDs. In 2000, the emphasis changed with, for example, the need to clear the Fort George site in Londonderry of munitions in preparation for the handover to the civil authorities. Very little was found and the area was declared safe for redevelopment. Sadly, while searching the hold of a ship on 6 April 2000 Corporal J. Gaulder and Sapper J. Naivalura were killed.

Developments on the Mainland

In the early 1980s, PIRA increased their operations in mainland UK. They saw that a bomb there was worth ten in Northern Ireland. To help counter this, 58 Field Squadron EOD, commanded by Major J. R. (John) Wyatt, was raised in 1983. There were initially three operational roles: post-incident search, countering bomb threats from other terrorist sources and the disposal of pipe bombs left over from the Second World War. There followed pro-active offensive searches in the wake of the 1984 Libyan Embassy siege in London and other high-profile locations. In October 1984, PIRA struck at the heart of government with the Brighton Bomb. Five people were killed, but Prime Minister Margaret Thatcher escaped. This was a watershed: PIRA was now prepared to use long time-delay devices to attack important events. Royal Engineers were therefore placed in the vanguard of operations to counter this serious threat. It immediately became *de rigueur* for Sappers to be at the heart of preparing for State occasions, political party conferences and any events attended by VIPs that might attract the attention of Republican terrorists. This paid off – a bomb left in the Rubens Hotel adjacent to Buckingham Palace, for example, was located and was disrupted by the police.

Sappers in non-RE Appointments

Special Forces operations

A significant number of officers and soldiers from the Corps served in 22 Special Air Service (SAS) Regiment. The cartoonist Jak, in his book published in 1991 to commemorate 50 years of the SAS, made this apposite comment:

For some strange reason, the SAS attracts more men from certain Corps and Regiments of the British Army than others. It is perhaps natural that men of the Royal Engineers should be attracted to the SAS. They tend to be practical men, who prefer working on their own and it is a point worth making here that, on a percentage basis, the Parachute Squadron of the Royal Engineers is probably the Regiment's leading subscriber of men.¹⁸

In Northern Ireland, Sappers served with distinction at all levels in 22 SAS Regiment, 14 Company and Tasking Coordinating Groups (TCGs). These organisations were closely linked and played key parts in the penetration and disruption of both Republican and Loyalist terrorist groups. It could be argued that they made a disproportionate contribution to the success of the campaign. The SAS were deployed to Northern Ireland in 1976 following a statement in Parliament by the Prime Minister, Harold Wilson, that they were to be deployed to South Armagh. The PM was responding to the tit-for-tat killings in January 1976 of six Catholics by the Ulster Volunteer Force and ten Protestants at Kingsmills by PIRA. The SAS were involved in intelligence-gathering, reconnaissance and surveillance, training others in covert observation techniques, ambushes and raids. 14 Company was the successor to the Mobile Reaction Force (MRF), which had been set up in the early 1970s. They were strategic assets and worked under the umbrella of Intelligence and Security Group Northern Ireland.

The first Task Coordinating Group was formed in Belfast in 1979, and two more developed in the 1980s to cover the remainder of Northern Ireland. Their remit was to provide

intelligence-led tasking and coordination of covert operations involving Special Forces and other agencies. They were formed from a combination of RUC Special Branch (SB) and Army Special Forces' personnel. The success of this combination of highly specialist groups was a very important factor in the eventual demise of PIRA and Loyalist paramilitaries.

Sapper High Risk Search teams also supported these operations to clear hides for booby-traps and enable the safe removal of munitions.

Military Intelligence Officers

Early in the campaign, the British Army took few initiatives to aid knowledge transfer between roulement units. Limited intelligence operations were a major factor, the principal weakness being intelligence gathering. At the beginning the RUC, which might have been expected to spearhead this crucial function, was not in a position to conduct such activities and this prompted the Army to intervene and take the lead in this area. As the Troubles became more intense, military-intelligence units were formed and became active in gathering material. Some teams and individuals operated for extended tours compared with the normal roulement rotations. This provided continuity and enabled them to develop local knowledge and expertise.

Military Intelligence Officer (MIO) appointments were introduced in the early 1970s to provide the critical liaison between the RUC and Army intelligence organisations. Initially there were only three deployed to Northern Ireland, two in Belfast and one in Londonderry. Eventually there was on average one per RUC division. They were highly trusted officers. Because of the sensitive and important nature of the work they undertook, they required significant experience of intelligence issues, urban and rural operations and the ability to be discreet at all times. Historically, Special Branch had been wary of confiding in individuals perceived to be outsiders until they had the measure of the person to whom they were passing information. Military Intelligence Officers therefore had to build relationships with both Special Branch and personnel from other agencies to ensure

that coordination was relatively harmonious and friction-free. MIOs also had the responsibility of briefing battalion COs and passing back intelligence derived from questioning and tactical level operations. A small number of experienced Sapper officers who understood the local culture were employed on these duties.

Ulster Defence Regiment

A Sapper, Lieutenant Colonel R. J. D. (Robert) Reid, commanded 7th/10th (City of Belfast) Battalion Ulster Defence Regiment between 1985 and 87. At the time it was the largest infantry unit in the Army, comprising nine companies. It was some 1,400 strong, of which 120 were female, known as 'Greenfinches'. It supported three divisions of the RUC and worked closely with the fourth in Belfast. In addition to the priority responsibility of the city centre, which was the commercial heart of Northern Ireland and which had always been a prime target for PIRA vehicle-borne IEDs companies regularly deployed to border TAORs. Five off-duty soldiers of the Battalion were murdered in the period, and several others were targeted by PIRA.

Engineer logistics

The provision of effective logistic support for all the Sapper construction operations was a crucial factor in the timely and successful completion of the tasks described in this chapter. 325 Engineer Park, based at Massereene Barracks for the majority of the period, provided that flexible support with assistance as necessary from the Central Engineer Park at Long Marston. Until 25 Engineer Regiment was formed, the Park was under the command of the CRE. It consisted of two RE officers, the OC being a quartermaster and the second-in-command having a resources background. In the 1980s the establishment showed 33 RE soldiers together with some Royal Pioneer Corps troops for general labouring duties and Royal Corps of Transport drivers. Engineer materiel, specifically designed for use in Northern Ireland, such as button-on-fencing and components for sangars, was held along with temporary accommodation units and bulk materiel for concrete production. There was an extensive holding

of specialist vehicles, including articulated low-loaders, cranes and earth-moving plant, some of which was equipped with armoured cabs for use in public order operations. A range of engineer construction plant was available too. There were emergency power generating and lighting kits, and some of the former were incorporated into Security Forces' bases as they were developed. On the very extensive site at Antrim there were vehicle, metal, woodworking and paint workshops.

325 Engineer Park ordered, collected and delivered direct the materiel required by the squadrons. In the case of South Armagh, they played an important role over the years in Operation *Tonnage*, which is described elsewhere in this chapter. Sourcing the materiel was not straightforward and involved the OC in very sensitive, protracted negotiations. His staff dealt with a wide variety of civilian contractors who were often intimidated by PIRA. On one occasion in July 1986, John Kyle from Omagh was murdered because it was alleged that he had supplied the Security Forces. (The murder weapon was later recovered at the scene of the successful SAS ambush of a PIRA gang at Loughgall in 1987.) To reassure local contractors by maintaining personal security for those involved, invoices could not be sent to the mainland for payment. Great care had to be taken to ensure that they were not compromised. Vehicles used for the delivery of materiel to sites frequently had the registration details changed and had to be re-sprayed overnight before being loaded for deployment the following morning.

325 Engineer Park often manufactured replica terrorist weapons, for example Mark 10 mortars and bombs, for use in research by both Sappers and the RUC within Northern Ireland. Bombs were either dropped on, or fired at, various types of protection to assess their effectiveness.

When 25 Engineer Regiment formed up, the responsibility for such support was taken over by 43 Field Support Squadron.

Boat Operations and Shallow Water Diving

33 Squadron was responsible for the provision of boat operations support to Security Forces throughout Northern Ireland except

on Upper and Lower Lough Erne, for which the UDR battalion in County Fermanagh was responsible. This commitment was predominantly on Lough Neagh and on the River Foyle, close to Londonderry, and included reconnaissance patrols, intercept operations, movement of materiel and support for the diving



Divers at North Howard Street Mill.

section using Rigid Raiders and Combat Support Boats.

Not all boat operations went according to plan. In 1988, a Royal Marines' detachment carrying particularly sensitive equipment was to deploy to County Tyrone using Lough Neagh and the Boat Section as the means of entry. As one of the two new high-speed launches that had been acquired by 33 Squadron for this type of operation left its moorings and slipped down the Six-Mile Water estuary into Lough Neagh, the Boat Section commander felt confident of a successful mission. But disaster struck not long after ramping-up speed across the Lough, when one of the Royal Marines rushed on to deck from below to exclaim that the boat was taking on water very fast. In a moment of forgetfulness, and with a relatively new design of boat, the crew had forgotten to secure the 'bungs'. A helicopter rescue was mounted, and the crew with the RM detachment were saved without harm. What started as a boat operation ended as a diving operation, with the focus clearly on searching and retrieving the sensitive equipment. All ended well, which only goes to prove the benefit of having boat, diving and search operations all under the same command.

Shallow water diving was an important skill used to support a variety of operations throughout Northern Ireland, occasionally including activities offshore. 33 Squadron diving team in particular took part in searches of loughs in South Armagh trying to locate bodies dumped after terrorist incidents. They also worked with the RUC searching for weapons and munitions thought to have been discarded after incidents and on one occasion in the summer of 1983 they used explosives to help clear the wreckage of a sunken ship that was blocking the mouth of the River Bann. The Royal Navy was assisted off Portrush, on the North Antrim coast, and in Carlingford Lough in separate underwater clearance operations. Throughout the campaign, RE divers had the responsibility for routine checks of drains and sewers that ran close to, or directly under, Security Forces' bases. Sensors and grills had been installed over the years, particularly in Belfast and this reduced the burden somewhat. VIP visits and routes used during the marching season also required such

clearance operations. In 1983, during a joint RE/RUC operation in the vicinity of the Divis Flats in Belfast, a team recovered the body of a dead boy who had drowned in a sewer. On a more light-hearted note, in 1987 the commander of 33 Squadron, Major G. R. C. (Guy) Munnoch, who was a shallow-water diver, recalls that he presented the CLF with the Squadron plaque in the very murky waters on the floor of Lough Neagh. This was to show that 'Sappers do it differently' – but little did he realise at the time that the CLF was not an enthusiastic diver. He survived.

Some Reflections on the Campaign

Looking back over the whole period of more than thirty years, 1969 to 2000, that Sappers supported the Security Forces during the Troubles in Northern Ireland, it is clear that much was achieved, but at a cost. Lessons were learnt that would prove invaluable in future campaigns and operations. Mistakes were inevitably made, some with deadly consequences, but the successes over the period were very considerable, reminding Security Forces' commanders, Army and RUC alike, of the unique range of capabilities of the Corps of Royal Engineers, its versatility and its built-in ability to respond rapidly in any emergency.

In this brief history it is impossible to portray the atmosphere of fear, excitement and esprit de corps that existed throughout the campaign. Very many tasks were undertaken, mostly successfully, but of necessity they may have gone unrecorded here. Commanders regularly praised Sappers for their contribution (and some have been noted in this chapter). The police, then named the Royal Ulster Constabulary, were also fulsome in their gratitude for the contribution made by the Corps in so many ways – some by units, others by individuals often operating in civilian clothes. And many Sappers received awards for their service.

Royal Engineers were required to provide cover from view and protection from attack by gunmen, rocket-propelled grenades, mortars and vehicle-delivered bombs. Accommodation had to be built and improved, some temporary and some permanent, often to comply with civilian building regulations. Much of the work

was undertaken in exposed urban and border areas where the risk of attack was significant. Barricades were cleared on numerous occasions, often during rioting by angry mobs throwing petrol bombs or in the face of the threat of attack by gunmen. Many border-crossings between the Republic and Northern Ireland were closed, often using great ingenuity.

High Risk Search operations and Search training for all Security Forces were undertaken by the Corps. Teams always operated in a very dangerous environment. They were vulnerable to direct terrorist attack as they searched for remotely controlled devices or cleared the route for an Ammunition Technical Officer to a potential bomb. There were boat and shallow water diving operations. Sappers also deployed to Northern Ireland in the infantry role. Individuals served on operations as commanding officers of Ulster Defence Regiment battalions – indeed, the Regiment's first commander was a Sapper, Brigadier (later Major General) L. Scott-Bowden. They served in 22 SAS Regiment and in specialist intelligence gathering and other covert roles. A major engineer park operated, providing engineer materiel for all construction operations. Survey, together with Postal and Courier Services participated fully. Officers served in staff appointments in HQNI and elsewhere throughout Northern Ireland. Literally, Sappers were everywhere.

The upside was that all Security Forces were able to experience the whole range of the Corps' capability throughout the campaign. The operational requirement for Sappers as tradesmen, combat engineers and as soldiers was vividly demonstrated. Their flexibility was maximised by commanders. And the Corps of Royal Engineers rose magnificently to the challenge: indeed they relished it. Officers were able to provide direct and much-needed support to the Security Forces, often under great pressure and in extremely dangerous situations. Senior NCOs were regularly leading and being expected to perform tasks well above their job descriptions, while junior NCOs often had to operate away from their parent unit. The latter and even the Sappers serving in Northern Ireland, rapidly learnt how to become self-sufficient in an operational theatre.

The operational experience and the inevitably rapid 'coming of age' of all young servicemen resulting from a tour in Northern Ireland would benefit HM Forces in the years to follow. This ability to take responsibility and use personal initiative to complete tasks successfully, despite many and frequent challenges, has proved invaluable. There were also significant challenges over technical issues, with the need to develop a robust response in the face of a frequently changing threat.

Sadly there was a downside. More Sappers lost their lives during the period covered by this volume either serving in Northern Ireland or in the case of Colonel Mark Coe, murdered in Bielefeld as a direct consequence of the Troubles. This history cannot mention the detail of each tragedy. There were also failures: for example, some border-closure operations were only partially successful, and the command structure on occasions had its limitations. But lessons were learnt quickly, and overall the Corps proved to be remarkably successful.

In conclusion, it is worth returning to the flavour of service in Northern Ireland during this period. Vivid contrasts were experienced. The media often led the general public to believe that the whole of Northern Ireland was aflame. There were some periods of widespread unrest, but generally violence and extreme danger were localised. Numerous areas became too risky to drive through, even in a protected vehicle, and were placed out of bounds. But much of Northern Ireland was safe for Security Forces to travel in civilian clothes in a 'covert' car. Even the carrying of personal firearms on many journeys was deemed unwise. Some Sappers were on four-month emergency tours; others, such as the CRE, were on two-year tours of duty and were accompanied by their families. Family life there was unusual, to say the least. For instance, accompanied personnel could be in married quarters in Lisburn or Antrim one moment and then, within half-an-hour or so, be at the border or in Belfast assessing damage caused by a terrorist bomb attack on a Security Forces' base. And in the early 1980s, a hunger striker called Bobby Sands was starving himself to death in the Maze Prison, just a few miles up the road from Lisburn.

Everything about service in Northern Ireland was unusual and often bizarre. Things were not normally what they seemed. It proved extremely difficult for servicemen from mainland Great Britain to understand all the factors involved in any given situation. The pressures on local people were significant; the threat to their lives and livelihood were insidious, sustained and often not revealed. But at the same time, the hospitality of the majority of Ulster people was second to none. And the Northern Ireland countryside and coastline are magnificent.

In challenging circumstances, the Corps of Royal Engineers provided comprehensive and effective support for Security Forces' operations throughout the long, tortuous campaign. To mark the Corps' involvement, a silver centrepiece was made. It was designed by 325 Engineer Park and reflects the Royal Engineers' main tasks in relief on its six faces; representing the six counties where the operations took place. It is kept in the Royal Engineers Headquarter Officers' Mess at Chatham.

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The Northern Ireland silver centrepiece, which commemorates the part played by the Corps of Royal Engineers in Northern Ireland between 1969 and 2007 depicting, in relief, the main activities of protective works, construction, border closures, high risk search and infantry role operations.

Senior Engineer Officers in Northern Ireland

CRE Northern Ireland	
1980	Lieutenant Colonel R. M. Stancombe
1982	Lieutenant Colonel F. A. F. Daniell
1984	Lieutenant Colonel J. G. Barber
1986	Lieutenant Colonel D. P. Stephenson
1988	Lieutenant Colonel S. W. Hesketh
1990	Lieutenant Colonel C. W. Crawford, MBE
CO 25 Engineer Regiment	
1992	Lieutenant Colonel A. C. Mantell
1994	Lieutenant Colonel M. G. McAlpine
1996	Lieutenant Colonel I. M. Caws
1998	Lieutenant Colonel C. R. J. Sloane

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Northern Ireland Glossary

Alliance Party Founded in 1970, it is one of the main political parties in Northern Ireland and attracts support from across the sectarian divide.

ANFO Type of home-made explosive (HME). Consisted of ammonium nitrate and fuel oil. Used frequently by PIRA in the construction of large IEDs.

Anglo-Irish Agreement Agreement signed on 15 November 1985 by Margaret Thatcher and the Irish Taoiseach, Garret FitzGerald, with the objective of addressing all-Ireland issues. It inflamed Unionist opinion.

Apprentice Boys of Derry Protestant group that organises parades to commemorate the siege of Derry in 1688 when apprentices closed the gates of the City on the approach of the army of King James II. From this came the cry 'No Surrender!'

Ard fheis Irish name for a political party's annual conference.

Airborne Reaction Force (ARF) Used by the Army to react quickly and move generally by helicopter to the scene of an incident.

Armалite US Army rifle used to significant effect by PIRA.

Active Service Unit (ASU) Term used to describe a small group of PIRA terrorists, normally four or five strong. Concept developed by PIRA from the mid-1970s to try to resist penetration of the organisation by SF.

Ammunition Technical Officer (ATO) The ATO disposed of the IED, once its location had been confirmed by RE High Risk Search (HRS) teams who were also responsible for clearing routes to the scene. Formerly Royal Army Ordnance Corps, latterly Royal Logistics Corps. Known as 'Felix'.

Booby Trap These were used by PIRA as a means of detonating an IED to kill SF. On occasions they were attached to a 'come-on', an item that might be attractive to a member of SF.

Border Crossing Point (BCP) Routes across the border between Northern Ireland and the Republic. Many were closed by RE in an attempt to stop the easy movement of terrorists and munitions.

Button-on-Fencing Profile sheeting together with steel supports and appropriate reinforced concrete foundations originally designed in the mid-1970s by 523 STRE (Const) to replace corrugated iron (cgi) cover-from-view fencing in Northern Ireland.

Castledillon The country house north of Armagh used by RE squadrons as their base within 3 Infantry Brigade's TAOR.

CATO Chief Ammunition Technical Officer – the senior RLC officer based at HQ Northern Ireland, commander of all the ATOs.

Commander Land Forces (CLF) Commander Land Forces, a two-star appointment at HQ Northern Ireland, Lisburn.

Close Observation Platoon (COP) Platoon in an infantry battalion that underwent specialist training to enable intelligence gathering activity using observation techniques and equipment.

Cordon Cordons of soldiers were used to isolate the scene of an incident or to prevent terrorists or their supporters infiltrating an operation.

Cover-from-View Originally corrugated iron (cgi) but, during this period, mainly button-on-fencing erected to prevent terrorists from seeing into SF installations and selecting targets.

Command Wire Improvised Explosive Device. (CWIED) Used by PIRA. The device, e.g., a culvert bomb, was detonated from a firing point some distance away. The IED was detonated electrically using the CW.

Continuity IRA (CIRA) One of the two dissident groups that emerged from PIRA after the Peace Process commenced. The other was the Real IRA (RIRA).

Covert vehicle A hired vehicle with local number plates, which members of the SF could use to travel within Northern Ireland incognito.

CRE Northern Ireland The commander of all Regular RE units in Northern Ireland, based at HQ Northern Ireland and reporting to the GOC via the CLF. The post was combined with that of the CO of 25 Engineer Regiment in 1992.

Crowd Control Obstacle (CCO) Container filled with concrete and with deployable wing walls. Used to enable SF to control aggressive crowds. Delivered on RLC DROPS vehicles.

DCRE Wks The RE design cell under the command of the CRE at HQ Northern Ireland.

Democratic Unionist Party (DUP) Founded in 1971 by Rev Ian Paisley representing largely lower-income group Protestant views.

Demountable Rack Offload and Pickup System (DROPS) Vehicle used by RLC to deliver, e.g., CCOs.

Explosive Ordnance Disposal (EOD) The removal or destruction of improvised explosive devices. There was a split of responsibility between RE High Risk Search and RAOC (later RLC) EOD teams. The former cleared the route to the IED, and the latter disposed of the device.

Electronic Counter Measures (ECM) Equipment designed to combat the threat posed by remote-controlled (RC) IEDs. By the 1980s, Army patrols were equipped with manpack sets. There were vehicle mounted versions.

Flit SF using a covert vehicle to recce a route, eg, for Operation *Tonnage*. Also described a small, fast moving convoy at night carrying materiel to Crossmaglen or Forkill.

Garda Siochana Known as the Garda. It is the police force of the Irish Republic.

General Officer Commanding (GOC) Three-star appointment at HQ Northern Ireland, Lisburn.

General Purpose Machine Gun (GPMG) Standard Army machine-gun. Replaced by the SA80.

Good Friday Agreement Agreement signed on 10 April 1998, which was a major step forward in the Peace Process.

Grand Central Hotel The former five-star hotel in Royal Avenue, Belfast, that was used as an SF base until 1982.

H Blocks Compounds within the Maze Prison, so named because of their layout in 'plan view'. They became the focus for Republican protests, culminating in the hunger strikes of 1981.

Headquarters Northern Ireland (HQNI) Three-star HQ at Thiepval Barracks, Lisburn. 39 Infantry Brigade (initially 39 Airportable Brigade) was co-located. The barracks was attacked by PIRA on 7 October 1996, when two car bombs were detonated.

High Risk Search (HRS) Search operations undertaken by RE when the risk of encountering an IED was high. Other search operations were undertaken by infantry Low Risk Search (LRS) teams. All HRS teams were trained by RE at RSME.

Improvised Mortar A weapon system used by PIRA to enable stand-off attacks against SF bases. The baseplate could be booby-trapped to catch unwary SF in the follow-up operation.

Incident Control Point (ICP) Location set up from which a specific incident could be controlled. It was generally jointly used by the Army and RUC.

Irish National Liberation Army (INLA) Small but very violent Republican paramilitary group, which also took part in internecine feuds. It was formed in 1974 as a breakaway from PIRA.

Irish Republican Socialist Party (IRSP) Political wing of INLA.

Irish Republican Army (IRA) From 1969, the IRA split into Official and Provisional wings.

ISO Containers International Standardization Organisation containers used for transporting freight by land, sea and air.

Long Kesh Original name of the Maze Prison. It was constructed in 1971 by RE to house internees.

Loyal Orange Lodge The Orange Order comprises Orange Lodges. Founded in 1795, it is a Protestant organisation well known for organising marches and events to commemorate the victory of King William on 12 July 1690 at the Battle of the Boyne. Traditionally linked to Unionism.

Military Intelligence Officer (MIO) Army officers who provided critical liaison between RUC and Army intelligence organisations.

Mobile Reaction Force (MRF) Intelligence-gathering unit, which was superseded by 14 Company.

Northern Ireland Training and Advisory Team (NITAT) Special teams dedicated to delivering training in both UK and Germany for those units and independent subunits deploying to Northern Ireland. They concentrated on low-level tactics. RE personnel formed part of each organisation, primarily for search operations.

Northern Ireland Office. (NIO) Office of the British Government set up to administer Direct Rule from Westminster.

Official Irish Republican Army (OIRA) IRA was resurrected in the mid-1960s under Cathal Goulding. It became known as OIRA. It was a Marxist organisation, which was not prepared to participate in the 'armed struggle', although it perpetrated atrocities including the bomb in the Parachute Regiment Officers' Mess, Aldershot, in 1972. It declared a unilateral cease-fire in 1972. Also known as the 'stickies' from their use of adhesive badges to commemorate the Easter Rising of 1916.

Official Unionist Party (OUP) Name adopted by the section of the Ulster Unionist Party that opposed the concept of power sharing in 1974. It eventually became the majority of the party and reverted to the original name.

Operations Banner and Descant The names given to the deployments of units to Northern Ireland during the campaign. The former covered those for UK-based units, the latter those from the British Army of the Rhine (BAOR).

Options for Change See Chapter 2 for details.

Police Authority for Northern Ireland (PANI) From 1970, this organisation had the statutory power of holding the RUC Chief Constable to account. All members were appointed by the Secretary of State. It was replaced by the Policing Board as a result of the *Report of the Independent Commission on Policing in Northern Ireland*, published in September 1999.

Peaceline Name used to describe the fencing constructed by RE in the very early 1970s to provide a physical barrier between Catholic and Protestant communities in Belfast. Initially it was a temporary structure, built using scaffolding and corrugated iron. Over the period of the Troubles, the barriers were developed into permanent structures.

Peace Process Events leading up to the 1994 PIRA cease-fire, the end of most of the violence of the Troubles, the Good Friday Agreement and subsequent political developments.

Pig Term used by SF to describe the one-ton armoured vehicle used by the Army for the first twenty years of the campaign as an armoured troop carrier.

Provisional Irish Republican Army (PIRA) PIRA was born in 1969, splitting from OIRA. It was a revolutionary organisation with the goal of a united Ireland as a 32-county state that would be both Republican and Socialist. The largest of the Republican paramilitary organisations, it was responsible for the 'armed struggle' in Northern Ireland, mainland UK and in Europe until the final cease-fire in 1998. Known by Republicans as Oglagh na hEireann. Provisional Sinn Féin ('Ourselves Alone') is the political wing.

Plastic Bullet Officially known as a Plastic Baton Round. It was a controversial weapon system used by SF in riot situations. It could be lethal.

Permanent Vehicle Check Point (PVCP) Check point constructed by RE. They were generally on main routes and were designed to enable SF to check the details of those travelling in the vehicle and, if necessary search it. They were vulnerable to attack.

Radio-controlled improvised explosive device (RCIED) See ECM, above. PIRA used radio-controlled means to detonate IEDs.

Real IRA (RIRA) One of the two dissident groups that emerged from PIRA after the Peace Process commenced. Responsible for the car bomb that was detonated on 15 August 1998 in Omagh, killing 29 people, the single worst atrocity during the Troubles. The other dissident group was the Continuity IRA (CIRA).

Rocket-propelled grenade, RPG 7 Weapon used by PIRA against sangars and armoured vehicles. Warsaw Pact origins.

RE Search Adviser (RESA) Junior RE officer or SNCO who specialised in planning and supervising HRS operations during a deployment to Northern Ireland. Trained at RSME.

RE Search Team (REST) Six-man team of RE soldiers. Responsible for HRS operations under the supervision of a RESA.

Royal Ulster Constabulary (RUC) Established in 1921, after partition. Its forerunner was the Royal Irish Constabulary (RIC). 304 policemen, including RUC Reserves, were killed during the Troubles. It was replaced by the Police Service of Northern Ireland (PSNI) following the *Report of the Independent Commission on Policing in Northern Ireland*, published in September 1999.

RUC Reserve Consisted of both full-time and part-time members. They operated alongside Regular RUC officers.

Sacrificial floor The top floor of specially designed SF accommodation, such as at Forkill and Crossmaglen, that would remain unoccupied and absorb the force of a direct hit by a mortar bomb.

Sangar Protected installation, generally built by RE. They were used for guarding locations and observation purposes. In the early days of the campaign they were constructed using sandbags. This was superseded by high-density blockwork and finally pre-fabricated versions were installed.

Search Described as 'the systematic procedure for finding terrorist munitions, documents and other equipments in addition to locating their bombs and booby traps'. It was split into High (HRS) and Low Risk (LRS). Valued as an offensive weapon against the terrorist, HRS was taught at RSME, while LRS was taught at RSME and Sennelager. Continuation training continued at NITAT and in Northern Ireland.

Special Air Service (SAS) Elements of 22 Special Air Service Regiment were deployed to Northern Ireland from 1976, in response to tit-for-tat sectarian murders.

Social Democratic Labour Party (SDLP) Main Nationalist party, set up in 1970 with the objective of promoting a united Ireland by peaceful means.

Secondary Device Terrorists used a second device on occasions with a view to catching SF dealing with an initial IED.

Semtex A powerful commercial explosive used by PIRA.

Security Forces (SF) A term used to describe the RUC and Army. The abbreviation also covered Special Forces, primarily SAS.

Sinn Féin 'Ourselves Alone'. It was the original Irish Nationalist party, founded in the early twentieth century, when all Ireland was British. It is an all-Ireland political party, which has representation in Dublin and since the 1980s, in theory, at Westminster. It took no part in elections both north and south of the border until the early 1980s. It developed into a very effective political party in Northern Ireland, increasing in strength and representation. Sinn Féin MPs refuse to take their seats at Westminster. It has representatives in the Northern Ireland Assembly.

Self Loading Rifle (SLR) Used by the Army as the standard weapon, with a single-round capability. Replaced by the SA80.

Stormont Home of the Northern Ireland Parliament until 1972, when Direct Rule from Westminster was imposed. The impressive building was completed in 1929. It became the seat of the Northern Ireland Assembly after the Good Friday Agreement of 1998.

Tactical Area of Responsibility (TAOR) Term used by the Army to describe the area in which a unit or subunit operates. It has clearly defined boundaries.

Tasking and Coordinating Group (TCG) Joint RUC and Special Forces organisation designed to provide intelligence-led tasking and coordination of covert operations.

The Troubles Periods of ethno-political conflict in Northern Ireland that spilled over at various times into mainland United Kingdom and Europe.

Ulster Defence Association (UDA) The largest Loyalist paramilitary group. It was established in 1971 and proscribed in 1992.

Ulster Democratic Party (UDP) Political wing of the UDA.

Ulster Defence Regiment (UDR) Raised in 1970 after the Hunt Report recommended the disbandment of the 'B Specials' (Ulster Special Constabulary). Its first commander was Brigadier Scott-Bowden, late RE, and it was made up of full and part-time officers and soldiers. At its height there were eleven battalions. It merged with the Royal Irish Rangers to become the Royal Irish Regiment in 1992. Three Sapper officers commanded battalions. The Regiment served for just over 22 years on continuous operational duty. 257 were killed.

Ulster Freedom Fighters (UFF) Part of the UDA.

Ulster Special Constabulary (USC) Established on the partition of Ireland to provide a force to defend Northern Ireland from the IRA. It was disbanded in 1970 and replaced by the UDR. The 'B Specials' were particularly well known as part of the USC.

Ulster Unionist Party The main Unionist party in Northern Ireland. It was dominant from 1920 until 1972 on the imposition of Direct Rule from Westminster. It became the Official Unionist Party to distinguish it from the DUP.

Under Vehicle Improvised Explosive Device (UVIED) A booby trap used by PIRA. The explosive charge, contained in a box, was fixed to the car, generally using magnets. It was detonated using a mercury tilt switch.

Ulster Volunteer Force (UVF) Loyalist paramilitary group. It was declared illegal in 1975.

Ulster Freedom Fighters (UFF) Loyalist paramilitary group linked to the UDA.

Vehicle Borne Improvised Explosive Device (VBIED). A large bomb, generally but not exclusively, made of home-made explosive. The vehicle, e.g., a van or lorry, was used to deliver the bomb to the target.

Vehicle Check Point (VCP) Frequently used by SF, as part of framework operations, to monitor the movement of vehicles and people. They were generally set up for short periods. They were vulnerable and lost the potential of surprise if they remained in position for too long.

Worldwide Commitments

Introduction

Earlier chapters of this volume have shown how the realities of government priorities led to a form of soldiering quite different from the general war for which the Army was principally trained and equipped in 1980. By the 1990s Northern Ireland, the Falklands War, the Gulf War and the Balkans operations had figured in many soldiers' lives. There was, too, an abundance of lesser commitments, some programmed, others as short-notice emergencies, to enliven the schedules of already-busy units.

While there may have been few common threads in their political backgrounds, to the soldier these commitments all offered something different and for the British Sapper a break from routine European soldiering. Most of the Corps involvement was on the combat engineering and artisan trade side, but a commitment also remained to provide mapping to meet military needs in locations where British forces were still stationed.

The Corps' world-wide activities were very varied and included:

- Supporting British dependencies.
- United Nations operations and related international interventions.
- Disaster relief.
- Treaty exercises: projects and exercises conducted under bilateral defence relations agreements with countries, normally on a continuing basis over a period of time such as the series in Canada known as *Medicine Man* and *Waterleap* and in Kenya, *Larchpole* and *Oakapple*.
- One-off projects in support of foreign policy or defence interests.
- Survey operations.

The scale of all this was well illustrated by the EinC, Major General M. (Mike) Matthews, in his report to the to the Corps in June 1983:

The next part of my talk will bring you up to date with what the Corps is doing in other parts of the world.

First, Hong Kong, 67 Gurkha Field Squadron have recently moved into their very fine new barracks at Perowne. The Sappers out there, like the rest of the Army, have been kept very busy patrolling the border and the sea approaches to the Colony. I was most impressed with the boat patrols run by the Regiment, 33 Engineer Regiment (EOD) are currently undertaking the challenging task of clearing an old, abandoned, burnt-out ammunition dump near Lyemun on the route of a proposed new trunk road.

We have also had Sappers in Nepal. Members of 19 Topographical Squadron worked on the summit of Dimba (11,010 feet!) with a splendid view of Mount Everest.

11 Squadron have recently returned from Kenya where they were involved in building a camp for the Kenya Army.

As usual the Sappers have been involved in many parts of the Middle East:

(1) We have a field squadron second-in-command in the Omani Engineers, and next week we will have two of them.

(2) We have a Sapper supervising the building of the new Qatar Defence HQ.

(3) The last member of our team with the Saudi Arabian National Guard, known as SANG, leaves next week.

(4) We have a Colonel, Lieutenant Colonel, Captain and two SNCOs working with the UK team running one of the hospitals for SANG.

(5) In the Lebanon a party of Sappers from Cyprus prepared the accommodation for the British Armoured Car Squadron in the Multi-National Force.

(6) In Sinai we have a GE. [Garrison Engineer]

(7) Major (Retd) Arthur Hogben and Major John Rogers (21C 33 Engr Regt (EOD)) were part of an international team that went to Egypt recently to discuss mine clearance in the Western Desert.

(8) In Cyprus, besides the usual work we have been doing for many years, we have recently been clearing Greek and Turkish mines along the Green Line.

Moving West, in Gibraltar, the Sappers continue to be responsible for the power station. 1 STRE will be carrying out some combat

engineer training in the UK later this year. To maintain the force levels in Gibraltar a UK based unit will be sending out the equivalent number of personnel (up to twenty) to continue the artisan commitments.

Moving South, in Sierra Leone a composite troop built two Bailey bridges and refurbished eight timber bridges, earning themselves a great reputation in that country.

Moving further South, at Halley Bay in the Antarctic, a detachment from 24 Squadron was involved in building an unusual accommodation complex on behalf of the British Antarctic Survey.

Swinging North again, in Belize, roulement squadrons have continued to maintain camps and do a number of small construction tasks as well as acting as infantry.

In Canada 59 Squadron on this year's WATERLEAP is currently working on power and water supply and roads for the Canadian Forces.

In June last year a troop of 10 Squadron converted a WW2 German Gun Casement at Merville France into a Museum for the Airborne Assault Normandy Trust.

In Northern Ireland, where we have come down to just 33 Squadron and a roulement troop from Germany, our tasks have been as varied as ever with search playing a major part.

In addition to their normal world wide responsibilities, the Postal and Courier Service:

- are now supporting both Civil and Military communities in the Falklands.
- operating in the Lebanon and in Sinai.
- and during the last year they have supported thirty-six overseas exercises.¹

Until the end of the threat from the Warsaw Pact in 1991, the forces for these operations and exercises were invariably mounted either from HQ UKLF at Wilton or, in the Far East, by HQ British Forces based in Hong Kong. In the 1990s units based in Germany, and now part of Land Command, also became available for such tasking.

British Dependencies

The dependencies Hong Kong, Belize, Gibraltar, and Cyprus still required a permanent military presence; they also generated commitments for UK-based units. The situation in Hong Kong was

unique in that the handover to China was the inevitable consequence of the ending of the nineteenth-century lease on the New Territories. There it was the manner of the change, rather than the fact, that was in dispute. Belize, by contrast, was bedevilled by a territorial quarrel with its neighbour, Guatemala, which left Britain with a definite defence commitment without which transfer to full independence would not have been easily achieved.

Gibraltar's strategic importance had been subsumed under the wider considerations of the NATO alliance; her political future was now a matter of resolving the conflict between the historic claims of her Spanish neighbour and the fears and aspirations of her population. Britain's interest in Cyprus centred on the sovereign base areas, retained since Cyprus became independent in 1960 for their importance as a communications centre and potential support base for operations in the region. However, Britain also played a continuing part in the United Nations presence that had maintained the buffer zone delineating the territories allocated to the two communities split since 1960 and from which the Turkish Republic of Northern Cyprus was declared in 1983 (and recognised only by Turkey).

Withdrawal from Hong Kong

Background

The development of Hong Kong as a financial and economic centre after the Second World War was a remarkable success. Nevertheless, Britain had little option other than returning the Colony to China when the 99-year-lease on the New Territories, signed in 1898, expired, and in 1984 an agreement was signed under which the sovereignty of Hong Kong would pass to the Peoples' Republic of China in 1997. The Sappers in Hong Kong continued to support the garrison and the Hong Kong Government until the withdrawal.

Royal Engineers Organisation

Following the withdrawal of 54 Support Squadron in 1975, all combat engineers in Hong Kong were found from The Queen's

Gurkha Engineers (QGE). At the beginning of the period the Regiment comprised a regimental HQ and 67 Gurkha Field Squadron, based at Perowne Barracks, and 68 Squadron based at Bowring Camp (named after the first two QGE regimental colonels), in the Castle Peak area of the New Territories, and a Support Squadron (redesignated 70 Support Squadron in 1982) at Sek Kong. The Commandant QGE was also CRE Hong Kong with responsibilities stretching from the Pacific Islands to Nepal.

69 Gurkha Independent Field Squadron was reformed on 1 March 1981 in Hong Kong. A parade to celebrate this event was held on 4 May, after which the Squadron left for Kitchener Barracks at Chatham, becoming operational at the end of 1981. Generating sufficient trained manpower for 69 Squadron was to have a significant impact upon the rest of the Regiment for some time to come, but having a squadron based in the UK offered the opportunity for Gurkha Sappers to gain much greater experience, as well as benefiting from UK rates of pay, something until then only available to Gurkha infantry units that had had a battalion based in UK on a rotational basis for a number of years. Until then, the only Gurkha Sappers in UK were those on courses.

Discussions about the longer-term future of the Brigade of Gurkhas, post Hong Kong, began in earnest in 1987, and it was clear that the future of QGE was tied inexorably to the future of the Gurkha infantry – without the latter it would be difficult for the three Gurkha Corps units to survive. After considerable debate and uncertainty, it was decided that QGE would be run down after 1997 to a single field squadron, which would become part of 36 Engineer Regiment at Maidstone. In 1993 the run-down of the Hong Kong garrison started in earnest. Within QGE the RHQ, 68 Gurkha Field Squadron and 70 Support Squadron were disbanded in December of that year. The only combat engineer unit in Hong Kong was now 67 Gurkha Field Squadron, redesignated as an independent squadron. In the UK, 69 Gurkha Independent Field Squadron lost its independence when it moved to join 36 Engineer Regiment. The final part of the jigsaw was put in place when 67 Squadron disbanded in 1996.

Apart from combat engineers, there were other Sappers in Hong Kong throughout this period. Military Engineers Services (Works) provided a number of individual works officers and clerks of works, who were integrated into the Hong Kong Government Architectural Services and Electrical Services Divisions and played a key role in the maintenance of the military estate. The Survey Cell, coordinating survey work throughout the region, continued to function until 1997. The Postal and Courier Service was also there until 1997 but was absorbed into the new Royal Logistics Corps in 1993.

Operations, Projects and Disaster Relief

No major military threat to Hong Kong existed at this time. There was talk of the danger of limited incursions by Chinese forces close to the border acting on their own initiative, but this may have been more an effort by successive commanders to motivate training than representing a genuine threat. The long-standing role of backing-up the police in dealing with violent civil unrest continued, and units were, of course, expected to maintain their combat readiness for operations outside Hong Kong.

The main operational effort during this period was the joint police-military effort to prevent illegal immigration from China and, increasingly, by sea from Vietnam. The engineer part in this was to continue to support operations on the border by improving the border camps and physical obstacles, particularly the border fence, and to provide waterborne interception in conjunction with the Marine Police. The Regiment had established a Boat Troop equipped with Sea Riders and Rigid Raiders specifically for this task, and these were deployed in the waters to the east and west of the New Territories searching for 'illegals' attempting to enter the Territory by boat or swimming. In addition it frequently moved infantry, also involved in the operations, to remote areas. Latterly the operational task switched more to anti-smuggling patrols. Boat Troop was in existence for thirteen years and established an enviable reputation among other elements of the garrison. It also provided a marvellous training arena for watermanship in which

Gurkhas do not have natural skills. Some tens of thousands of Vietnamese boat people fled to Hong Kong and were interned by the Hong Kong government in temporary camps until repatriation could be arranged. Some of these were old military camps, including Bowring Camp, erstwhile home to one of the QGE field squadrons; others were temporary camps set up as quickly as possible to cope with the flood of immigrants. Eventually, purpose-built camps were established by the Hong Kong Government. QGE and MES (Wks) were heavily involved in reactivating the old camps, improving their security and restoring essential services.

Another regular commitment was Counter Terrorist Search. QGE maintained and trained its own search teams and, because of the Royal Engineers' acknowledged skill in this area, also trained the Royal Hong Kong Police (RHKP). Throughout the Territory there was a close relationship with the RHKP, which resulted in a number of joint operations, including defensive searches of important venues for the visit of the Queen in 1986, and the Prince and Princess of Wales in 1989. Their high-profile itineraries meant that a number of the most impressive structures in Hong Kong had to be declared safe. Riding on the roofs of the external lifts of the Hong Kong and Shanghai Bank building, searching the new western harbour tunnel and the multi-storey exhibition centre, complete with its display of Ferraris, were eye-openers for young Gurkha searchers.

The majority of time was spent on projects of varying complexity. They ranged from major tasks, such as a 54 metre reinforced concrete bridge and road on Lantau, a road into the Castle Peak Range and Internal Security training facilities at Sek Kong, through medium sized projects such as the construction of jetties, jeep tracks, a large shelter for a drug rehabilitation centre, training and sports facilities for schools for the handicapped, to smaller self-help tasks on the military estate. Many were in support of the infantry battalion on duty on the border, improving defences, obstacles and living accommodation. They all offered the opportunity for valuable practice in project planning and control, design work and the application of trade

skills. 67 Squadron took part in an unusual project with the Nepalese Army, helping to build a section of a mountain road from Katari to Okhaldhunga in East Nepal on Exercise *Holdfast* 1996, just before the Squadron disbanded. The road was in challenging terrain, as shown in the two photographs, and



Exercise *Holdfast*, 1996, in East Nepal. 67 Gurkha Independent Field Squadron constructing a major culvert and a gabion retaining wall.



offered the QGE Sappers a rare opportunity to exercise in their home country.

Military involvement in disaster relief within Hong Kong had reduced over the years, as the Hong Kong Government built up its own agencies for the purpose, but there were still occasional calls on the military, particularly Sappers, for help. Examples of the sort of work this involved were the construction of emergency flood defences and the clearance of roads blocked by landslides, the damage being normally caused by persistent monsoon rain or typhoons. As successive typhoon signals were raised at the Royal Observatory in Kowloon, the military assumed higher states of readiness in preparation for possible operations, while the whole community braced itself for the coming onslaught. Gurkha Sappers were also frequently tasked with a variety of disaster relief operations further afield, often in the smaller Pacific islands (some of which are mentioned later in this chapter).

Training

Hong Kong provided good terrain for the basic infantry training needed by the Gurkha Sappers, although there were limitations on firing some support weapons, but there was not the same scope for combat engineer training. Standards were enhanced by the rotation of soldiers through 69 Squadron in UK, while increasing use was made of courses at RSME. This individual training was consolidated in-theatre by exercises at all levels of command including internal security exercises held jointly with the RHKP. Every effort was made to get each field squadron out of the Territory regularly to provide more challenging training opportunities, Brunei becoming a regular destination.

Training facilities had been redeveloped at Perowne Barracks. These covered combat engineer training and assault pioneer training for the Gurkha infantry, Class 2 trade training in a replica of the workshops at RSME with carpenters, plumbers, welders and bricklayers all copying the syllabi of the Chatham courses, and counter terrorist search training. For Class 1 training and the more demanding technical trades, soldiers were sent to the UK. Despite the excellent facilities at Perowne,

however, it became clear that closer integration of all training with the ever-changing UK courses would be necessary to maintain uniform standards, and a gradual move was begun to get all soldiers back to UK for their courses.

Withdrawal

In 1996 the last QGE unit in Hong Kong disappeared with the disbandment of 67 Gurkha Independent Field Squadron. Any disbandment is difficult and sad, but this one had its own special characteristics. All or part of the QGE had been in Hong Kong since 1962, and much of its accumulated belongings were still with 67 Squadron. The soldiers were to be dispersed, some being made redundant and returning to Nepal, some to joining 69 Gurkha Field Squadron in the UK. Gurkha families, who had become accustomed to the support and protection of the British medical and welfare facilities, had to return to Nepal. Amid all the packing and preparations for departure, time had to be found to show round members of the People's Liberation Army, who it was thought would inherit the barracks the following year. On 6 September 1996, 67 Squadron mounted a final dusk parade at which the Squadron Sergeant Major handed the Squadron flag to the Colonel of the Regiment, Major General A. D. (Tony) Pigott, for safe keeping in anticipation of the Squadron one day being re-raised. After the disbandment of the Squadron, there remained a handful of Works Service staff in Hong Kong, and the very last Sapper to leave Hong Kong was Major A. R. (Alf) Palmer.

There had been a Sapper presence of some sort in Hong Kong from the time that it was acquired by the British Crown in 1841 and described by the Foreign Secretary, Lord Palmerston, as a barren rock with scarce a house upon it.² The Corps' legacy in Hong Kong is part of the landscape, from the construction of military roads such as Route Twisk (Tsuen Wan to Sek Kong, built to move armour to the border), and the Luk Keng road (from Plover Cove to Sha Tau Kok, also originally built to allow the border to be reinforced) to the many jeep tracks, jetties, footpaths and other minor structures all over the New Territories.



BELIZE

Although all the serving Sappers departed, a significant number of both British and Gurkha retired Sappers stayed on, working as managers, designers and tradesmen on the massive civil engineering projects connected with the new Hong Kong airport at Chep Lap Kok. At one time there were so many ex-Gurkhas working there that they called themselves '71 Squadron'. This was claimed to be the largest civil engineering project the world had ever seen, and by coincidence the site is on Lantau Island, just across the water, and in view of Perowne Barracks and Tai Lam, where Sappers had been stationed for some fifty years.

Belize

Belize (formerly British Honduras) achieved independence on 21 September 1981 but only on the basis that Britain would continue to maintain a military presence. The problem was that emerged from time to time was that Guatemala would assert its claim to territory in southern Belize. The previous volume of the Corps history records how Britain's responsibilities for the defence of Belize built up as the threat from neighbouring Guatemala developed in the 1970s.³



20 Field Squadron patrolling Haulover Cut, Belize, in Rigid Raiders, 1988.

The Belize Defence Force consisted of a light infantry force of regulars and reservists along with small air and maritime wings. It assumed total defence responsibility from British Forces Belize on 1 January 1994, three years after the Guatemalan government recognized the self determination of the Belizean people and ten years after Belize's independence. During the period until 1994, the Corps' commitment to British Forces Belize was normally a field squadron on roulement. The role was to continue work in connection with the expansion of the garrison infrastructure, as described in Volume XI, and to provide engineer support to the British forces in the country. For most of the period these comprised an infantry battalion, an artillery field battery, an Army Air Corps flight with Gazelle and Lynx helicopters, plus an RAF detachment providing air support with four Harriers and additional helicopter support with Pumas.

Numerous projects were undertaken by the Sappers, perhaps the most challenging being the upgrading of the main explosives storage site in Belize, the Ladyville Explosive Storage Area, to reach the standard for a licence from the Directorate of Land Service Ammunition. This absorbed significant effort from elements of successive roulement Belize field squadrons before being completed in 1993 by 25 Field Squadron under Major A. D. (Tony) Harking. Its final cost to the Foreign and Commonwealth Office was just short of £740,000, and the date of its handover coincided with the announcement of the impending withdrawal of British troops from the country.⁴ The tasks included the construction of five steel storage sheds, complete with huge clay traverses, site roads, concrete and stone hard standings, extensive electrical wiring to provide power to secure bunkers and to incorporate an intruder detection system, and laying and commissioning an 8-inch-diameter pressurised fire main around the site, complete with pump house and twelve hydrants. As a troop commander from 25 Squadron described it later:

The project involved a wide variety of tasks many of which, although not technically demanding, had not previously been encountered by either of the construction troops. These tasks included the reclaiming of the majority of the site from the

surrounding jungle and mangrove swamp, which was inhabited by poisonous snakes and crocodiles; one of the latter was captured during Phase Two and became the project pet.⁵

This was one of the last major projects before the demise of British Forces Belize. However, Belize offered opportunities for military training of a highly demanding nature, including adventure training, and construction projects for the Corps. It is a country of greatly varying terrain ranging from a low coastal plain to jungle-covered mountains, of poor communications and a tropical climate. Off the coast there are hundreds of small islands, or 'cayes', and a fascinating underwater natural history. Arrangements were therefore negotiated for continuing training in the country, which also demonstrated the possibility of British support to Belize's own defence.

In October 1994, the UK set up the 90-strong British Army Training Support Unit Belize with the British Forces Adventure Training Centre to assist in the administration of the Belize Jungle School and to act as a focal point for six company-sized British units training in the country. The scope of this training was later extended to include battalions. The Training Support Unit also supported the regular series of Sapper *Sailfish* exercises designed to provide construction project experience for units tasked from HQ LAND. These *Sailfish* projects benefited both the Training Support Unit and the Belizeans, while allowing squadrons to practise expeditionary skills without the added pressure of being deployed on operations.

Sapper squadrons deployed to Belize were also deployed on disaster-relief operations in the Caribbean and other nearby countries from time to time; these are mentioned later in the chapter.

Gibraltar – The End of an Era

The previous volume of this history recorded the reduction of the Sapper strength in the Territory from the two-squadron Gibraltar Engineer Regiment to a single Specialist Team RE. The period covered in the present volume saw the final departure of the Corps from the Rock.



In April 1991 the Navy, Army and RAF Commands in Gibraltar were brought together into a single Command, British Forces Gibraltar, commanded by a rear admiral with a joint staff drawn from the three services and a strong civilian component. The resident infantry battalion was withdrawn, and the Gibraltar Regiment, previously a territorial artillery unit, was re-rolled to become an infantry unit and reconstituted with a mixture of regular and volunteer personnel. At this time the Royal Engineer presence consisted of 1 Specialist Team Royal Engineers (Fortress), which was 30-strong, comprising 20 specialists, who worked with the PSA in various technical appointments, and a field section of 10.

Additionally, every year many Sapper units visited the colony on exercise and to carry out projects, under a series of *Shot* exercises. A typical example was in 1981 when a troop from 48 Field Squadron carried out some work on the Nuffield Swimming Pool for the Fortress Headquarters and built a pipe range and water tanks for the PSA; in the same year 61 Field Support Squadron worked on the recovery of the Spur Battery Gun from the top of the rock prior to its donation to the Imperial War Museum. Two small but unusual survey tasks were carried out in Gibraltar in the late 1980s when the School of Military Survey produced a geological map of the Rock in support of work by the Corps geologists, and 135 Independent Topographic Squadron RE (V) re-mapped the tunnel systems.

The formation of a unified Command with an independent budget was the catalyst for a review not only of the command structure but, more importantly, the whole *raison d'être* for the Command. In 1992 the recently appointed Chief of Staff of Military HQ, Gibraltar, a Sapper Colonel A. J. (Tony) Reed Screen, was tasked by the Commander to undertake a fundamental review of the Command's role and the required force level. There were to be no sacred cows. Thus it fell to a Sapper to recommend that in 1994, 290 years after Captain Joseph Bennet⁶ landed on the Rock, the last surviving Royal Engineer unit, 1 Fortress STRE, should be disbanded.

With more than 50 kilometres of tunnels inside the Rock, an airfield and a host of fortifications and buildings plainly visible, there is a constant reminder of the long-standing relationship between the Rock and the Corps and, not least, its importance as the birthplace of the Corps of Royal Military Artificers. But it was felt that something more tangible was needed to remind future generations of their heritage and the very special place that Gibraltar has in Corps history. In 1972, when the Corps celebrated the bicentenary and the Honorary Freedom of Gibraltar, the Corps had presented the people of Gibraltar with a pair of wrought-iron gates to the Alameda Gardens. For the commemoration of the Corps it was decided that a statue would be more fitting, and a suitable position was found in Main Street in the centre of the town of Gibraltar.

The statue, the design of which was based on the 1772 Sapper, was sculpted by a local sculptress, Mrs Jill Cowie Sanders, and cast in bronze in Spain. The plinth was hewn from a single piece of Gibraltar limestone fashioned by Mr Anes who, over twenty years earlier, had assisted with the stone pillars for the gates at the Alameda Gardens. On Saturday 26 March 1994, 60 Field Support Squadron, who were on a six-week construction exercise, paraded and exercised the Freedom of Gibraltar.⁷ The Mayor, the Honourable Miss M. Montegriffo, took the salute in the company of the Chief Royal Engineer, General Sir John Stibbon; also present was General Sir William Jackson, Governor of Gibraltar from 1978 to 1982. After 290 years the presence of a formed Royal Engineer unit on the Rock came to an end.

Individuals and units continued to visit the Rock to carry out projects and training, however. The Corps' links were further marked by the creation of a formal 'Alliance' with the Gibraltar Regiment. This was sealed by the signing of an Alliance Scroll on 22 June 1996 by the Chief Royal Engineer, General Sir John Stibbon, and the Honorary Colonel of the Gibraltar Regiment and was witnessed on a parade in which the Corps was represented by 127 (Sussex Yeomanry) Field Squadron (V), who were visiting the Rock for their annual camp.⁸

Cyprus

Throughout the 1980s and 1990s an uneasy stability prevailed throughout the island following the events described in Volume XI. The United Nations presence of some 1,200 officers and men manning the buffer zone, mostly from Argentina, Austria and the UK, proved sufficient to allow both communities to coexist with little more than minor incidents to ruffle the calm. Talks continued intermittently towards the aim of creating the basis for a new or revised constitution for the whole island, but nothing was resolved that would allow the removal of the UN. Nevertheless, most Cypriots were able to concentrate on the main business of achieving economic prosperity, the most manifest feature of this being the massive expansion of tourism, especially in the Greek sector. Meanwhile the Sovereign Base Areas, and RAF Akrotiri in particular, 'continued to play a significant role in supporting UK operations in the Middle East',⁹ and this was confirmed in successive defence statements on estimates. Headquarters British Forces Cyprus and RAF Akrotiri were in the Western Sovereign Base Area at Episkopi, and a resident battalion of infantry was also stationed in each of the Sovereign Base Areas.

In 1980 the only stationed Sapper unit in Cyprus was 62 Cyprus Support Squadron, located in Dhekelia in the Eastern Sovereign Base Area. Its complement was 6 officers, 68 soldiers and 58 civilians.¹⁰ Two years later this was reduced by an officer and 14 other ranks but by the end of the period the civilians were reduced to 46 and the military strength had increased to 74, organised into a headquarters echelon, plant troop and field troop. The main operational tasks for the Squadron, in pursuance of Commander British Forces Cyprus's Operational Directive, included search, diving and small-boat support. These skills were spread throughout the Squadron, and some juggling within the organisation was invariably necessary when it came to operations. There were also three standing operational tasks: snow clearing on Mount Troodos to maintain access during the winter, for which a section from Plant Troop deployed for three months each year; maintenance and repair of the patrol tracks in the United Nations Force in Cyprus

CYPRUS



area; and dredging the three moles for boat operations. Many other tasks came their way, the attractive environment compensating for the hard work and long hours inevitable in a small unit and being the only Sappers on the island.

The Squadron was awarded the Wilkinson Sword of Peace Award for 1981, while commanded by Major R. J. (Richard) Sandy, in recognition of the magnificent achievements by all ranks of the Squadron and their outstanding work in fostering good relations with the local communities. The following year the Squadron, now commanded by Major B. (Bruce) Wittall, almost swept the board at the Near East Skill at Arms Meeting, winning 11 out of 14 of the trophies on offer.

In 1982 a United States-led multinational force went to Lebanon in an attempt to keep apart three warring factions, the Palestine Liberation Organisation, the Israeli Army (which had just invaded the country) and the Syrian Armed Forces, whose interest was to remove the Palestinians and assert their own influence in the country. The situation developed into an extremely hazardous battle for supremacy in which the multinational force's aims were never properly worked out. Both the American and French contingents suffered grievous losses in two suicide-bomb attacks in October 1983: 241 and 56 soldiers respectively were killed in these two attacks. Royal Engineer officers visited Lebanon at this time to advise on the protection of buildings for the multinational force as a whole. In January 1983 a detachment from 62 Cyprus Support Squadron went to Beirut to prepare the building in which the British element of the multinational force (Operation *Hyperion*) was to be accommodated and was placed under the auspices of Lima Company of the US Marine Corps detachment. An early incident described by a Senior NCO in 62 Squadron illustrates the tension:

Within only a few hours of arrival, we experienced our first taste of 'the war'. Israeli patrols were observed to the south and, by the early evening, a heavy artillery and small arms battle raged for nearly 8 hours. The next morning, the OC of Lima Company reported a sighting of Israeli tanks and APC a mere 800 metres from the USMC base. We then witnessed a really audacious piece

of John Wayneism when he confronted the entire force single handed, produced his pistol and invited the leading tank commander to take himself and his troops back from whence they had come. With the entire marine contingent at the ready behind him, the Israelis recognised discretion as the better part of valour and did so. Before we obtained clearance to move to our own location, another battle started 1500 metres to the west.¹¹

More visits were made later that year after the bombings. A further project, over four weeks, was required; it included essential maintenance on the building and improvements to security by means of relocating entrances, blocking roads and improving the perimeter walls and fences as well as the supervision of Lebanese workers on a bypass to route traffic away from the headquarters. Throughout, the commitment the Corps continued to provide a small contribution to the multilateral force, not least from the Postal and Courier Service.

Operation *Granby* (see Chapter 6) created a whirlwind of tasks for the Squadron, the most urgent of which was support to the Royal Corps of Transport for the unloading and storage of munitions at RAF Akrotiri to form a 30-day stock in what was to become the Forward Mounting Base. Plant operators quickly had to train on fork lifts to join the unloading team working in shifts. The existing munition storage space had to be extended by 25 bays using earth bunds, each 24 metres \times 24 metres \times 4 metres, together with link and access roads. This was achieved, again by shift work, in four weeks from 20 August 1990. Almost immediately another *Granby*-related project was undertaken to provide a 750 metre \times 85 metre level base for some RAF signals equipment. So urgent was the requirement that work had to start before either the design criteria or the source of funding were clear. A two-degree change in the orientation needed by the RAF, a critical matter, added 70 metres at both ends. As described in a report in the *RE Journal*:

The one surveyor on establishment, LCpl Palmer, became a key man. He checked the new orientation by Astra Survey and discovered we were only three minutes out which was deemed to be an acceptable deviation by our client. The whole success of the project depended on this young NCO and as a result he received a Commander's Commendation.¹²

The Squadron's fine work in support of Operation *Granby* was recognised by the award of the MBE to its Officer Commanding, Major R. C. (Rob) Swanson.

UNFICYP had existed since the civil war in Cyprus in 1964.¹³ Originally in some strength to keep the warring factions apart, it evolved into a classic international 'trip-wire' force, whose chief duty was to guarantee the integrity of the buffer zone separating the two communities. Operations consisted of observation from static observation posts, patrolling and the checking and maintenance of the minefields originally laid by the Greek and Turkish protagonists. The UK Sapper commitment was for an officer and twelve other ranks in support of the British battalion together with, normally, a warrant officer clerk of works on the staff of the Canadian Force Engineer at Headquarters UNFICYP, responsible for all the Force's camps.

This routine business was enlivened by small projects for the tradesmen. Plant was provided from 62 Cyprus Support Squadron, and for large earth-moving tasks plant operators would be provided from UK units. Normally this element comprised an officer and ten men. Most of their work was routine maintenance within the UN buffer zone, but each tour would provide a few extra tasks. The patrol track in the mountainous western sector was particularly hazardous and had to be maintained twice a year by the more experienced 62 Squadron plant operators, who had a good knowledge of that part of the UN buffer zone. Occasionally mine-clearing tasks were conducted following mine strikes on UN vehicles.

Apart from these operational matters, Cyprus also provided opportunities for training and numerous tasks. Many were relatively minor, often within the training areas and were undertaken both by the resident squadron and by units from the UK. As well as supporting the UNFICYP troop with resources and plant, 62 Squadron provided the same service to the annual ten-week visit of a Royal Engineer support squadron on Exercise *Pinestick* for various military projects. Such tasks could range from emergencies, such as the installation of six temporary reverse osmosis plants in Episkopi to cope with a threatened severe water

shortage, carried out by 62 Squadron in 1991,¹⁴ or helping the antiquities department re-erecting five 5th-century pillars in Kato Paphos,¹⁵ to the building of a Twynham prefabricated metal hut near Limassol by 11 Field Squadron in 1995.¹⁶

UN and Related International Interventions

United Nations operations during this period took place in: the Gulf (UNSCOM, UNIKOM), Former Yugoslavia (UNPROFOR), Cyprus (UNFICYP), Pakistan (in aid of Afghan refugees, UNOCA), Namibia (UNTAG), Mozambique (ONUMOZ), Cambodia (UNTAC and UNAMIC), Western Sahara (MINURSO), Rwanda (UNAMIR), Angola (UNAVEM), Sierra Leone (UNAMSIL), Congo/Zaire (UNDP). Sappers became eligible for ten of the UN medals during this period. Many led to operational experience under fire; few were without danger; all presented opportunities for real professional experience and a welcome alternative to Northern Ireland or Salisbury Plain. Over the years the nature of these interventions began to be better understood and defined. In the early days of peacekeeping, with some exceptions, the guiding principle was that UN forces would only be committed where intervention was agreed by each of the protagonist governments in a dispute. In the 1980s and 1990s it was more likely that a UN resolution would be passed for so-called 'wider' peacekeeping embracing a variety of tasks that included observers, military assistance teams and humanitarian relief. Frequently it was only possible to deal with disparate factions rather than identifiable governments.

The Corps' involvement in the Gulf, the Former Yugoslavia and Cyprus has been covered in Chapters 6 and 7 and earlier in this chapter; the more significant of its other UN commitments and related international interventions are detailed here.

Zimbabwe

The Commonwealth Monitoring Force that deployed in late 1979 during Operation *Agila* to assist in the transition from Rhodesia, governed by Ian Smith, to Zimbabwe, governed by Robert Mugabe, contained 70 Sappers of all ranks drawn from many

units in the Corps, including a Lieutenant P. A. (Peter) Wall (see Foreword to this volume), and was led by Lieutenant Colonel F. G. (Francis) Sugden, then CO 22 Engineer Regiment. The monitoring force succeeded in ensuring a peaceful integration of ZAPU, ZANU and Rhodesian Security Force units into the new Zimbabwe Army before handing over its responsibilities and withdrawing in March 1980. Thereafter, the British Army deployed a British Military Assistance and Training Team in the country until 2001, which normally contained Royal Engineers. In 1981 there were fourteen members from the Corps on the team, but the numbers varied from year to year.

The New Hebrides become Vanuatu

The British and French, who settled the New Hebrides in the nineteenth century, agreed in 1906 to share sovereignty jointly and then administered the islands until their independence in 1980, when the new name of Vanuatu was adopted. However, a popular rebellion broke out on Espiritu Santo, one of the 82 islands forming the archipelago, led by Jimmy Stevens who demanded independence from the remainder of Vanuatu. This threatened to wreck the agreement, so the rebellion had to be neutralised.

A joint Anglo-French expedition was launched, of which the British component comprised 42 Commando Royal Marines with elements of other arms and services (Operation *Titan*). The Corps was represented by an officer, Lieutenant J. M. (Jon) Gunns and two NCOs from 32 Field Squadron with a twelve-man detachment from 9 Parachute Squadron under Staff Sergeant Turner and Sergeant Bullock from the RE Postal and Courier Service. On 14 June 1980, with Independence Day due on the 30 July, they flew to the capital, Port Vila, on the main island of Efaté and made preparations for future action that included internal security training with the police and, for the Sappers, resuscitating a former wartime airstrip and building an assault course for the local college. The airfield task was intended to be used as part of a deception plan for a possible airborne operation but, as events developed, a parachute insertion became

unnecessary. Military operations at this stage were restricted to supporting the police, who deployed a mobile unit to another of the larger islands, Malakula, to demonstrate a presence and prevent the rebellion spreading. Tension rose on Espiritu Santo as Independence Day approached. On 24 July an exactly balanced force of 100 British and 100 French troops under a French lieutenant colonel flew by Puma helicopter to the capital, Luganville, where they mounted guard on the key points. No serious rioting took place, and the Independence Day celebrations on Efaté passed off successfully, the band of the Royal Marines beating retreat as the sun went down and the Union flag being lowered for the last time. Lieutenant Gunns reported that the principal danger had been from coconuts falling rapidly and without warning!

Rwanda

The 1994 intervention in Rwanda exemplifies the change in emphasis in UN actions at the time, in that its aims were primarily humanitarian.¹⁷ The uprising was an internal affair; the dispute and its resultant fighting lay between two factions rather than two governments. The UN mission was to provide security for the various forces and organisations of the participating countries. The mission of the British contingent (BRITCON), which deployed after genocide had occurred, was to provide combat and combat service support for the UN work but not to engage in any internal security operations.

The trouble stemmed from the endemic hatred of the two tribal groups in Rwanda: the Tutsis, the historic ruling minority, and the Hutus, who had until recently held power for twenty years. During this time they had evolved a plan of genocide by which the Tutsis were to be disposed of forever. The motivation for carrying this plan into action was provided by the replacement of the Hutu government in 1992 by a Tutsi-dominated faction, the Rwanda Popular Front (RPF), who sought to bring Rwanda to democracy through a form of power sharing. They had invaded the country from Uganda and won control only after a three-year civil war, the resolution of which was

achieved with the help of the UN, who maintained a mission in the country, UN Aid Mission in Rwanda (UNAMIR). The extreme faction of the Hutus nursed their grievances for two years and formed a group, the Interahamwe, as the instrument for their genocidal ambitions. The signal for the attack was given in April 1994 by the dramatic shooting down of a plane at Kigali airport carrying the President of Rwanda (ironically a moderate Hutu who supported the ideals of the RPF). A report in *The Times* almost five years later provides an insight into the terrifying chaos and slaughter that immediately followed:

Everyone in Kigali who was pro-democracy or anyone who had spoken out against the regime was hunted down and killed. Within the next few hours every journalist, every lawyer, every professor, every teacher, every civil servant, every doctor, every clerk, every student – all were murdered in a house-to-house operation undertaken by the 1500-strong Presidential Guard and the militia.¹⁸

The majority of the survivors fled the country, principally across the border to Goma in Zaire and to a humanitarian protection zone in south-west Rwanda. Huge camps grew up that soon became overcrowded; food and water were scarce, and epidemics soon spread rapidly. By the middle of July cholera and dysentery were claiming thousands of lives every day.¹⁹

The UN observers were unable to do anything in this burgeoning nightmare situation. After an estimated one million Tutsi and moderate Hutu had been systematically killed, international outrage at these events and the resultant refugee problem, as hundreds of thousands sought safety across the border in Zaire, brought about a cease-fire. UNAMIR was then revived and made the focus of a major humanitarian operation involving many national forces and non-governmental aid organisations. The military element, 5,500 strong, was largely provided by African nations.

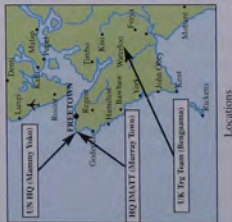
The main problems facing the international force were the provision of water and sanitation in the refugee camps, the repair and development of the infrastructure and its own protection from military action. The British element, known as Operation

Gabriel, comprised most of 5 Airborne Brigade Logistic Battalion, whose commanding officer became commander of the British contingent, 9 Parachute Squadron plus a Military Works Force and an EOD team, under Major I. S. (Iain) James, and a large component of 23 Parachute Field Ambulance. A small signals group and a platoon of infantry were also included. The first task for 9 Squadron was to establish the contingent's self-sufficiency for water supply, sanitation and the basic infrastructure required to enable it to proceed with its mission.

The main aim of the humanitarian operation was to settle the population by encouraging the return of the refugees and persuading those remaining in the country not to flee. To this end the British element undertook to set up medical centres sited so as to attract refugees into well-managed areas back in their own country. As well as the obvious requirement for accommodation, water supply and sanitation, considerable work was necessary on the infrastructure. The most significant task was the reopening of the Kanzenze bridge on the main road some 20 kilometres to the south of the capital. The successful repair of this 260-foot four-span Bailey bridge brought many benefits, not least bolstering the credibility of the UN efforts to restore the economic structure of the country, which some Rwandans were beginning to question.

Parts for the Kanzenze bridge had been obtained from the Rwandan Ministry of Public Work. Also available were components for another small bridge to improve the crossing on the main road into Uganda at Gatuna, until then served only by a small improvised timber construction. Provision of materials for water supply was more of a problem because no UN funds were available for this. The solution found was for the NGOs responsible for particular areas to provide the funding, which was then accounted for by the British contingent's administration. Procurement was thus freed from the UN's ponderous system, and work was able to progress rapidly.

The Rwanda operation, like so many UN interventions, had its EOD dimension. The four-man team from 33 Engineer Regiment (EOD) was the only EOD capability available to



UNAMIR. There was a considerable mine and unexploded ordnance problem left behind by the previous Hutu government forces, some of it planted deliberately to terrorise the civilian population. The EOD team had first to set up a collection and information desk. In conjunction with UNICEF, UNESCO and the Save the Children Fund, they helped in a mine-awareness programme as well as carrying out numerous clearances and disposal of unexploded ordnance. Initially this was solely in support of the British contingent, but the terms of reference were soon modified to cover both wider UNAMIR and civilian tasks. Sapper Copsey from 9 Parachute Squadron lost the lower part of one leg when he stepped on an anti-personnel mine while helping to build the Kanzenze Bailey bridge.

Sierra Leone

Sierra Leone, a former British protectorate, had been the victim of no less than six military coups since gaining independence in 1961. In 1990 the Revolutionary United Front (RUF) rebel group, with strong links to Liberia, tried to gain control of Sierra Leone's diamond mines. Nine years of civil war and atrocities crippled Sierra Leone. While RUF rebels controlled the diamond trade and forced children into militias to fight for them, the people remained impoverished and helpless. Assistance was sought from the sixteen-nation Economic Community of West African States (ECOWAS) and an 'armed monitoring' force, ECOMOG, led by Nigeria, was set up in 1997. It remained in Sierra Leone until 2000, achieving a measure of stability, albeit at great human and financial cost. In 1998 a small United Nations Observer Mission, UNOMSIL, was sent to the country, but the following year this was replaced by a much stronger 'Aid' mission, UNAMSIL, a force that grew from 6,000 to 17,500. This, in theory, had the strength to oversee the implementation of the Lomé Agreement signed in July 1999 to provide for a permanent end to hostilities in Sierra Leone; disarmament, demobilisation and reintegration of all former combatants; democratic elections; the creation of effective and democratically accountable armed forces; and an international peacekeeping force to supervise the peace process.

In May 2000, the RUF attacked UN camps in the central and eastern areas of the country. A number of UN personnel and journalists were killed and more than 200 others were detained.²⁰ The UK's first response was to launch a programme for the evacuation of non-combatants, Operation *Pulliser*. A battlegroup based on the 1st Battalion the Parachute Regiment flew immediately to the country, followed by an amphibious reaction group including 42 Commando aboard HMS *Ocean*. Both forces had engineer elements drawn from 20 Field Squadron, 33 Engineer Regiment and the Military Works Force. A Joint Task Force Headquarters was established in Freetown, split for geographical reasons into Main, in the city, and Rear, at Lungi airfield, separated by fourteen kilometres of water. The immediate engineer tasks were the construction of an ammunition depot and improving the living conditions of the emergency force. A maintenance team was then authorised. The SO2 Engineers at Main was Major A. M. (Andrew) Cliffe, and the SO3 infrastructure at rear was Captain M. P. (Matthew) Walton-Knight.

An International Military Advisory and Training Team (IMATT) was deployed under British leadership in the same year. The team was principally British, but Canada also contributed. The British policy was to build up the effectiveness of the Sierra Leone army by providing training teams, initially on a short-term basis under Operation *Basilica*, including engineer maintenance sections. This led to the Joint Task Force Headquarters becoming the single unifying command for all United Kingdom forces in the theatre. Although the United Nations remained the overarching authority, the United Kingdom provided no troops to UNAMSIL other than in one or two individual posts. Within the IMATT structure loan service posts were established for the creation of the Sierra Leone engineer regiment. The first commanding officer, who also doubled as Chief Engineer Sierra Leone Armed Forces, was Lieutenant Colonel A. D. (Andy) Wilson.

At this stage the remnants of the Republic of Sierra Leone Armed Forces were scattered around the country, disorganised and without any real direction. The Government could only exercise control in the Freetown area. In September 2000 a

maverick group of rebels took hostage seven members of the 1st Battalion the Royal Irish Regiment and held them in a jungle hide-out. A swift and successful helicopter-borne rescue operation was mounted with members of the Parachute Regiment and the SAS, although one member of the rescue party was killed. The situation gradually improved as the policy of 'disarm, demobilise and reintegrate' gradually took effect and the cease-fire held. The build-up of the engineer regiment was slow as the key posts could not easily be filled from loan service volunteers at short notice. The deficiency was made up by short-term reinforcements from the UK and by help from a field troop, EOD detachment and STRE attached to the short-term training team. Forming and training the Engineer Regiment while simultaneously conducting ongoing operations was a significant challenge. Initially potential engineer soldiers were identified by the IMATT teams, by the Training Team and through the process of disarmament, demobilisation and reintegration. All engineers completed the Training Team package before undertaking combat engineer training run by the IMATT at Benguama. Additionally a number of plant operator courses were undertaken and a limited amount of trade training was conducted.

Gradually, as the political situation settled down, the three brigades of the Sierra Leone Army located respectively at Kenema, Port Loco and Masekia, were able to regain control of the country. The RUF threat subsided but was replaced by the possibility of attack from Liberia. Each brigade had a close-support engineer troop permanently attached to it. The main engineer tasks in support of the brigades were initially focused on field defences but shifted to route-opening and clearance as the situation developed. The conditions were very basic, most engineer tasks being accomplished with locally acquired resources, and this tested the IMATT engineer trainers, who enjoyed getting back to real 'sticks and strings' engineering. Additional challenges included adapting to living in Sierra Leone with its tropical climate, disease, poverty and a shortage of basic infrastructure and services. Perhaps the most difficult challenge

of all was the daily fight against corruption, which at that time was rife throughout the country.

Pakistan and Cambodia: Landmines

While there was a mine-clearance element in nearly every UN operation, two undertaken during the period covered by this volume illustrate in particular how mine clearance became a key political, economic and social issue around the world. They also illustrate the scope of UN responsibilities in the period following a protracted civil war or insurgency.

When the Soviet Union, under the leadership of President Gorbachev, decided to withdraw their forces from Afghanistan in 1989, they had been fighting a bitter internal struggle against the Mujahideen for some ten years.²¹ During the conflict millions of mines were laid, a large proportion of which were in the air-delivered, anti-personnel category. The Mujahidin movement had been supported from Pakistan, and some three-and-a-half million Afghans had taken refuge there. The UN set up the Office of the Coordinator for United Nations Humanitarian and Economic Assistance Programmes relating to Afghanistan (UNOCA) in 1988 to oversee a rehabilitation programme. The following year UNOCA launched Operation *Salaam*, an overall rehabilitation programme and a twin-track mine-awareness education programme for all the Afghan refugees living in Pakistan coupled with a mine-clearance training programme given to Afghan male refugees. The situation was complicated because the departure of the Soviets had not ended the fighting. This continued with unabated intensity between the new Soviet-backed government and the Mujahideen backed by Pakistan and the West. A number of nations contributed to the programme, and by February 1989 mine-clearance training had begun in Peshawar with military teams from Australia, Canada, France, New Zealand, Norway and the United States. Similar training also began in Quetta in April that year with teams from France, Turkey and the United States.

In answer to a UN request, UK participation in Operation *Salaam* began in June 1989, when Lieutenant Colonel R. A. (Rob)

Hyde-Bales undertook a reconnaissance in Pakistan to confirm the scope of the task and suggest a *modus operandi* for RE involvement. It was decided that the UK contribution could best be provided by a small, experienced group consisting of a lieutenant colonel, to be the UN Chief of Staff in Quetta, and two four-man training teams. Each training team was to be led by a captain and include a warrant officer or senior NCO and two junior NCOs. After a week's preparation in the Field Engineer Wing at RSME, Lieutenant Colonel Hyde-Bales and the two teams arrived in Quetta in July 1989 and worked alongside training teams from the US Special Forces. They trained Mujahideen Afghan refugees in mine awareness and clearance on fourteen-day courses. The training consisted of a concentrated programme on identification and recognition of the 30 types of land mines in use in Afghanistan (mainly Soviet but also British, Chinese, Czech, Italian, Yugoslavian and Pakistani); recognition of likely mined areas; detection of mines and trip-wires; breaching and pulling drills; neutralising and disarming drills; explosive disposal of mines; recognition and disposal of unexploded ordnance; recognition and disposal of booby-traps; and first aid, undertaken by the Red Crescent Society. In due course, after a total of eight weeks of additional training that culminated in a methods of instruction course, selected Afghan instructors were trained to work alongside their British and American counterparts. Lieutenant Colonel Hyde-Bales' impression of the students was:

Our students were, to a man, former Mujahideen now living in the Afghan refugee camps around Quetta. They were, in the main, aged between 20 and 35 years old, physically tough, extremely resilient, dextrous, competitive by nature and the majority of them also had a strong, if at times somewhat perverse sense of humour. They were very good students who were quick to learn and keen. A strong bond formed between student and instructor as the course progressed.²²

Lieutenant Colonel N. F. (Noel) Mulliner succeeded Lieutenant Colonel Hyde-Bales in early 1990, and the commitment continued until September 1990.

Cambodia²³ had seen conflict in one form or another since the 1960s, culminating in the Pol Pot regime and the consequent invasion of the country by the Vietnamese in 1978.



This sparked a civil war. The People's Republic of Kampuchea, the Vietnam-backed regime, was then opposed by three guerrilla factions: the Khmer Rouge (Pol Pot's party, backed by China), the Khmer People's National Liberation Front and the Front Uni National pour un Cambodge Indépendant, Neutre, Pacifique et Coopératif, (FUNCINPEC) a royalist party. In October 1991 a cease-fire was negotiated in Paris, but this did not mean that there was freedom of movement or action around the country. The four opposing forces, particularly the Khmer Rouge, still controlled matters within their own areas. Moreover, after twenty years of warfare the country itself was in a devastated condition, with millions of unmarked and unrecorded mines scattered everywhere and claiming casualties every day. Brigadier J. H. (John) Hooper, after his retirement from the Army, visited Cambodia as a volunteer on behalf of the HALO Trust²⁴ in 1992 and described the widespread prevalence of mines there:

The mines started to be laid in Cambodia in the early days of the Vietnamese war. The Ho Chi Minh Trail ran through the North East corner of Cambodia and the various base camps along it were



Left: A training team member instructing on mine recognition.

Above: A mines-awareness poster.

defended with Vietnamese laid mines. The various factions which later developed in Cambodia and which have fought one another with varying degrees of enthusiasm ever since have all laid every conceivable type of minefield. The fighting and mine laying is still going on despite any UN assurances to the contrary.

So used are the peasants of Cambodia to mines that it is quite common to find a peasant has recovered antipersonnel mines from a field or from an abandoned dump and laid them himself to protect his rice crop from marauders of which there are many. Various disaffected members of the community have formed bandit gangs quite unrelated to the various factions. These gangs, amongst a variety of other antisocial activities, lay antitank mines on the roads and demand money from travellers before removing them to allow passage – mine warfare private enterprise at its very best. However this familiarity with the mines does not prevent the regular large toll of casualties. Economic necessity forces peasants to enter known minefields to gather firewood, or to recover a cow or buffalo which has strayed into the field. They know how to cope with the mines they see but of course, it is the unseen mine which causes the casualty.²⁵

The British Government intended to support the UN Advanced Mission in Cambodia (UNAMIC) by contributing towards a mine-awareness programme, along Operation *Salaam* lines. The UN then quickly asked for Military Liaison Officers (MLOs), and so the first UK personnel deployed to Cambodia were not Sappers but three MLOs. However, it soon became clear that there would be no hope of resettling the 360,000 Cambodian refugees in time for the elections for a new Cambodian government because of the vast areas of mine-polluted land. Mine-clearance moved up in the order of priority, and the UK agreed to provide the commanding officer and one ten-man team of RE instructors for a Mine Clearance Training Unit (MCTU) drawn from nine different countries. Lieutenant Colonel M. W. M. (Mike) Warren, at the time Chief Instructor Tactics Wing at the RSME, was appointed to command the unit and deployed in February to organise the mine-clearance training plan and also to take over as Commander of the British Contingent (COMBRITCON).

In March 1992, UNAMIC was subsumed into the United Nations Transitional Authority in Cambodia (UNTAC) and the

UK's contribution (under Operation *Lecturer*) increased substantially to COMBRITCON and 3 MCTU HQ staff, 10 MCTU trainers, 38 Military Observers and 70 Naval Observers (UNNOs) until the final withdrawal of UNTAC. UNTAC's mandate included the words, 'the repatriation and resettlement of the Cambodian refugees and displaced persons and the rehabilitation of essential Cambodian infrastructure during the transitional period'. The Authority's military commander was Lieutenant General J. M. Sanderson, an Australian Sapper who had been Senior Instructor at the RSME from 1971 to 1973. His experience as an engineer was invaluable in assessing the needs of this war-ravaged country. He commanded a huge force with representatives from 45 countries that included 15,547 troops, 893 military observers, and a 3,500-man civilian police force. Also present were other UN agencies such as the UN High Commission for Refugees and the UN Development Programme, plus some 60 NGOs.

Meanwhile Lieutenant Colonel Warren, based in Phnom Penh, was trying to find his way through a myriad of organisations ranging from the military components through the UN agencies (all with their own separate aims and budgets) to the many NGOs. None seemed to have a clear idea of priorities for mine clearance or any funding for it, fundamental though it was to the whole endeavour of bringing a settled peace to Cambodia. He set himself the mission of 'clearance of selected areas of Cambodia to allow repatriation of refugees'. For this he would need to train platoons of indigenous mine clearers using the training teams at his disposal from contributing countries. Once trained on a four-week course that followed the pattern of Operation *Salaam*, the teams would need supervision, which would be provided either from NGOs, including the HALO Trust, or the supervisory teams created from the training teams. The eventual objective was for the clearance 'platoons' to become capable of working on their own under Cambodian supervisors, once these could be found.

The UK mine-clearance training team (MCTT) was at first restricted to training the 'de-miners'. Eventually it was agreed

that the instructors could also supervise mine-clearance operations but under strict guidelines and command procedures in accordance with an order personally signed by CGS so as to minimise the risk of British casualties. Allowing the UK MCTT to supervise as well as train improved the team's experience, as well as its credibility with the other contingents.

Although clearance was a top priority, other important aspects of the mine problem had to be dealt with. Mine awareness, later referred to as mine-risk education, was important especially for children in schools. An overall policy-making body had to be created and a database set up to maintain records, based on work already done by the HALO Trust. By the time Lieutenant Colonel Warren and his successors, Lieutenant Colonels Alan Roland-Price and Noel Mulliner, had left the country, the clearance training and operations were progressing well, and the Cambodian Mine Action Centre was beginning to take shape. The following excerpt from an article written by Lieutenant Colonel Mulliner for the *Army Quarterly and Defence Journal* provides an idea of the scope and challenge of the operation:

By 16 November 1993 there were no more UK military personnel in Cambodia. By then 360 military personnel had deployed to Operation Lecturer, all refugee camps on the Thai/Cambodia border had emptied, successful elections had been held in one of the world's poorest countries, one British officer had died, two and half million square metres of minefields had been cleared and over 30,000 mines and items of unexploded ordnance destroyed.²⁶

The Corps' contribution in Pakistan and Cambodia towards reducing the threat from mines set a pattern for continued UN work in this field. In 2000 the Cambodian Mine Action Centre was still functioning.

Angola in support of the UN Angola Verification Mission (UNAVEM III)

Angola had been devastated by years of warfare, fuelled during the Cold War by the superpowers taking opposing sides. Its infrastructure had all but collapsed, while roughly 35 per cent of

its inhabitants were homeless, and there was an additional risk posed by an estimated ten million landmines. The civil war in Angola between the Marxist-inspired MPLA and the UNITA rebels had been waged since the departure of the Portuguese in 1972. Since then the UN had supported the peace process in two distinct phases: the United Nations Angola Verification Mission (UNAVEM) I deployment, which successfully allowed the extraction of Cuban forces, and UNAVEM II, which had failed to monitor properly the elections in 1991-2.

In 1995 UNAVEM III²⁷ was deployed to the country in order to try and secure a lasting peace between UNITA and the Angolan Government. The main contributors to the core infantry component were Bangladesh, Brazil, India, Namibia, Portugal, Russia, Zambia and Zimbabwe, and the mission also included additional military observers and civilian police. UNAVEM III was authorised to deploy one infantry battalion into each of the six regional capitals of Angola in order to monitor the demobilisation and disarming of the UNITA forces and their subsequent movement into quartering areas.

Britain's role was restricted to logistical support, and the British Government agreed to provide a Logistic Battalion Group (BRITLOGBAT) based on 9 Supply Regiment RLC with a total number of 645 personnel from sixteen different units. 20 Field Squadron, with Major C. J. (Chris) Rose as OC, deployed on light scales to Angola on Operation *Chantress* from April to August 1995 in support of 9 Supply Regiment to provide infrastructure engineering for the subsequent deployment of the main UN Force. The Squadron contingent numbered 89 all ranks, including a four-man EOD detachment from 33 Engineer Regiment (EOD) and two additional clerks of works from an STRE (Works). 20 Squadron's advance party deployed to Lobito port on 13 April and established a squadron base in a disused bottling plant. The Squadron subsequently controlled the BRITLOGBAT's REME, Transport and Force QM detachments, all from the same camp. Initially 20 Squadron's mission was confined to providing RE support to the British contingent in UNAVEM III, but the remit soon expanded and over the



Major Rose and WO2 (SSM) George escorting Baroness Chalker, Minister of State for Overseas Development, around Lobito Port.

following three months the Squadron's tasks encompassed:

- Providing assistance to the UN in order to establish two 1,000-man transit camps for UN troops.
- Establishing four 200-man camps in Lobito and one 100-man camp in Luanda for BRITLOGBAT personnel.
- Providing potable and non-potable water for BRITLOGBAT.
- Restoring essential services to BRITLOGBAT locations.
- Providing field defences and security lighting to BRITCON and UN HQ locations.
- Continuous camp and building repair and maintenance in all locations.
- Plant and earthworks; in particular, the repair of the harbour and port road surfaces and route maintenance.
- Mine clearance in support of BRITLOGBAT activities.
- Diving, including support to the Royal Fleet Auxiliary *Sir Galahad*.²⁸
- Route and engineer resource reconnaissance.
- A number of humanitarian aid tasks, including the refurbishment of the Lobito town water purification system and the provision of schooling facilities.

Major Rose stated in 20 Squadron's Post-Operation Report:

The Squadron proved more than capable of providing BRITLOGBAT with infrastructure support and was pro-active in leading the majority of humanitarian aid projects. For the commanders and staff, the planning required to mount and project a newly-created force, supply it with tools and vehicles and mould it within an unfamiliar team and environment was particularly demanding. For the SNCOs, JNCOs and Sappers the operation confirmed artisan and basic combat engineer skills and required much initiative and improvisation to achieve success. The need to continually adapt designs to the equipment, tools and stores available is becoming a standard feature of UN operations and Op Chantress was no different. Very rarely do either exercises or training offer such excellent preparation for war or operations short of war.²⁹

All the units deployed on *Chantress* were jointly awarded the Wilkinson Sword of Peace.³⁰

Disaster Relief

Earthquakes in Mexico City and San Salvador

In the 1980s the British presence in Belize made possible the mounting of two earthquake relief operations within thirteen



The Wilkinson Sword of Peace.

months of each other. These disasters occurred in Mexico City on 19 and 20 September 1985 and in San Salvador on 10 October 1986.

32 Field Squadron was the roulement unit in Belize when Mexico City was struck. An area some three kilometres by five of the old city area amounting to about 10% of the city as a whole was severely affected, at least 500 buildings being destroyed and 1,000 damaged. Operation *Vasco* was mounted, under an RAF wing commander, and two Puma helicopters were despatched to Mexico City with the immediate relief party. The Sapper element was under Major D. M. (Derek) Webb, OC 32 Field Squadron. It soon grew to include a troop headquarters and three well-equipped sections, with a good mix of tradesmen so that it would be balanced and capable of undertaking a wide range of tasks. Each section was equipped with a high cycle set, chainsaw, Tirfor Jack, Stihl saw, artisan toolboxes and most of its usual combat engineering items.

The detachment was asked to tackle the collapsed telephone-exchange building, the aim being to preserve the part of the building that still contained working communications equipment. First they had to shore up the remaining structure and then move on to clearing the collapsed upper floors. It was known that there were ten dead bodies in the rubble, so recovery of those would clearly be an early priority. The top four storeys had collapsed, and the rubble from these floors was resting on the ceiling of the first floor. The building had been shaken east-west and then north-south, causing the upper floors to fall in a south-easterly direction and resulting in a two to three metre overhang. Work started on 22 September, shoring being accomplished using readily available telegraph poles. Gradually they worked their way through the upper stories cutting the fallen beams and slabs and the mass of entangled exchange equipment into manageable sections. As the bodies were freed, the Mexican Red Cross moved in to take them away. The task was completed by patching up the holes above the remaining exchange equipment with tarpaulins, and this ended a dramatic seventeen-day visit. The operation concluded with a farewell ceremony in

the presence of the British Ambassador before boarding a Hercules for the flight back to Belize, where on the following day the troop met Her Majesty the Queen who was on a royal visit of the Caribbean. Major Webb was later awarded an MBE and Lance Corporal White a BEM in recognition of the detachment's achievements.

The San Salvador earthquake thirteen months later was similarly devastating. In Santa Marta, a suburb on the hills to the south-east of the city, a major landslip buried 40 families. At the Calle Rubin Dario, in the city centre, numerous high-rise buildings were badly damaged, trapping nearly 500 people inside. Between 1,300 and 1,500 people were killed, 11,000 injured, 200,000 made homeless, and over 500 buildings were either destroyed or damaged so badly that they would have to be demolished.

Operation *Angora* was mounted from Belize on 12 October and a reconnaissance party flew by Puma led by OC 48 Field Squadron (Construction), Major J. C. (Jonathan) Walmisley. He established that there was little demand for rescue work, which was well catered for from elsewhere, including two search-and-rescue teams from the UK. However, follow-up emergency lighting and water-supply assistance from 48 Squadron for a week from 15 to 21 October proved extremely welcome. Supplementary lighting was provided in three different locations, which included two hospitals, and a water-purification detachment operated in another area. Additionally, a clerk of works from the Squadron worked for nine days with the Association of El Salvadorian Civil Engineers and Architects, inspecting a total of 85 buildings, including two hospitals and numerous office blocks. On his advice, many of the buildings were evacuated until they were repaired, while some buildings were so badly damaged that they had to be demolished.

Hurricane Relief

Hong Kong Sappers found themselves in the front line for this work on many occasions. Examples were deployments to Vanuatu in 1987 and 1988 to supervise relief work after Cyclone *Uma*; this

included two Sapper teams in succession from the UK spending a year in the country managing projects to rehabilitate the road network of Tanna, the worst-hit island. The work was funded by the British Overseas Development Administration. As a result of the QGE efforts, the EinC received a complimentary letter from Baroness Young, Minister of State at the Foreign and Commonwealth Office, which concluded: 'The successful operation has clearly been a credit to both Royal Engineers and Gurkha traditions and to Britain'.³¹ OC 34 Field Squadron and twelve soldiers deployed from Belize to Jamaica in September 1988 in the aftermath of Hurricane *Gilbert* to help provide emergency power and water. They later helped return the Princess Margaret Hospital to working order. The EinC received a signal from the High Commissioner writing in glowing terms of their professionalism, dedication, cheerfulness, enthusiasm and sheer hard work, all of which created an excellent impression.³²

Cyclone *Ofa* struck Western Samoa in early February 1990 and caused considerable damage to crops, roads, buildings and the water supply. A reconnaissance team from QGE deployed at short notice from Hong Kong to establish what the Corps could do to help. Consequently a team of twenty from the roulement squadron flew from Belize and arrived in Western Samoa on 28 February 1990. They repaired water supplies, power supplies for the morgue and carried out essential work in Tuasinin Hospital. They also repaired and enhanced the sea defences. The team returned to Belize on 28 March.

Flood Relief: Operation *Rivers*

In July and August 1993, Nepal was struck by the heaviest recorded rainfall for over a hundred years. In the immediate aftermath of the floods that followed, more than 2,000 people lost their lives and 30,000 were left homeless. The main hydroelectric station supplying power to Kathmandu was put out of action. Most significantly, the Prithvi Rajpath, the vital route from India into Kathmandu, was closed because of landslides and the destruction of bridges. With a million people cut off in the Kathmandu valley, requiring 1,500 trucks a day to supply them,

it was essential to reopen the road link. For the first time in the 180 years during which Gurkhas had served the Crown, they were used in their own country with 68 Gurkha Field Squadron, commanded by Major J. R. (John) White, being deployed, reinforced with a troop from 67 Gurkha Field Squadron, on Operation *Rivers*.

A reconnaissance took place in a Royal Nepalese Army helicopter, jeeps and on mountain bikes, and established that three bridges were down at Malekhu, Belkhu and Mahadev Besi on the Prithvi Rajpath as well as another bridge down at Bhainse on the Tribhuvan Rajpath, an alternate route into Kathmandu. The multinational, multi-agency operation included the QGE, the Royal Nepalese Army, the US Air Force, the Overseas Development Agency, the British Foreign and Commonwealth Office, Mabey & Johnson Limited and numerous other parties. 68 Squadron constructed three emergency bridges over a period of four weeks with assistance from 50 members of the Royal Nepalese Army Engineers. Thirty metres of Bailey bridge were flown from Hong Kong very quickly in a chartered Antonov 124, and some days later a further 140 metres of Mabey & Johnson bridging came in five US Galaxy aircraft straight from the Mabey & Johnson factory in the UK, which opened specially during its summer holiday.

Within 90 hours of the Anotov arriving in Kathmandu, the Bailey bridge had been offloaded, sent down a precarious route and then built on site at Malekhu by the troop from 67 Squadron, thus restoring limited access to the capital. The completion coincided with an unexpected visit from the Prime Minister, M Giriji Prasad Khoirala, for whom the bridge was quickly closed so that it could be handed over officially. Over the next 24 days, and overcoming further rain and floods, 68 Squadron worked indomitably to complete the two Mabey & Johnson bridges at Mahadev Besi and Belkhu by 1 September. Both sites required substantial piers in mid-span, seated on reinforced concrete footings that had been built deep into the river bed and which had to be protected from the river scour by sturdy gabion reinforcements upstream of each pier.



Above: Belkhu Pier at the launch of the bridge.

Below: Belkhu bridge almost complete



Six members of the Squadron received awards in recognition of these impressive bridging achievements. Major White and Staff Sergeant Krishnadhaj Sahi were awarded MBEs and there were GOC Commendations for Lieutenant I. K. (Ian) Stewart, WO2 (SSM) Yakub Limbu, WO2 (MPF) Mansfield, and Sapper Angkaljang Sherpa. Such was the motivation and leadership of

Staff Sergeant 'Krishna' that he worked with a broken hand for several days to ensure that the bridge at Mahadev Besi was launched without delay.

Commander British Forces Hong Kong, Major General J. P. (John) Foley, regarded the planning and execution of 68 Squadron's deployment as a textbook example of how such disaster relief operations should be conducted.³³ A letter from the Prime Minister of Nepal to the British Ambassador in Nepal highlighted the gratitude of the Nepalese people:

His Majesty's Government and the people of Nepal are grateful for this generous assistance which is regarded as a token of deep and abiding friendship between our countries. My special thanks are also to ... all personnel involved in the completion of this arduous and challenging task accomplished in such a short span of time.³⁴

Exercises and Projects

Overseas exercises and projects have always been valuable to the Corps for the opportunities they provide for subunits to train and carry out projects in unfamiliar territory, different climates and often with better training facilities than at home. These



Malekhu bridge finished and taking traffic.

subdivide into two categories: training for operations in which war-fighting, command and control and combat engineering skills are tested largely in an all-arms context; and construction projects in which professional engineer planning, project management and proficiency at trade are developed.

Training for operations

Chapter 4 has shown how the pattern of exercises in the 1980s contributed to the winning of the Cold War. Foremost in importance and continuing into the 1990s and beyond was the British Army Training Unit Suffield (BATUS), located at the Canadian Forces Base Suffield, Alberta. The opportunities for live firing and the huge area of prairie available for manoeuvre offered invaluable training for war and for the Sappers to work with infantry and armour in simulated all-arms battle conditions. BATUS was also a useful testbed for the developments in tactical doctrine and use of equipment that dominated thinking in the 1990s. Experience there helped shape the new close-support regiments that appeared by the turn of the century and the matching of the brigade/regiment and battlegroup/squadron levels of command. (See also Chapter 3)

In the early part of each year a range preparation Sapper unit, normally found from a Germany-based field squadron, spent between six to eight weeks on Exercise *Warpaint*, preparing the training area at BATUS for the following *Medicine Man* exercises at battlegroup level. There were normally up to seven *Medicine Man* exercises each year, where all-arms battlegroups would form up and complete a programme of training under the general direction of the permanent BATUS staff, on which there was an SO2 RE, a QMSI and a small Sapper team. For much of this period the battlegroups were supported by a large engineer troop. However, as mentioned earlier in Chapters 2 and 3, the reorganisation of the Corps resulted in a Sapper regiment supporting a brigade and a squadron supporting a battlegroup. Thus in the mid-1990s the Sapper participation in *Medicine Man* exercises was increased to squadron level, which brought immense benefits in terms of the training of the Sappers and the

understanding of battlefield engineering imparted to the battlegroup commanders.

Other all-arms exercises for UK-based units, set at battalion group level and each supported by a Sapper troop, were mounted regularly throughout this period in Wainwright, Canada (Exercise *Pond Jump West*), in the USA (Exercise *Trumpet Dance*) and Kenya (Exercise *Grand Prix*). All these were important exercises that helped maintain the Corps' focus on operational training and build unit affiliations with the supported battalions.

A major exercise in Oman was mounted in 1987, assisted by the Omanis. The deployment comprised a joint force that included the Royal Navy, 3 Commando Brigade Royal Marines, 5 Airborne Brigade and the RAF. The exercise *Saif Sareia* (or *Swift Sword*) rehearsed the UK's out-of-area capability with limited Sapper support provided by 9 Parachute Squadron and CO 36 Engineer Regiment. The exercise involved an amphibious and a parachute assault to secure an airfield and rescue hostages.

Towards the end of the 1990s, and with the increased restrictions in training in Germany, the Army initiated all-arms formation training in Poland at brigade level on a series of *Ulan Eagle* exercises with Sapper support at regimental level. These were challenging, realistic exercises offering excellent training.

59 Independent Commando Squadron trained nearly every winter in Norway with 3 Commando Brigade throughout these two decades in order to hone its cold-weather skills and develop the specialist combat-engineering expertise for the terrain and climate.

Project exercises

The *Waterleap* series of exercises in Canada, begun in the 1960s, helped set a precedent for several other Royal Engineer exercises negotiated as part of a 'defence relations' agreement with the host country. On exercises such as *Larchpole* and its 1991 successor *Oakapple* for squadron projects in Kenya, *Northern Quest* for troop projects in Norway and *Pinestick* for plant projects in Cyprus, Royal Engineer units were able to obtain valuable

experience on construction work, improving planning skills, project management and trade expertise.

Waterleap itself was a twelve-week commitment for a squadron each year. Actual deployment was preceded by a process of planning that began two years in advance and involved not only the squadron but also the elements of the Military Works Force that would design and eventually help in the technical supervision of the project. Nearer the time a confirmatory reconnaissance would take place and pre-project training would be arranged for the tradesmen and other members of the squadron for the tasks ahead. These were designed to stretch the capabilities of the units. For example *Waterleap 94* at Wainwright, undertaken by 59 Independent Commando Squadron at a cost of over £800,000, included building a bulk-fuel installation with all its ancillaries (asphalt traffic circuit, control hut, pipe distribution system), a 39 metre equipment bridge on reinforced concrete abutments, a 25 metre outdoor range and three bivouac sites with toilet blocks and kitchen sumps. Time was also allowed in all *Waterleap* programmes for limited adventure training and some local leave. From the mid-1990s *Waterleap* was indefinitely postponed because the Corps was then very heavily committed in Bosnia, where it was also gaining significant project experience anyway. It could at some time in the future be re-activated should the Corps and the Canadians wish.

Exercise *Larchpole* produced a wide variety of tasks throughout the 1980s. One of the more elaborate deployments, *Larchpole 80*³⁵ undertaken by 32 Field Squadron, commanded by Major R. J. D. (Robert) Reid, reinforced with Military Works Force personnel and individuals from the Royal Corps of Signals, Royal Army Medical Corps, Royal Army Ordnance Corps and the Territorial Army, involved the construction of thirteen kilometres of high-quality murrum road (compacted friable rock), including thirteen culverts and a 30 metre bridge across the River Gucha in Kenya. The bridge works consisted of a double/single Bailey on high-level reinforced concrete abutments and massive gabion protection, with earthwork approach ramps. The work was undertaken for the Kenyan Department of Transportation and

Communications, and there was close liaison with the Chief Engineer, Nyanza Province. The task site was Wath Oria, a tiny village in the remote sugar-cane area of South Nyanza almost at the edge of Lake Victoria, tucked in near the Tanzanian border. This was in the heart of country inhabited by the Luo Tribe and an area seriously underdeveloped after years of neglect. It was located ten hours' hard driving from the supply base near Nairobi, over pot-holed tarmac roads and murram tracks. There was no effective road system and the River Gucha provided a major barrier, so the urgent necessity to provide the infrastructure that would enable much-needed development in support of sugar cane production was clear. The work was challenging; it demanded both a high degree of engineering skill and sustained effort. There were frustrations and difficulties. There were moments of despondency when delays developed as the pool of Sapper plant held in Kenya was found not to be up to the job. Equally there were moments of elation when, for example, a reconnaissance party scouring the surrounding countryside located an American aid organisation that willingly agreed to loan a fleet of plant and tippers at no cost. The plan was made to work using Sapper initiative. It was also a carefully calculated gamble that completion would be possible before the arrival of rains.

Pre-project training was identified as an important factor to enable the project to run efficiently; artisans and Plant Operators were given maximum opportunity to practise a range of trades. Revision was provided on the use of commercial explosives required to assist with the removal of stratified rock on the bridge centreline. Once deployed and on site, local politics, changes to design, identification of reliable sources of supply, struggles to obtain the finance to pay suppliers, corruption, plant and vehicle failures, long lines of communication and the inevitable battle against time before the rains set in all added to the challenge. The upside was that the local people were grateful for the successful outcome, while all those involved in the operation benefited from the experience. The hand-over ceremony comprised a formal parade, the cutting of tape, the unveiling of

a plaque and speeches witnessed by the British High Commissioner, the Kenyan Minister for Transport and other dignitaries, together with many local people. The Squadron commander was presented with a magnificent assegai and shield signifying an honorary warrior of the Luo. (The assegai being made of high-quality steel, some of the less charitable suggested that this might explain the loss of a number of steel reinforcing bars from site.) The Chief Engineer UKLF, Brigadier R. A. S. (Tony) Rickets, was presented with a live and protesting bull. Meanwhile, 400 kilometres away on the other side of Nairobi at Kajiado, Miss Georgie Orme, a missionary who ran a hospital for seriously disabled Maasai children, was expressing gratitude for the work done by a succession of Squadron artisans who had helped her improve facilities and enable her to increase the much-valued care she gave to the numerous tragic cases she nursed back to health.

Larchpole was replaced by the *Oakapple* series in 1991, under which less elaborate tasks were undertaken by unreinforced field squadrons, with funding for the projects' materials being supplied by a charity. 3 Field Squadron were faced with an unusual challenge on *Oakapple 95* when the charity's contribution for the funding of the materials for the building of a training centre for a Maasai community was delivered, not in Kenyan shillings but in the form of some bags of cement that had gone off and almost 200 goats! Fortunately, there was a Gurkha battalion deployed in Kenya on Exercise *Grand Prix* at the same time, and so the squadron was able to exchange the goats (which were welcomed as fresh rations by the Gurkhas) for cash in order to buy the building materials needed.

Kenya also offered opportunities for troop projects, normally for six to eight weeks at a time, under Exercise *Crabapple*. There was also a requirement to start clearing the unexploded ordnance resulting from many years of live firing during a succession of British Army exercises in Kenya. Hence in the 1990s one or two EOD sections from 33 Engineer Regiment (EOD) deployed for a short period each year to help deal with this issue on Exercise *Pineapple*.



Above: The bridge being launched across the River Gucha.

Below: Completed railway bridge across the River Gucha with a local shamba in the background.



There were a series of troop projects undertaken in the summer months in Norway under Exercise *Northern Quest*, normally by the ACE Mobile Force (Land) troop. These offered excellent training, often in a remote environment, and helped forge closer participation between the Norwegian and British Armies.

For Gurkha units, training and projects in Hong Kong were circumscribed by the size of the territory and the diminishing areas in which to operate, as the urban sprawl spread wider and wider. Overseas exercises provided more scope as well as a chance for troops and squadrons to operate independently. There were regular exercises in Brunei and occasionally in Fiji, Malaysia, the Solomon Islands, Papua New Guinea, Australia, New Zealand and even as far afield as Hawaii. Blasting channels through coral reefs, building wharfs, jetties, schools, jungle tracks and bridges were common tasks, but some were more unusual and unexpected. In 1982 in Brunei a troop built two towers in the middle of a mangrove swamp to allow a television crew to rise above the canopy and film rare birds. In 1983 a troop commander in Fiji was required to shoot a wild bull in the jungle for a funeral ceremony. A troop in Papua New Guinea trekked over the alignment of the 'Bulldog Track' built in 1944. And in 1993 a troop built an Iban longhouse deep in the jungle of Brunei.

One-off Projects

As well as the regular training and project work described above, this period of the Corps history was marked by a multiplicity of individual projects of great variety, ranging from the help given by the divers to the recovery of the Tudor warship *Mary Rose* in 1982 to the building of a jetty in South Georgia.

A major additional commitment imposed on the Corps as a result of *Options for Change* was a series of significant projects in the UK to improve training facilities for the Army leading to marked savings for the Defence Budget. As the EinC put it in his 1995 report:

The main effort within the UK has been our work on the Army Field Training Centre (AFTC) projects required to provide the field army with much-improved facilities on the training areas, whose use has increased dramatically with the return to UK of so many units from Germany. On all the AFTC projects Engineer Branch Land acted as the project sponsors, and Military Works Force the project managers. The projects included the rebuild and refurbishment of the Warcop Training Area by 39 Engineer Regiment. Here 6 new ranges were constructed, 8 existing ranges upgraded, 16 buildings rebuilt or refurbished and 600m of new roadway built ... At Catterick, 36 Engineer Regiment constructed a permanent defence position of 66 trenches together with toilets and storage facilities, a 250-man emergency shelter, 20 outdoor classrooms and other training facilities. 22 Engineer Regiment ... constructed the Berril Valley Obstacle Line on Salisbury Plain ... The total cost of the projects is in the region of £3M, a saving of £3.5M when compared to the cost to the Ministry of Defence (MoD) if civilian contractors had been used, and involved over 60,000 man training days.³⁶

Saudi Arabia

A resident Royal Engineer Team under the direction of Brigadier R. (Bob) Wheatley continued to provide supervision for the major construction engineering projects for the two Saudi National Guard hospitals near Riyadh and Jeddah, valued at £540 million. (The projects, started in 1977, are described in Volume XI.) The Riyadh Saudi Arabian National Guard Hospital was handed over to the US Army/Hospital Corporation of America from July/August to October 1982. The Royal Engineers Team were then run down so that by Christmas only the commander was left in Saudi Arabia, and Colonel B. R. (Brian) Rawlings remained in Riyadh to deal with the 'maintenance period' until June 1983. The Jeddah Saudi Arabian National Guard Hospital handover was completed earlier, by December 1981, and the management of the hospital was passed to 'SANGMED', a British management team. Colonel P. M. (Mike) Hill took over as Deputy Commander of SANGMED from Colonel B. P. (Brian) Daly in May 1984 and was replaced two years later by Colonel J. L. (Jeff) Barker. All



Riyadh National Guard Hospital.

RE involvement ended in 1988. The complexity of the projects clearly illustrated the capabilities of the Corps' more technical experts.

Nepal

In the 1980s a major project was undertaken in Kathmandu to build a new Transit Camp to support direct air trooping to Hong Kong. This was supervised by Major R. N. (Ray) Butcher, a garrison Engineer, who was awarded an MBE for his indefatigable efforts to produce an outstanding facility complete with a headquarters for British Gurkhas Nepal, and married quarters for both British and Gurkha staff. He was supported by a number of able Gurkhas who had qualified as clerks of works at the RSME. Further major changes took place as the Brigade of Gurkhas looked ahead to its likely future post-1997. The Depot and BMH at Dhahran were closed, and the Garrison Works Office moved to Kathmandu. Finally, facilities at Pokhara were expanded, the project planned and supervised by the DCRE and his mixed British and Gurkha staff, to produce one of the most attractive camps in the world.

South Georgia

A troop from 25 Engineer Regiment deployed to South Georgia in November 1986 to replace a damaged wooden jetty with a steel piled structure 24 metres long and 13 metres wide, designed by the Military Works Force. As well as formidable technical problems, there were very challenging logistical issues. The project stores, including a large, hired crane, were supplied from the UK, and thereafter the only support came once every six weeks via a ship from the Falklands. To add to the young troop commander's cares, the weather conditions were unusually severe: over the Christmas period winds of more than 100 knots made construction work both difficult and dangerous. To the great credit of all concerned, the task was completed in February 1987 several weeks ahead of schedule.³⁷

Survey

The end of the Cold War and the increasing use of geographically unfamiliar territory, led to a greater Survey involvement in most exercises. In addition to military training exercises, survey units, in particular 19 Topographic Squadron, routinely took part in survey exercises overseas. Some were on a regular basis, such as those in Cyprus, Kenya, Norway and, after the Falklands Campaign, to the South Atlantic. Other survey work, such as in Nepal to provide that country with a complete triangulation network, met a specific need. All such exercises provided benefits both to the military surveyors and to the local survey organisation, the former by training to operate in different and usually difficult terrain (something that paid dividends during the Gulf War), and the latter by the legacy of the survey work done. As to emergency operations, these often occurred at short notice and in areas not covered by NATO or national plans existing map stocks. Maps would be in immediate demand, and the first response would be the production of briefing maps for use within the Ministry of Defence. When necessary, maps would then be produced and issued if a deployment was mooted. (See Chapter 10.)

Additional Worldwide Deployments

The activities described so far in this chapter do not include all the deployments undertaken by Sapper units during this period, but they do demonstrate the enormous versatility of the Royal Engineers together with the variety of challenges experienced by so many different units and individuals. The following list, taken from reports to the Corps by successive EinCs, briefly mentions some additional deployments and further illustrates the Corps' utility:

1980:

Oman. 20 Field Squadron helped improve the water supply and electricity for local people.

Dominica. 8 Field Squadron assisted with post-hurricane repair work. St Helena and Funafuti. Specialist assistance from the MWF.

1981:

St Lucia. Detachment from 22 Engineer Regiment helped with Disaster Relief operations after Hurricane *Allen*.

Italy. 32 Field Squadron assisted with erection of community buildings in the aftermath of an earthquake in November 1980 in the area of Naples and Salerno.

South Georgia. A detachment from 39 Engineer Regiment spent five and a half months rebuilding a jetty and mooring facility for the British Antarctic Survey.

Trinidad. A team of four from 49 Squadron (EOD) carried out the clearance of a large pond, recovering in excess of 1,000 live shells dumped there during the Second World War.

Gambia. A small team helped to train the Gambian Field Force Pioneer Unit.

1984:

Sinai. A Garrison Engineer ran the camp maintenance for the Multinational Observer Force.

Nepal. MES Works were engaged in camp rebuilds in Kathmandu and Pokhara.

Ethiopia. Two men from 9 Parachute Squadron assisted with water supply at several locations, while the rest of the Squadron was in Kenya.

1985:

Bahamas. Joint Army/Police detachment including members from 33 Engineer Regiment (EOD) carried out search and security operations for a Commonwealth Heads of Government Meeting.

Solomon Islands. A team from 33 Engineer Regiment (EOD) cleared

the site of a previous battlefield (Guadalcanal) around Henderson Airfield so that the runway could be extended. The team also trained the Solomon Islands Police Force in battle-area clearance techniques.

1986:

The Corps was working or training in 42 different countries.³⁸

1987:

Gambia. The MWF assisted the Royal Engineers Training Team Gambia with the design and construction supervision of a complete army barracks for the Gambian Defence Force.

1989:

Thailand. QGE constructed a suspension bridge in Kow-Yai National Park.

Malawi. A reconnaissance team assessed the problem of mines on the railway line that links Malawi with the coast through Mozambique. This was followed up by a two-man team who ran mine clearance courses for the Malawi Army.

Antarctica. 39 Engineer Regiment sent a sixteen-man team to Antarctica to assist the British Antarctic Survey construct new accommodation.

1991:

Indonesia. An MWF team advised the Indonesian Air Force on airfield construction and maintenance.

Diego Garcia. An MWF team reconnoitred and planned the construction of an armoury.

1992:

Jamaica. A two-man team from HQ EinC advised the Jamaican Defence Force on expanding their engineers to regimental size. This was followed up by a training team from 11 Engineer Group, who spent three months running a basic combat-engineer course.

The Turks and Caicos Islands. An initial reconnaissance for a series of causeways between the Islands was carried out by the MWF.

1993:

Bahamas. A small party from 59 Independent Commando Squadron assisted the Island of Eleuthera following Hurricane *Andrew*.

Angola. A small team from 39 Engineer Regiment and the MWF supervised the refurbishment of Uige Barracks as part of the Foreign and Commonwealth's contribution the outbreak of peace there, which was very short-lived.

1994:

The Corps deployed Military Assistance Training Teams to Egypt, Mexico, Ghana and to the Conference on Security and Cooperation in Europe.

1995:

Middle East, Turkey and Italy. 12 (Air Support) Engineer Brigade provided extensive support to the RAF with a variety of infrastructure tasks and minor construction projects at short notice in support of UN Air Space Policing Operation *Deny Flight* (over Bosnia) and Operation *Jural* (over Southern Iraq).

1997:

Middle East. 12 (Air Support) Engineer Brigade continued to provide support to the RAF. During Operation *Colmar*, 34 Field Squadron (Air Support) moved all the life support, operations support and aircraft accommodation of Operation *Jural* to Al Kharj airbase in Saudi Arabia.

1998:

Middle East. 34 and 53 Field Squadrons (Air Support) deployed to the Al Salem airbase in Kuwait and Al Kharj airbase in Saudi Arabia in support of RAF operations.

Brunei. One Chartered Engineer and a clerk of works deployed to Brunei to identify methods of providing clean air to offices and accommodation following extensive fires in the rainforest.

1999:

East Timor. An EOD SNCO and JNCO deployed to East Timor as part of the 2 Royal Gurkha Rifles Company Group. They were later joined by an electrician and plumber plus by two clerks of works from MES (Works) Brunei.

Middle East. Continued deployments by units from 12 (Air Support) Engineer Brigade.

NOTES

1 *REJ*, 97/3, September 1983, p. 151.

2 *Corps History*, Volume I, p. 500.

3 *Corps History*, Volume XI, p. 114.

4 *REJ*, 108/2, August 1994, p. 134.

5 *REJ*, 108/1, April 1994, p. 97.

6 See *Corps History*, Volume I, pp. 62–6. Gibraltar was occupied on 23 July 1704 during the War of the Spanish Succession. Captain Talbot Edwards commanded the Train that arrived in December with the reinforcements that boosted the original garrison sufficiently to keep off repeated Spanish

- attempts to recover the territory. He had been preceded by the Queen's Engineer, Captain Joseph Bennet, who arrived on 5 November 1704.
- 7 *Sapper*, August 1994, p. 404.
 - 8 *Sapper*, September 1996, p. 450.
 - 9 Cm 5000. Ministry of Defence Performance Report 1999/2000, p. 16.
 - 10 Information from Major B. G. Whitall, OC 62 Cyprus Support Squadron in 1982.
 - 11 Staff Sergeant N. Brown, 'Two Weeks in Beirut' in *Sapper*, Volume 21/3, June 1983.
 - 12 *REJ*, 105/3, December 1991, p. 281.
 - 13 *Corps History*, Volume XI, p. 220.
 - 14 *REJ*, 105.3, December 1991, p. 2823
 - 15 Staff Sergeant K. Lowerson, 'Rock of Ages' in *Sapper*, Volume 25/10, August 1992, p. 361.
 - 16 11 Field Squadron, 'Ripon Sappers in Cyprus' in *Sapper*, Volume 27/1, June 1995, p. 98.
 - 17 *REJ*, 109/2, August 1995, p. 136.
 - 18 *The Times*, 4 March 1999, p. 21.
 - 19 *REJ*, 109/2, August 1995, p. 137.
 - 20 *REJ*, 114.3, December 2000, p. 184.
 - 21 *REJ*, 106/3, December 1992, p. 204.
 - 22 *REJ*, 104/1, April 1990, p. 49.
 - 23 *REJ*, 106/3, December 1992, p. 228.
 - 24 The HALO Trust was set up by Lieutenant Colonel Colin Mitchell (late Argyle and Sutherland Highlanders) and by Guy Willoughby in 1988.
 - 25 *REJ*, 106/3, December 1992, pp. 228-9.
 - 26 *Army Quarterly and Defence Journal*, Volume 125.1. The officer who died from the effects of cerebral malaria was an RAF UNMO.
 - 27 UNAVEM III was replaced by the UN Observer Mission in Angola (MONUA) in 1997.
 - 28 Navy support was also provided by *Sir Galahad*, which was most useful in moving engineering supplies, equipment and stores between the capital port of Luanda and Lobito. In fact, the crew also helped at one stage with filling sandbags for the defence of the various subunit locations.
 - 29 20 Field Squadron Post Operation Report, Operation *Chantress*, dated 15 December 1995, pp. 39-40.
 - 30 The Wilkinson Sword of Peace was awarded for Operation *Chantress* rather than any specific unit, with 9 Support Regiment RLC providing the Regimental Group HQ under Lieutenant Colonel H. (Harry) O'Hare, RLC.
 - 31 *REJ*, 102/1, March 1988, p. 9.
 - 32 *REJ*, 103.1, March 1989, p. 7.
 - 33 Letter from Major General J. P. Foley (CBF 310, dated 13 September 1993).
 - 34 Extract from letter dated 3 September 1993 from the Office of the Prime Minister of Nepal to His Excellency Mr. Timothy George, British Ambassador in Kathmandu.
 - 35 *REJ*, 94/4, December 1980, p. 214.
 - 36 *REJ*, 109/2, August 1995, p. 120.
 - 37 *REJ*, 102/1, April 1988, p. 9.
 - 38 *REJ*, 101/1, March 1987, p. 3.



Survey

Foreword

by Sir Idris Pearce, CBE, DL, TD

Honorary Colonel of 135 Field Squadron RE(V) 1989-1994

It is abundantly clear that changes wrought during the period 1980 to 2000 are of the most profound nature. Military Survey dates itself from 1747, when William Roy embarked on the production of a map of the Scottish Highlands, the first example of the creation of a map in support of military planning - in this case in the aftermath of the last Jacobite rebellion. Roy later undertook work which was ultimately to form the foundation of the Ordnance Survey in which the Royal Engineers were an important part. The Royal Engineers have subsequently played a distinguished part in mapping here in the UK and in many aspects of mapping around the world, not just for military purposes but for economic and development reasons, as well as developing the theories and scientific principles on which surveying is based worldwide.

In the 1980s the contribution to the civilian sphere was becoming less central to the Royal Engineers role, as was mapping overseas in the broadest sense. This volume shows just how great a change was made over the twenty years in question. It brought back a greater focus and more intimate involvement with operations, both strategically and tactically, thus binding Survey even more closer to the Sapper role and strongly emphasising the great ingenuity and initiative with which Surveyors solve the problems of the day. This I observed at first hand when in my National Service at the then School of Military Survey in the TA Survey Regiment and subsequently in Survey's sole TA Squadron of which I had the privilege of being Honorary Colonel.

The challenges of the next twenty years are already becoming clearer and I am confident that the new generation will rise to the challenges with equal verve, initiative and good humour that we expect from our Sappers.

Introduction

The changes that swept the armed forces during the last two decades of the twentieth century affected Military Survey to the extent that virtually nothing that was familiar in 1980 was in place by the year 2000. Indeed the very word 'Survey' and the descriptor 'Topographic' disappeared from many staff and unit titles to be replaced by the NATO term 'Geographic'.

Military Survey entered this period with a lingering focus, for uniformed and civilian staff alike, on long-term international map-production programmes and field surveys undertaken according to priorities decided in conjunction with the NATO Geographic staff or because diplomatic opportunities arose. By 2000 momentous technical, organisational and cultural changes had transformed the role into direct geographic support to the planning, command and control, and execution of all British defence deployments.

In these two decades it is possible in broad terms to identify three main periods in respect of Military Survey:

- For much of the 1980s, technology was transforming demands for geographic support, but change was incremental. Restructuring saw units amalgamated, and the focus sharpened on the doctrine for tactical support. These were reflected in capability plans, which were ultimately to transform the Military Survey operational concept and organisation. By coincidence, key technology developments began to mature as the First Gulf War erupted, and this marks a punctuation point in the story.
- The early 1990s saw huge change on three fronts; Military Survey was formed as an Agency (an independent entity holding its own budget) and subsequently came under the direction of

the Chief of Defence Intelligence (CDI). The collapse of the Warsaw Pact and the Soviet Union led to opportunities for collaboration with former enemies; and, finally, the digital revolution, in the light of Gulf War lessons, transformed both capability and organisational posture, including a complete switch from routine production to direct support to the field army. Much of this change was compressed into a hectic five years and subsequently refined during the years of the Balkans conflict.

- In the closing years of the 1990s, Military Survey was merged with the Joint Air Reconnaissance Intelligence Centre (JARIC) to form the Defence Geographic and Imagery Intelligence Agency (DGIA). With that change came the loss of the title 'Director of Military Survey' and the prospects of further profound change ahead.

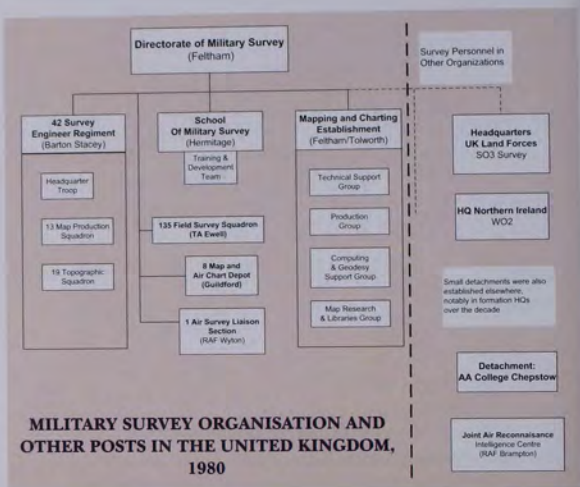
Military Survey at the Beginning of the Period

By 1980, almost all Military Survey units were based in the UK and Germany, the total strength being about 1,400, with about one-third military and two-thirds civilian.

The Director of Military Survey (DMilSvy) was a two-star officer with the headquarters at Feltham and reported to the Assistant Chief of the General Staff. During the period the Directorate had five staff branches: Survey 1 dealt with establishments, promotions, postings, finance, etc.; Survey 2 with requirements for production and supply matters; Survey 3 with source material procurement; Survey 4 with equipment and development issues; and Survey 6 with field and geodetic survey. There was a warrant officer at HQ UKLF and at another at HQNI with a small team, whose duties were checking town plans, which were under revision, and maintaining many general and specialist map products.

UK Units and Staffs

The uniformed element of Military Survey was concentrated in four principal units, three of them in the UK, as shown in the diagram overleaf.



- 42 Survey Engineer Regiment was located at Barton Stacey, near Andover, and comprised 13 Map Production Squadron, 19 Topographic Squadron and a Regimental Headquarters Troop.
- The School of Military Survey was at Hermitage, near Newbury in Berkshire, together with the Training Development Team.
- 135 Independent Topographic Squadron remained Military Survey's sole Territorial unit and was based at Ewell.¹

Additionally, 1 Air Survey Liaison Section (IASLS), a specialist unit providing reconnaissance planning support, was at RAF Wytton.

The majority of the civilian element, predominately Mapping and Charting Officers, was employed in the Mapping and Charting Establishment RE (MCE); a unit about 600 strong, mostly co-located with the Director's HQ at Feltham. There were four operational groups: Production; Library (housed at Tolworth near Kingston-upon-Thames); Geodesy and Computing; and Technical Services, the last of which was commanded by a Military Survey

lieutenant colonel. MCE also provided the General Staff Map Branch in MOD Main Building, responsible for mapping support to the central and single-service staffs. A number of civilians from these disciplines held staff posts in the Directorate of Military Survey. No. 8 Map and Air Chart Depot, a storage and distribution unit with mostly civilian staff, operated from its site in Guildford.

Military Survey officers and soldiers also served in UK units not under the Directorate of Military Survey's control. The largest single grouping was at the Joint Air Reconnaissance Intelligence Centre (JARIC) at RAF Brampton, whose Technical Services Squadron provided specialist photogrammetric support and was commanded by a Survey major. A number of senior positions at the Ordnance Survey were still filled by Survey officers on the basis that, as in the Second World War, the production resources at Southampton would be needed in the event of general war.

Germany

The final principal uniformed unit was 14 Topographic Squadron, an independent squadron at Roy Barracks in Ratingen near Düsseldorf. The Survey Production Centre RE (SPC), under a retired Military Survey officer and manned by German civilian staff, was based in Mönchengladbach.

Survey officers were represented on the staff of Headquarters BAOR and 1 British Corps. Technical control over these units was asserted through the senior Military Survey officer in theatre, who liaised closely with HQ 1 British Corps to ensure operational training priorities were reflected. Military Survey NCOs were at divisional level with TACIPRINT, now established as a valuable asset, in contrast to the UK, where 42 Survey Engineer Regiment provided TACIPRINT support on an exercise basis only. A staff sergeant and lance corporal were serving on the British Military Mission (BRIXMIS) in Berlin providing mapping and graphic support.

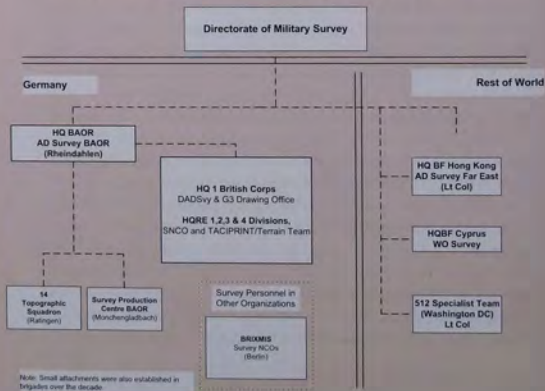
Rest of the World

512 Specialist Team Royal Engineers (512 STRE) was based in Washington, DC, lodged with Military Survey's opposite number,

the Defense Mapping Agency (DMA). The Commanding Officer, a Survey Lieutenant Colonel, doubled as the DMilSvy's head of liaison to the DMA and also provided advice to the British Defence Liaison Staff in Washington.

In the Far East, the Survey presence was centred on Hong Kong, where Headquarters British Forces included a Survey branch headed by a lieutenant colonel with a small drawing office, map store and library. In conjunction with the local civilian Lands and Survey Department, this branch exercised responsibility for the production and maintenance of mapping of the Colony for use by the military and the local police force. Other tasks included meeting mapping requirements for British forces in Brunei and Nepal, liaising with mapping agencies in South-East Asia and Australasia and acquiring library material. Routine requirements for operating within base areas elsewhere were satisfied by UK production triggered by a warrant officer in the relevant HQ, such as in Cyprus.

MILITARY SURVEY STAFFS, UNITS AND DETACHMENTS: GERMANY AND THE REST OF THE WORLD, 1980



Other permanent overseas representation was maintained through the means of exchange postings, which were arrangements for the exchange of officers with the United States, Australia and Canada and senior NCOs with the latter two countries.

The Military Survey Operation

Mapping for NATO

A central aspect of Military Survey's remit to 'provide Survey support to the Armed Forces' was the provision of maps, air charts and related products and data. A priority focus was naturally the NATO area of interest. Sound international relationships and mechanisms were essential to ensure that the UK requirements were met in both national and NATO contexts.

Military Survey activities took place within the framework of joint agreements with equivalent organisations among NATO partners. The map production, storage and supply system was governed by NATO Geographic Policy, which specified the map scales to be used and detailed who produced what, where it was stored and in what quantities. The fundamental principle was that nations were responsible for producing operational and tactical mapping products covering their own territory and also providing this to other NATO nations. Both the UK and USA had extensive interests outside this area and, historically, a more sophisticated capability than the majority of the NATO members. Thus, the USA and UK undertook to produce between them the air chart requirements and mapping of the Eastern Bloc countries.

Standardisation and joint planning were necessarily important elements to ensure interoperability. Within NATO the 'geographic' organisations were at the forefront of standardisation and collaborative working, the key to interoperability that was an underpinning principle of the Alliance.

The forum was the annual NATO Geographic Conference, attended by a senior Military Survey officer representing DMilSvy. Under NATO Geographic Policy, the arrangements under which geographic information and products were made

available was based on the idea that national contributions constituted an acceptable *quid pro quo*; equal financial value in both directions was not required and, for the most part, money did not change hands.

Military Survey played a key role in geographic matters in NATO and, as a consequence, held the Chief Geographic Officer posts at SHAPE, two of the three major subordinate Commands and Northern Army Group (NORTHAG). There were warrant officer posts in HQ AFSOUTH and the NORTHAG War Reserve Map Depot at Viersen.

MCE carried out the majority of the UK worldwide map production, while the Survey Production Centre RE in BAOR undertook BAOR-specific tasks. In previous decades the operating concepts reflected the notion that Military Survey would deploy to support a major operation with a mobile 'train' of heavy vehicles providing the full range of map-making functions. This still happened in Germany on exercises, but the concept was considered obsolete. The mobile equipments were now the small-format four-tonne truck-mounted TACIPRINT and Map Supply Point (MSP).

Soldiers were expected to contribute to the production programmes, and 42 Survey Engineer Regiment and 14 Topographic Squadron undertook a small amount of map-production work. This work was often associated with an overseas theatre or regular deployment such as in Belize, Northern Ireland, Kenya and Norway.

The large map stocks produced under the direction of Military Survey, or acquired through co-production and exchange agreements, were stored in the main map depots at Guildford and at Ratingen near Düsseldorf in the British Forces Germany Map Depot, and distributed through the freight and postal systems. On transition to war, map stocks were to flow forward through the combat map supply chain to the deployed forces. Distributing these stocks in crises was practised and honed during regular field exercises. Military Survey directed the bulk of its efforts towards stockpiling in peacetime the mapping necessary to support operational plans by the UK's NATO-assigned forces.

The majority of the mapping produced was never issued but was salvaged after replacement by revised editions. This continued until the end of the Cold War, when radical change was brought about due to a shift in defence needs.

Out-of-Area Operations

A further effort in pre-stocking material was undertaken for Joint Theatre Plans (JTP), which covered a number of areas around the world where British interests might require an intervention. The location of such an operation was generally unpredictable but typically characterised as small, perhaps involving personnel evacuation or disaster relief, and it could well be highly localised.

Whereas NATO requirements were beginning to demand a rich mix of data and conventional paper products, designed to support a wide range of forces and emerging C3 or weapon systems, the information requirement was, by contrast, relatively undemanding.

Joint Operations Graphics at 1:250,000, a product having a worldwide agreed standard specification, selected 1:50,000 maps and town plans made up the bulk. Extensive collaboration with the United States Defense Mapping Agency, who were content to receive large stocks of a relatively small number of different maps and air charts from the UK in exchange for huge coverage from their own production schedule, made it possible to meet the UK's priority needs. These arrangements, which covered the design and development of emerging computer-readable (digital) data, as well as finished product and source material, were governed by an agreement between the two organisations overseen by a succession of Directors of Military Survey since the Second World War.

Director-level relations were maintained through the Five Nations, Mapping Charting and Geodesy (MC&G) Directors Conferences, with the USA, Canada, Australia and New Zealand. These were particularly valuable in encouraging the wider adoption of joint interoperability, the adoption of NATO and US/UK standards, and in coordinating cost-sharing programmes.

To meet unpredicted emergencies, Military Survey collected maps and other geographic data from governments or private

sources. Over 600,000 unique items worldwide were held in this way. Where Military Survey staffs existed overseas, such as in Hong Kong, collection and negotiations with governments for exchanges of information were managed from within the Survey branch of the HQ. Civilian specialists used their knowledge to seek out material for purchase, or to negotiate collaborations with other governments on behalf of the Director of Military Survey. On occasions, governments preferred an exchange in kind, such as geodetic surveying services by Royal Engineer surveyors. By these means, maps or data – oil pipeline charts, boundary documentation and surveys, timetables, tourist maps – were procured so that something, however esoteric, might be available at the earliest opportunity for rapid copying or as source material in support of an emergency. This was to prove itself time and again a cost-effective way of managing risk, so much so that it was settled policy that bulk stocks of maps would not be held 'just in case', except where a formal plan demanded it. As if to prove the point, when the Falklands crisis arose in 1982 (see chapter 5), the library collections proved an essential and effective starting-point.

Surveys

Royal Engineer Field Surveyors were highly trained technicians used to deploying in small groups at long distances from base. One significant element of their work involved fieldwork for mapping, sometimes in collaboration with allies. Alternatively, the field survey work might provide positioning data for other users. 19 Topographic Squadron undertook the bulk of these. Some tasks were mounted as exercises on an almost annual basis for a number of years. Over the years, Exercise *Trig Norge* took surveyors to Norway for a variety of purposes from providing mapping control to creating calibration points for the Royal Artillery Position and Azimuth Determination System (PADS) and inertial navigation systems. Exercise *Trig Cent* provided field-support survey to Belize and, following the Falklands War, Exercise *Trig South* deployments did the same for the Falklands and South Georgia. Exercise *Trig Med* met the requirement for a

yearly check of the Cyprus Sovereign Base Areas demarcation markers with resurveys where necessary. Occasionally the Territorial Army soldiers of 135 Field Survey Squadron carried out this latter task.

14 Squadron's field surveyors operated largely in Germany, and to a lesser extent in Berlin, Netherlands and Belgium, in support of theatre tasks such as the provision of Artillery PADS (Position and Azimuth Determination System) or RAF inertial navigation systems control-points. In the UK, 13 Squadron supported missile programmes and, under Operation *Moccasin*, identified the deployment routes and launch sites for the American cruise missiles based at RAF Greenham Common and RAF Molesworth.

One particular aspect of the field survey operation stood in some contrast to mapping – extensive and continuous round-the-world operations. Survey tasks frequently took surveyors to new locations in Africa, the Middle East and Far East; then, following the end of the Cold War, Eastern Europe. Exercise *Fourpence*, for example, allowed surveyors to operate in harsh remote regions while at the same time providing valuable assistance to the Survey of Kenya. It too became a regular fixture in the manner of Exercise *Trig Norge* and others.

The Nepal Survey

A significant survey was Exercise *High Trig*, which took place between 1982 and 1985 with the aim of producing a primary survey control network of Nepal, essential for the Nepalese Government to plan the development of the country. This exercise was the last major triangulation of an entire country to be carried out by classical methods, for soon GPS was to change the face of land-surveying and render triangulation obsolete. During each of the three years of the project, a 30-strong detachment from 19 Squadron spent six months working between the hot plains, where 100-foot microwave towers had to be climbed to obtain the necessary intervisibility, and Himalayan Peaks at 17,000 feet, from which observations could be made at night to lights on survey points up to 50 miles away. The task



Survey observations in Nepal at 20,000 feet.

involved travel by means as diverse as helicopters and ox-carts and in some cases involved three-week treks, mainly on foot, before survey work could start. After three years work in extreme locations, 19 Squadron provided the Government of Nepal with a primary survey control network of 68 stations on which to base their national mapping. In addition, although it was not intended to measure the height of Everest with any greater accuracy than existed at the time, they did confirm that 29,029 feet was as good a value as was likely for some time.

World Wide Positioning

While some of these exercises had the effect of offering a challenging environment for the development of a young NCO, there was a much broader purpose for them. In many cases, such work was carried out as a quid pro quo for access to maps and other data from host governments. In other cases, the data itself would be useful in the creation of a precise model of the world, as the basis for operations of global navigation systems and of the strategic deterrent.

512 Specialist Team RE worked with their US counterparts to produce an ever more precise geodetic framework of the Earth. The territories in which Washington-based, but globetrotting, 512 STRE set foot are far too numerous to mention. They carried out Doppler, and in turn GPS, and gravity surveys in many countries throughout the Americas, Africa, the Middle East and

Far East as well as manning permanent static mission-tracking stations in Cyprus, Ascension Island, Diego Garcia, Bahrain and St Helena.

Complementing this was a static system worldwide, including in UK. Military Survey was one of the early users of satellite surveying systems and since 1970 had managed a Tracking Network (TRANET) ground monitoring station at Barton Stacey. As the GPS system was implemented, so the station took on the monitoring of those satellites.

All these tasks provided sound training that was to be put to good use during operations in the Gulf and the Balkans.

Training and Trade Structure

In 1980 Survey training was carried out at the School of Military Survey (SMS) at Hermitage with the exception of Class 3 training of apprentice technicians at the Army Apprentice College at Chepstow. The soldier trades initially reflected the map production process: field survey, air survey, cartography, photography and lithography and a storeman trade, with all but the latter holding technician status.

SMS had three departments, Field Survey, Air Survey/ Cartography and Lithography, titles that were to change several times during the ensuing two decades, broadly reflecting the current soldier trade structure. In the case of soldier courses, the syllabi and testing were the responsibility of the RE Survey Training Development Team, also based at Hermitage. SMS also provided all-arms training in the form of the Map Reading Instructors Course, which trained some 300 students each year. There were also courses for the other services: the Draughtsman Specialist and the Aids to Navigation Courses.

Officers who chose a Survey career attended the Army Survey Course (ASC) and, on successful completion, were awarded the military qualification 'Svy' and granted exemption from the final written examinations of the Royal Institution of Chartered Surveyors. In 1980 the ASC still reflected the need to survey overseas lands and, although it covered the complete map-production process, was biased towards field and air survey. In

due course, selected officers could subsequently attend a one-year university course to specialise in a relevant subject such as geodesy, photogrammetry or printing. From 1980, under a change of direction initiated by Major General M. A. (Mike) Sexton in 1977, attendance at the Army Staff Course, if selected, represented an alternative.

Training for War

For military surveyors in a unit every established post had a war role, generally a different task in a different place from their routine peacetime employment; for example, an air survey technician at Barton Stacey revising the mapping of Belize might deploy to Herford to man the Corps Map Depot. Although routinely employed on map production, the Survey soldiers' priority task was to prepare for their war roles, which were to provide field-survey expertise, terrain-analysis skills to formation staff, rapid map-production facilities and to man the combat map supply system. UK-based personnel in this way augmented the small Survey staffs at formation headquarters, and the Survey Production Centre doubled its production capacity by receiving a complete second shift of personnel from 13 Squadron. The main tools in the provision of Survey support to formation headquarters, including the Ace Mobile Force (Land) and 3 Commando Brigade, were the mobile printing and map-supply facilities, TACIPRINT and Map Supply Point.

These 'war' skills together with general military training were practised in a continuous cycle of exercises starting at the lowest level with squadron work-ups and culminating in major exercises in Germany such as the BAOR-wide Exercise *Wintex* and the biennial Northern Army Group Geographic Exercise *Dominate*. Military Survey actively participated in the two largest deployments of British troops since the Second World War when first Exercise *Crusader* in 1980 and four years later, Exercise *Lionheart*, practised the entire mobilisation plan and moved some 60,000 men and all their equipment across the Channel to their wartime deployment areas. Specialist terrain maps were produced, and map distribution was a major effort. 14 Squadron also provided the many 'special-

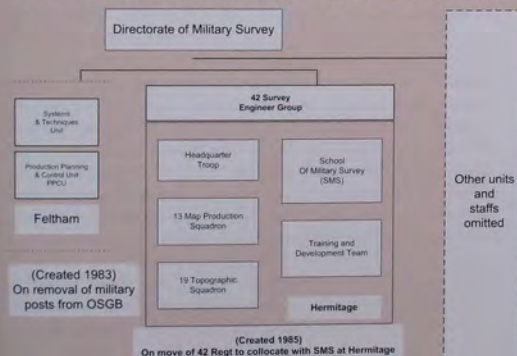
to-exercise' graphics needed by directing staff to manage manoeuvres in a peacetime environment.

Organisational Change in the UK 1983-1986

1983 saw nearly two centuries of direct management of, and involvement in, the Ordnance Survey of Great Britain (OSGB) come to an end when Colonel H. C. (Hugh) Woodrow, the last serving Sapper to fill an appointment there, completed his posting and was replaced by a civilian. The termination of the long-standing link was brought about by pressure from the Ordnance Survey to replace its military officers with civilians, together with increasing demands on Military Survey and the MOD requirement that all those in uniform had a clear war role.

At this same time, the increasing complexity of both information requirements and technology required the Directorate staff functions to be enhanced and for policy to be more clearly separated from execution. The Director of Military Survey, Major General E. W. (Eric) Barton, secured Army Staff

UNIT DEVELOPMENT WITHIN THE MILITARY SURVEY ORGANISATION IN THE UNITED KINGDOM, 1983-1986



approval to use the manpower cover from the OSGB posts to create two small specialist units for this purpose, alongside his headquarters at Feltham:

- The Production Planning and Control Unit RE (PPCU) was to be commanded by Colonel Woodrow, to manage production and supply both within the UK forces and with NATO partners.
- The Systems and Techniques Unit (STU) was to develop the Military Survey response to emerging requirements for computerised information, looking at both weapon development trends and internally at Military Survey capabilities. It was therefore to be headed by a civilian scientific officer with appropriate defence experience, with a military lieutenant colonel deputy, initially Lieutenant Colonel M. P. B. G. (Mike) Wilson.

Fallout from the 1975 Defence Review was behind the first major organisational change to established units. A Military Survey proposal for an amalgamation of 42 Regiment with the School of Military Survey at Hermitage was accepted and led to the formation of 42 Survey Engineer Group, initially commanded by Colonel R. Wood, 42 Regiment disbanding in September 1985. 19 Squadron provided the field and air survey capability and the manning of the War Reserve Map Depot, while 13 Squadron was responsible for the cartographic and reproduction facility. The composition of the Group and unit designations were to change several times during the ensuing years.

In January 1986 the rear party at Barton Stacey finally vacated the old wartime wooden huts as the demolition workers moved in. The Military Works Force left B Camp a few months later ending a Sapper connection with Barton Stacey that stretched back to the Second World War. With the close of the Barton Stacey station, the TRANET (Satellite Tracking) station was also moved to Hermitage in 1985, where it continued to provide updates to the universal GPS service. At the same time as these changes, Major R. A. (Dick) Ellis conducted a review of Military Survey's soldier structure. Published in 1986, it confirmed the production-

oriented structure but replaced the storeman trade with the new map-supply-based trade of Combat Surveyor. This trade would also be a starter trade for the technicians. Over the same period the Survey posts in HQ UKLF became a captain and a sergeant.

Capability Development, 1980–1989

The Director of Military Survey and his staff were well aware at the beginning of the decade that some policies that had been valid in an era of worldwide deployment, such as from-scratch comprehensive mapping requirements, were now questionable. Significant thought was given to developing more relevant skills and techniques. For instance, the time between revisions of the 1:50,000 M745 series by the German authorities was lengthy, often taking well in excess of five years. A 'quick' update was needed, and an overprint map revision programme had been started in 1976, designed to ensure that 1 British Corps could fight with the most up-to-date mapping possible. This was developed during the 1980s: 1 ASLS, planned and managed biennial RAF Canberra photographic reconnaissance missions to acquire complete new air-photograph cover of the Corps area. This was used by 14 Squadron to produce overlays, known as Topographic Information Overlays (TIOs), which showed the many changes on the ground caused by Germany's rapid development. In style, they were deliberately garish and made no effort to conform to cartographic standards, or to blend in with the original. It was a warning to the user – 'Here is a change that has more or less been captured but not necessarily in every detail.' The overlays were taken as far as the reproduction material stage so that should Transition to War be ordered, printing plates could be made immediately and existing map stocks overprinted in electric purple with the updating information. These would then be the first products to be distributed through the combat map supply system.

Terrain Analysis

Interest in detailed analysis of the terrain and its impact on military operations, for example identifying possible routes for

the movement of heavy tanks or the ability to dig deep trenches, only really started to develop as a discipline during the 1980s.² Terrain-analysis methods were being developed to provide more comprehensive geographic information to commanders in the field. Large libraries of paper thematic mapping such as geological and cross-country movement maps, and other documentation covering the British area of responsibility in Germany, were built up. Information as diverse as the distance between trees and the load-carrying strengths of bridges were all stored on paper in plan presses available for instant use. These libraries were used by Survey staff to produce rapid overlays to show key planning criteria, such as choke-points at specific times and under particular weather conditions, and were part of the intelligence preparation of the battlefield. In BAOR a series of terrain maps were produced and added to the map catalogue.

New Technology

Terrain analysis was an area ripe for computerisation, and a trial project, Pilot TERAS, was authorised. In 1989, it was demonstrated in Germany where, apart from evaluation, its main function was to show staffs the benefits of automated terrain analysis. The concept was accepted, and a contract let to provide a system to create a digital terrain analysis database covering the Corps operational area. However, before it could be brought into service the Cold War ended, and it was considered that there was no longer a requirement for such a product.

New technology had been slowly edging its way into field surveying for some years. 512 Specialist Team RE had used Satellite Doppler techniques for some time, and field and air surveys were initially computed on the then limited-ability desktop computers before final computation on the mainframe system at Feltham. For field surveyors everything was about to change. In 1980 the first of an eventual 24-strong constellation of satellites to provide the Global Positioning System (GPS) was launched, and by the end of the decade Military Survey was replacing its Doppler equipment with the commercial geodetic GPS systems that revolutionised field survey operations. It was

now possible to obtain accurate position 'fixes' 24 hours a day in all weather conditions. Also the need for 'line of sight' was removed and with it the need to climb summits; indeed Surveyors could occupy a site precisely where the survey mark was needed – be it in a valley bottom or on a gun line. By the end of the 1980s, the first generation of truly 'hand-held' GPS equipment became available and played a part in Military Survey's contribution to the Corps effort during the Gulf War (see chapter 6).

The Growth of Digital Products and Standardisation

During the 1980s, NATO increasingly relied on having more sophisticated technology in its weapons, avionics and command-and-control systems to gain a 'competitive edge' over the numerically superior Warsaw Pact Forces. At the leading-edge of weapons technology were the strategic weapons systems that relied on precise geodetic information and 3D terrain data to navigate to their targets. Weapon and avionics system developments forged ahead in the early 1980s, and it required great efforts from Directorate staff to ensure that geographic data requirements were considered by ensuring the early involvement of Military Survey in the planning phase of the new systems. In the area of command and control, headquarter systems increasingly needed a map background on screen against which to display information, and terrain analysis grew in importance. All these systems needed detailed, and in some cases 'intelligent', geographic data in order to function.

The burgeoning of computer technology led, in 1983, to the setting up of the first of many Computer Requirements Studies (CRESTs) to manage the development and introduction of such systems into Military Survey use, especially in the UK base operation at Feltham and Tolworth.

For some time, providing support to RAF navigation and weapons delivery had occupied a major proportion of the production effort at MCE. Indeed by 1982, Project 1/77, the production of targeting maps of the likely operational area, had become the biggest Feltham-based mapping programme. This RAF support also covered a range of products, such as the

moving map displays used to navigate the Harrier and Tornado aircraft. However, these were paper and film products respectively. Increasingly, digital geographic data was required to 'drive' the emerging avionics systems and their various training simulators.

Within Military Survey there was an increasingly close relationship between defence systems, digital outputs and production technology. As requirements burgeoned with the huge increase in applications, PACE (Production of Automated Charts Europe), which was essentially a switch to automated capture and compilation to produce a 'seamless database' for air charts, and the international Digital Landmass Simulation (DLMS) radar simulation programme data, Digital Feature Analysis Data (DFAD) and Digital Terrain Elevation Data (DTED) were joined by others over the years as requirements burgeoned with the huge increase in applications. Vertical Obstruction Data was essential for flight safety; Arc Standard Raster³ Product (ASRP) met the requirements for the background displays.

The digital geographic data for these developing requirements were to be provided by a variety of countries, so data standardisation became a major issue. To resolve this, an ad hoc Digital Geographic Information Working Group (DGIWG), initially with US, UK and German membership, was formed in 1983 through an initiative of DMilSvy, at that time Major General E. W. (Eric) Barton, and led by Lieutenant Colonel A. E. H. (Alex) Matthews. With the aim of achieving rapid results, it was decided not to incorporate it into the NATO hierarchy of committees. This had the secondary benefit that the French felt able to join in, using English as the sole working language. As other NATO countries started to tackle the issues involved, so they also joined DGIWG, developing a digital exchange standard called DIGEST, which NATO accepted.

The reproduction area first felt the impact of technology with the installation at Hermitage, following the Falklands War, of a colour scanner and associated edit station. An updated version was installed at Feltham in 1986, but the entire pre-press process was then the subject of digital development to the extent that by

the end of the century there was a fully digital pre-press capability. The main advance in the printing equipment inventory was the introduction, to 13 Squadron in 1985, of a very large format four-colour Roland 804B printing press, the largest sheet-fed press in the world at that time, followed by a similar but even larger six-colour press at Feltham the following year. This essentially moved reproduction into the computer-based integrated production era.

It was not only in the UK that these developments were taking place. Farther east in Riyadh a post was created in 1987, and was continued for several years, for a lieutenant colonel (initially Lieutenant Colonel R. M. (Richard) Johnston) to support the Al Yamamah project – the provision of weapons systems to Saudi Arabia. Survey involvement in the Sultanate of Oman was more substantial still. In 1983, the Omani Ministry of Defence asked the Director of Military Survey for advice on establishing a National Survey Authority (NSA). In response to this request, Lieutenant Colonel Matthews visited Muscat and made recommendations that included the attachment of a Survey colonel on loan service. The proposals were accepted, and in October 1984 Colonel W. (Bill) Codd was posted to Muscat to establish the NSA. Over the years the organisation was developed under Military Survey officer guidance, and a number of former Survey personnel were employed to provide the necessary expertise; a close relationship was maintained thereafter.

Modernisation of Production

By the mid-1980s it was clear that a more coherent strategic plan would be needed for production capability. Commercial satellite-based imagery was available, and studies to assess the use of imagery from LANDSAT and SPOT satellites led to this becoming an integral element of the production process. Imagery offered not just an up-to-date source but also a source of precisely positioned information not displaced by typical map generalisation. Imagery was to be a way forward.

There were other issues. A plethora of digital product variants were now beginning to emerge, and the production process itself,

even of paper products, was becoming increasingly digital in nature until the final print; there were synergies and production efficiencies to be gained by converging the two.⁴

Conformity with the US Defense Mapping Agency (DMA) output was also vital: UK aircraft, weapons and command-and-control systems were likely to work with their US counterparts and needed to operate with US-specification data, especially as the US was at this time investing substantial sums in developing new product concepts.

Project PETROS

In 1986, the chance came to work even more closely with the US when the DMA offered to help Military Survey modernise its production processes on the back of US production-system developments, with the prospect of an end-to-end production capability in digital form and guaranteed conformity with the US, then and into the future. It would have the characteristics expounded above – precisely positioned features delineated from digital imagery as a sound base for data up to 28 end-products. Project PETROS was born.

It was not an easy 'sell' for the Director General⁵ of Military Survey, Major General P. F. (Patrick) Fagan, MBE. At an eventual ten-year costing of about £280 million, it was the biggest procurement ever to take place within Military Survey and reputedly represented one of the biggest software programmes in Europe. US project timescales also prevented the luxury of placing the programme late in the procurement calendar, so it had to compete with, and overtake, many mainstream programmes that had already been funded. The brunt of the representational task for Military Survey was led by Lieutenant Colonel A. P. (Peter) Walker, supported by Lieutenant Colonel P. R. (Phil) Wildman, the project team leader, in conjunction with Lieutenant Colonel M. P. B. G. (Mike) Wilson, DGMilSvy's representative in the DMA. The project found a champion in the Master General of the Ordnance of the time, General Sir John Tibbon. Understandably wary at first of a programme of great size and some risk, he made a point of detailed questioning and

testing of the programme's claims and assumptions. It was to take nearly three years to reach final Equipment Policy Committee (EPC) agreement, in 1989. The size and scope of PETROS meant that it was given pre-eminence in all respects for a decade, with its procurement and development dominating life at Feltham.

The planned implementation timeframe was the next three-to-five years, but almost immediately after formal project approval a more pressing matter arose – Iraq invaded Kuwait.

The Impact of the First Gulf War

The story of the war as a whole, including the contribution of Military Survey, is told in Chapter 6. However, the impact on Military Survey – how its role came to be understood in a new light – is the purpose of this section. The war was to call into question many processes and the very understanding of 'readiness' itself.

The Gulf War forced a profound and ultimately highly beneficial re-thinking of the Military Survey concept for support to the armed forces. Both uniformed and civilian elements were fully committed. 14 Independent Topographic Squadron, initially deployed with 7 Armoured Brigade, was boosted subsequently by reinforcements from Hermitage and 512 STRE and, at the height of the campaign, had teams and detachments throughout the operational theatre, including soldiers deployed with the United States HQ VII Corps and 1 and 2 Marine Divisions. UK-based units and their mostly civilian staff were operating around the clock and also managing other department and other nation resources.

Planning and Responsiveness

As mentioned earlier in this chapter, there was a distinct divide in mapping support plans between the NATO area of interest and Out of Area. In a narrow sense, Military Survey was ready for a deployment to Iraq for an evacuation plan or similar but not for a sophisticated air-land manoeuvre battle over a wide area. Data had to be produced in NATO format. The Production Planning and Control Unit RE proved an ideal vehicle for planning this,

and the Commander, Colonel A. J. (Andrew) Hoon, set up an operations room in Feltham. Lieutenant Colonel C. G. A. (Chris) Nash headed the operations planning and coordinated priorities for work, assisted by Major M. J. (Mick) Perry. The operations room, a temporary measure in principle at the outset of the war, was to become a permanent feature.

It was not just the product that was unusual in an Out of Area context but the process by which the UK production operation became intimately linked with the theatre. Basic target information on paper and film were distributed by air to form the basis of planning. During the air operations themselves, nightly battle damage assessments called for new information to be added as an addendum immediately before a series of sorties. Thus data requests and responses were transacted late in the night and in the early hours of the morning, with results faxed through on a telephone system capable of handling highly classified data, in time for the next day's sorties. To these and related special tasks, a team of civilian staff, which numbered four originally, grew eventually to nearly 40, worked more than sixteen-hour days from before Christmas to the end of the air campaign – a magnificent response.

Terrain analysis exhibited similar features. For the first time, terrain analysis was put to the test in an area of the world that had not been practised over ad nauseam in annual exercises. New terms had to be learned and understood, such as *sabkha*, the flat sand-cum-salt features that littered the desert and represented a risk to *goings* for both tracks and wheels, especially when wet. As with targeting, so terrain analysis was the subject of interaction between staffs in UK and theatre. Priorities for analysis were driven closely by the requirements of the ground forces, communicated both by Principal War Headquarters (PWHQ) in High Wycombe, and from the theatre itself by the Chief Geo Officer of the coalition force, Lieutenant Colonel N. F. (Nick) Fickling.

Collaboration and Cooperation

There was also collaboration between Engineer Intelligence and Military Survey on the subject of terrain analysis, which was to



14 Squadron box body vehicles in the desert.

mirror a greater collaboration and integration between these elements of the Corps in the years to come. When the Engineer in Chief, Major General Richard Peck, was concerned about the implications of the nature and location of enemy positions, Lieutenant Colonel S. K. E. (Steen) Clarke was tasked with visiting the Military Survey operations room at Feltham and took with him map overlays showing these dispositions in some detail. Military Survey had been plotting pipelines and other obstacles and had also examined the terrain to look for *sabkha* and other risks to good *going* for the main battle tanks.

Lieutenant Colonels Clarke and Nash concluded that the combination of the terrain and enemy dispositions represented a significant issue and took this conclusion to the Engineer in Chief. Subsequent briefings by the EinC in the UK and by Colonel A. A. (Alasdair) Wilson in theatre had a significant impact on the decision to use a left hook though Wadi Al Batin as the main effort of the assault to liberate Kuwait.

When that final decision was taken and preparations were ordered, the Military Survey operations room staff noted the print demands for mapping with wry amusement – some hundreds of thousands of map sheets were to be printed covering Iraq and Kuwait, all unclassified. However, the different quantities specified for each sheet would have given away the main line of assault, so the whole print order was Top Secret. The mapping effort was

shared between the US and the UK, with liaison visits maintained throughout the war. Iraq was remapped at a scale of 1:50,000. Over 600 tons of maps were airlifted from the UK alone. It is also interesting to note that the availability of the map coverage was on the critical path for the starting-date of the ground operations.

The vital importance of international relationships was reaffirmed. There were two relationships of note, one of them with the US. Throughout the build-up to the war, and during the war itself, the Military Survey connection with its sister agency, the Defense Mapping Agency in the US (DMA), was crucial. Tasks were routinely shared as were source materials and end-products, and plans were regularly communicated. Lieutenant Colonel Nick Fickling and his US opposite number were in constant contact in the operational HQ and with their respective national organisations back home. The circle was completed by established links between Feltham and Washington, DC, through Directorate of Military Survey's principal officer in DMA, Lieutenant Colonel M. (Martin) Harvey. Without the trust built in peacetime, the ad hoc relationship of the four locations could not have worked.

A second vital relationship was with the Saudi national forces. In the early stages of the build-up, release of national mapping for use as source material for the coalition mapping was not forthcoming. However, the history of hosting foreign Geo officers on the Army Survey Course paid dividends: Major General Wood knew Major General Shahrani, his Saudi opposite number, from their days at Hermitage together, and so phoned him direct. The maps were duly released and the important updating of coalition products could be completed.

In the Field

In the field, some lessons were unexpected; others offered a new emphasis on an old theme. One of the old themes was the proving of the NATO-based Standard Operating Procedures (adjusted for the circumstances of the Coalition) for issuing and distributing mapping, and for ensuring all nations worked to the same edition. One of the surprises was the operational importance of teaching map-reading and navigation in the field en masse.⁶

The importance of terrain analysis in the field was newly demonstrated. Its proponents already knew its worth, but the extent could not have been forecast. Moreover, Major Rigby's squadron in theatre had acquired digital data from the US DMA and used this in the Pilot TERAS system, which had deployed with the squadron. They were able to see at first hand the power of such data: they were able to mix geographic data with intelligence and other operational material, such as minefield surveys, and it became clear just how much value could be added.

A surprising lesson (from the perspective of those observing BAOR in the previous decade) was the need for a mobile production capability. The cumbersome equipment with which military units started this period of the history – the mobile production train with 40-ton prime-movers and semi-trailers – had been mothballed. It was taken to Kuwait with considerable difficulty. The operation showed the need for a genuinely mobile capability more substantial than TACIPRINT, and other small systems available at divisional level. It was clear also that a flexible Geographic Support Group, capable of being tailored to the operation at hand, would be needed. No more would uniformed personnel have a scheduled production role mirroring their civilian counterparts. All this was to lead to a wholesale review of the structure and role of the Royal Engineer Survey soldier.

A New Approach to Readiness

Perhaps the most important lesson was that it was no longer possible to compartmentalise requirements for certain types of products and tactical support as NATO-area only: there were too many possible combinations of area, operation and weapon to allow definitive 'just-in-case' production. Something imaginative had to be done.

In 1991, Major General Wood introduced a new doctrine of 'Print on Demand', which evolved into 'Provision on Warning' in recognition of the fact that the concept must encompass all aspects of production. Its rationale was that there would be some time during the build-up phase of an operation to generate the required products at MCE. It became possible to envisage a

system whereby data could be produced by the UK (or an ally) and be added to in-theatre by deployed troops in a very short timespan, producing material specially designed for the imminent phase of the operation. Military Survey readiness plans would need to be explicitly linked to central planning assumptions on the timescale for build-up and deployment of key military components, conceiving a deliberate risk-managed approach to readiness. The planned response, which needed to be well rehearsed, could vary between the simple issue of library materials to fully pre-prepared maps, digital weapons and navigation data, depending on central staffs' view of risk.

The new concepts would depend vitally on the development of computer-based capability in, and connectivity between, the production and field deployable elements of Military Survey. These were to become more of a reality towards the end of the decade.

The 1990s: A Decade of Change

The years following the Gulf War saw considerable change compressed into a very short period. Part of the change was the planned development of digital capability and the reorganisation of roles, a continuous process refined by the Balkans experience. Part of the change arose in the wake of further cost studies and the Thatcher reforms of governmental processes. The unravelling of the former Soviet Union created new opportunities and further change. All these influences were concurrent; each had its own internal logic and can be understood separately. Nevertheless, their influence was felt simultaneously, especially over the ensuing five years, and for this reason the period following the end of the Gulf War to the mid-1990s in particular represented a highly compressed and profound period of change.

The Creation of the Defence Agency

In 1989, the Government Efficiency Unit issued the *Next Steps* report on the creation of Executive Agencies. The basic premise was simple: organisations such as the Royal Mint and the Vehicle Licensing Office, which charged fees for services, should be run

as pseudo-businesses under a chief executive within a policy framework set by ministers rather than as government departments. The chief executive would be responsible for the quality of services provided by the agency, for meeting agreed performance targets, resource efficiency and for producing corporate and business plans, together with commercial-style annual reports and accounts. Within a defined framework of responsibilities, the chief executive was free to manage the agency within his budget.

The initial tranche of twelve Executive Agencies, which included the Ordnance Survey, was successful. The surprise was that this concept was extended to the MOD, with a requirement for six Agencies to be formed within Defence by 1991. With no prior consultation, Military Survey found itself on the list together with the Hydrographic Department – the Hydrographer's agency was launched in 1990, and Military Survey was in the second MOD tranche for 1991.

The preparation for Agency status overlapped with the MOD's own *New Management Strategy for Defence* which was based on the *Next Steps* principles but introduced different requirements for management plans and budget regimes, and also included the *Options for Change* and *Peace Dividend* requirements. It was a time of some confusion as the various imperatives were untangled. All these elements were new, and MOD in particular appeared to be creating policy 'on the hoof' with no precedent to follow. This was not a wholly bad thing. Although it was to some extent a step into the unknown, it was actually quite an attractive opportunity for the Director General, Major General Wood. He could pitch for exactly the delegations and freedoms he needed, with some hope that many of these would be (and indeed were subsequently) accepted. Military Survey's operation included the provision of data for weapons systems, substantial specialist equipment procurement for Military Survey, production contracts and the control of international collaboration arrangements and of information purchase worldwide. To have both strategic and day-to-day control over resource commitment and cash-flows would therefore be a significant 'plus'.

Each candidate organisation had first to be assessed for privatisation, which in Military Survey's case was dismissed without much difficulty. Next to consider was the boundary of the agency and the respective roles of the agency and the responsible Minister. Careful thought had been given to the boundary. In order to retain the integrated nature of Military Survey, from the acquisition of source material through production to deployed support to field formations, it was agreed that all the military and civilian staff and units in the UK would be incorporated. The inclusion of a uniformed element caused considerable debate in the MOD and the Treasury, but the example of the intimate UK base-to-theatre connections in Operation *Granby* proved telling. The decision to include a uniform element enhanced the Agency's ability to respond to the many subsequent operational demands. 14 Independent Topographic Squadron and the Survey Production Centre in Germany had to be excluded, however, because of the command structure of BAOR.

Budget arrangements arrangements had to be hammered out in direct negotiations at the Treasury, who started from the expectation that Executive Agencies would charge their customers for their products and services. This led to tough negotiations with the MOD and more particularly with HM Treasury, with the Director General arguing that geographic products were combat supplies for which units should only be charged if they were also required to pay for their ammunition, food and fuel. This eventually gained acceptance. Exemption was also obtained from the need to put a capital value on the Map Library and map and air-chart stocks in the depots. This model retained the advantages of the Agency concept without the need to raise bills. Other defence Agencies followed a comparable pattern and were known as Defence Support Agencies (DSA).

Once through that hurdle, there was an enormous amount of detailed work to be done before acceptance as a fully fledged DSA, and Major General Wood set up a change-management coordination team headed by Lieutenant Colonel J. G.

(Jonathan) Forbes to develop the detail. A key task was a governing document (the 'Framework Document, or FD) defining objectives, targets, powers, flexibilities and accountabilities together with regimes for accounting, financial structure and personnel management. The FD was supported by a Corporate Plan, and all this had to be approved by the Office for the Minister for the Civil Service and the Treasury.

The principal purpose of the new Agency as agreed in the FD was to *'satisfy the requirements of UK Defence Forces for that specified geographic support essential to their capability to plan, train and fight, whilst seeking to achieve progressive improvements in operational effectiveness, cost effectiveness and efficiency'*.⁷ While not having to charge for support to Defence, the Chief Executive would be still required to present annual reports and accounts to Parliament. He thus became liable to appear before the Parliamentary Public Accounts Committee, and Agency accounts were liable to scrutiny by the National Audit Office. However, considerable financial autonomy was agreed, which allowed flexibility in managing the budget to meet defence requirements and a particularly valuable fast-track procedure for much equipment procurement. They also included 'international coordination with allied and other organisations on geographic matters', which gave him a worldwide reach and the authority to sign agreements with sister agencies of other nations.

In developing the organisational detail (see below), the identity of 42 Survey Engineer Group was retained. The function and role of the MCE was in certain respects enhanced, but the MCE itself was reorganised to take the form of four functional groups concerned with acquisition, production, special operations and development. The latter incorporated elements of the former Systems and Techniques Unit.

The former Directorate HQ branches also disappeared, some staff forming part of the Chief Executive's administrative HQ, based at Feltham, others being incorporated into the new functional groups of the former MCE. However, staff responsible for Defence geographic requirements and for new equipment (both for Military Survey and for new weapons systems) were

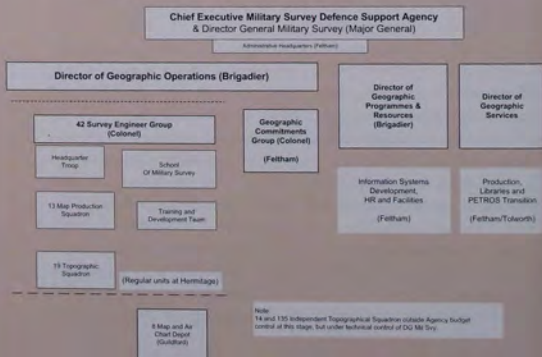
incorporated into a new Commitments Group at Feltham. This acted as the central clearing-house for new requirements of all forms. Additionally, it absorbed the operations element of the former Production Planning and Control Unit, integrating the work of future-requirements planning with planning for readiness.

The Chief Executive's team at board level comprised the Royal Engineer and civilian heads of the groups, along with a non-executive appointee from industry, selected by the Ministry of Defence. The Agency was overseen by a governing body chaired by the 'Owner', the Assistant Chief of the General Staff, with the Air Force, Navy and Intelligence staffs represented on the Owner's Board at two-star level.

In tandem with the *Next Steps* exercises, a department-wide formal review of all posts at two-star and above was carried out by Sir John Belloch, a retired Permanent Secretary. It concluded that the Director General of Military Survey was appropriately ranked at two-star. (That same exercise also covered the role of

THE MILITARY SURVEY DEFENCE SUPPORT AGENCY, 1992-1995

showing senior appointments held by Royal Engineer officers (shaded)



the Engineer in Chief and concluded likewise.) A number of other posts in the MOD were downgraded to one-star in this exercise, so it represented something of a recognition of importance and job weight for those two-star officers who survived scrutiny.

The Military Survey Defence Support Agency was duly launched in April 1991. Major General Wood became the first Chief Executive, retaining his Sapper role as Director General of Military Survey at the same time.

Move to Chief of Defence Intelligence (CDI)

At the MOD level, the Chief Executive reported to the Assistant Chief of the General Staff (ACGS) and to the Assistant Chiefs of the other two services and to the Chief of Defence Intelligence (CDI) through the Director General Management and Support of Intelligence (DGMSI). However, funding came solely through the Army, and within the MOD, the ACGS was increasingly reluctant to spend his Army money on the majority of the Agency's work, which was for the other services and Intelligence. This put Military Survey in a difficult position.

Because of this pressure to align responsibilities, efforts were made to transfer Military Survey to a Central Staff budget. After a number of false starts, the problem was solved when the Chief of Defence Intelligence, Air Marshal Sir 'Johnny' Walker, agreed to take the Agency under his wing. Military Survey operated internationally in a manner not unlike the CDI but more openly, so this was a good fit. Transfer was achieved in 1993, with the Chief Executive, Major General R. Wood, as the first incumbent under CDI, later succeeded by Major General M. P. B. G. (Mike) Wilson. However, Air Marshal Walker's successor, Lieutenant General John Foley, combined the Chief Executive post with that of DGMSI. This created the post of Director General Intelligence and Geographic Resources (DGIGR) within his Old War Office Staff, with Major General Wilson as the incumbent. On 1 April 1995, the post of Chief Executive now became a one-star post with a new incumbent, Brigadier A. J. (Andrew) Hoon, who also became Director of Military Survey.

Options for Change

In the midst of the Agency negotiations, *Options for Change* (outlined in Chapter 1) arrived, with its emphasis on the numbers in uniform. The Director General represented that the more fluid situation expected in the new era would require an increased need for geographical support, but this was not accepted. Reductions had to be made, including the loss of one survey squadron.

Clear war roles were endorsed for 13 and 14 Squadrons to provide general support to the divisions in the UK and Germany, but the operational role of 19 Squadron was more difficult to justify. In July 1993, 19 Squadron, which had been in existence for 166 years, was disbanded as the main *Options for Change* reduction for Survey, with its air surveyors and War Reserve Map Store moved to 13 Squadron. It was recognised that a geodetic capability must be retained, however, and a specialist team was formed up as 19 Specialist Team Royal Engineers. The overall reduction in uniformed strength was a major cause of concern.

A second strand to *Options for Change* was an increased role for the Territorial Army in a 'one army' approach that promised selective call-up of elements of the Reserve in situations less than total war. This, together with a reduced requirement for their war task with HQ AFCENT, led to a reassessment of the role of 135 Independent Topographic Squadron RE (V) to one of sustaining the operational map-supply system together with some reinforcement of the Regular squadrons.

1 April 1995 saw further changes when 14 Independent Topographic Squadron, then based in Mönchengladbach, came under the command of 42 Survey Engineer Group. At the same time, 1 ASLS, which had moved to RAF Marham in November 1993, was subsumed into 13 Squadron, retaining the title. 135 Independent Topographic Squadron RE (V) came under operational control of the Group, and 8 Map and Air Chart Depot was transferred to the Directorate of Geographic Information. Later, in September, Headquarters Troop reformed as 16 Survey Support Squadron.

Perestroika and the impact of the break up of the Soviet Union

Alongside the organisational changes that took place in the first half of the 1990s, the fall of the Berlin Wall and the collapse of the Soviet Union heralded new opportunities and was in due course to create new partners.

A significant 'first' had already occurred as early as 1984 when the then Director General, Major General C. N. (Chris) Thompson, accompanied by the Head of Survey 3, Mr. M. J. (Mick) Beynon, was invited to visit the Communist state of Romania.⁸ The Romanians had for some time shown an independent streak, even at the height of the Cold War, but despite the goodwill of these informal exchanges a Memorandum of Understanding (MoU) formalising collaboration was to await the fall of Communism. It was signed in 1992 by the then Director General, Major General Wood.

Until the collapse of the Soviet Union, these encounters were the exception rather than the norm. After 1990, however, the opening up of the Eastern Bloc and the initiation of the *Partnership for Peace (PfP)* project saw Military Survey staff open relationships with their counterparts in the PfP countries and beyond. Some remarkable insights into the Communist mindset were gained as the former Soviet partners willingly outlined their part in the mapping of the West for the Soviet Bloc armies. Interestingly, the Soviet Union appeared to have mapped the UK directly, using its own (and Eastern Bloc partner) resources – this despite the excellent mapping available to its attachés by the simple expedient of walking into WH Smith or one of the specialist purveyors. It would certainly have been the UK approach had such material been available on the other side of the Iron Curtain, with no more than the creation of an English language legend for use by troops (as indeed was to be done with Yugoslav Army maps of Bosnia a few years later). However, secrecy was everything on the far side of the Curtain. It was known that accurate Soviet 1:50,000 and other mapping was not made available to the public, and what was available to the public

was known to have deliberately misleading information. So why should they trust the Ordnance Survey public product?

Soviet products did become available. Briefed by the Directorate of Military Survey's staff, Defence Attachés (and Feltham staff themselves) sought out new material in the more open circumstances. Perhaps inevitably in the early stages of the revolution that was taking place, the first ex-Soviet products found their way into UK hands via 'entrepreneurs'. In due course, in what appeared at the time a remarkable change in the world order, Military Survey procured Soviet mapping and satellite imagery formally for use as source material.

Part of the *PfP* work was to prepare those nations for eventual membership of NATO. The first encounters with the *PfP* nations, to attend *PfP* geodetic meetings in Prague and Budapest in 1994, was also to show just how professional and thorough their geographic staffs were. Their mapping was consciously aimed at the military user and contained substantial information (such as river width, bridge capacities, selected obstacles to movement) that would contribute to analysis of goings for operations. This stood in contrast to Western mapping, where national civil organisations produced maps of their own territory and cross-country movement or road and bridge trafficability information were the subject of separate military production. In discussions on standardisation, these new partners were, as a result, urged not to 'degrade' their specifications to the NATO standard, but to continue to exceed it. *PfP* discussions and bilateral arrangements with other nations were to result eventually in Memoranda of Understanding formalising collaboration with Bulgaria, the Czech Republic, Hungary, the Former Yugoslav Republic of Macedonia, Slovenia and Poland, all signed by Brigadier Phil Wildman, OBE, on behalf of the Ministry of Defence between 1995 and 2000.

Organisation fall-out

Change of this magnitude inevitably and understandably impacted upon the organisation of Military Survey within the BAOR and NATO context. The transformation of BAOR to United Kingdom

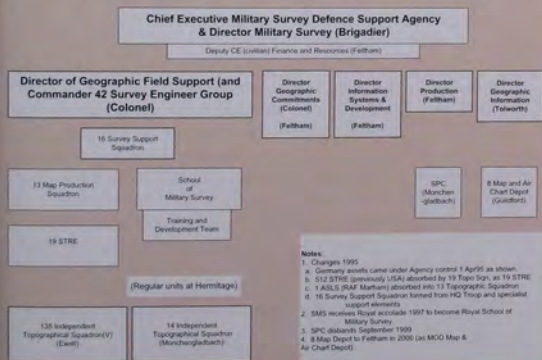
Support Command Germany (UKSC (G)) caused Survey personnel to be included in the new formation headquarters establishments from HQ UKSC (G) down to brigade level, and 14 Squadron was retained in Germany but with a move from Ratingen to Ayrshire Barracks in Mönchengladbach in 1995.

The disbandment of BRIXMIS brought about the loss of the Military Survey NCO posts there. The Survey Production Centre continued though only for a short while as, after more than half a century, it was closed at the end of 1999, Captain (Retd) Rod Siggs being its final officer commanding.

Under the new NATO organisation, Military Survey provided staff in the headquarters of SHAPE, AFNORTH, AFSOUTH, AIRNORTH, ARRC and the Joint Headquarters North and Centre. In due course, the new NATO members took their places in a much re-ordered NATO command structure, and East European mapping secured through bilateral and NATO arrangements became available to support exercises such as Exercise *Uhlán Eagle*. The new NATO members were also enthusiastic supporters of the standardisation and collaboration

THE MILITARY SURVEY DEFENCE SUPPORT AGENCY, 1995–1999

showing senior appointments held by Royal Engineer officers (shaded)



networks. Before taking up membership of NATO they had already attended the NATO Geographic Conference as observers in 1993. They had also joined in with the non-NATO networks such as the Digital Geographic Information Working Group (DGIWG) that had formed out of the original DIGEST developments of the 1980s. Towards the end of the period the membership of DGIWG was to swell to more than twenty nations.

Developing the New Capabilities

The Gulf War had ignited in earnest a fundamental change in the operation support concepts of Military Survey. This required new capability developments, to produce both maps and digital data in the UK, and to support the deployed Military Surveyors in operations, whether involved in positioning or in direct support to formation HQ. The UK base and field capabilities would also have to be complementary. These developments paralleled the rapid organisational changes of 1991–5 described earlier and were to continue into the period of the Balkans conflict, which helped to refine and consolidate them.

Production System Implementation

In 1991 work started on a new building to house PETROS, the Hotine Building,⁹ and the first staff received training in the United States. Installation and extensive training impacted heavily on production as more and more staff were inducted into the project over the next five years. The system achieved full operating capacity in March 1996 and reached its steady state of production six months later, six months ahead of schedule. The implementation successfully led to the multi-product database envisaged by the designers and, with some retrenchment, produced the range of paper and digital products required.

PETROS was optimised towards long-term production schedules and incremental revision. Meanwhile, commercial computer-based hardware and software had begun to match the sophistication of the PETROS design and offered some flexibility in the use of commercial imagery and databases that the bespoke system lacked.

Inevitably, therefore, further production capabilities emerged, especially for rapid response with non-standard products.

Throughout the 1990s, Military Survey units made extensive use of Geographic Information Systems (GIS), these capabilities proving ever more effective as computer processing power increased and commercial applications were expanded to provide an excellent range of analytical tools. Very strong relationships were developed with a number of GIS vendors.

In the same timeframes, the US Defense Mapping Agency was beginning to recognise that it too needed flexibility and that it was neither useful nor necessary to bear the great majority of the burden of developing and producing digital data. Two products in particular illustrated the approach: the Digital Chart of the World at 1:1M scale was made available for sale with the aim of encouraging the use and spread of the standards for raster data. At the equivalent of 1:250,000 scale, a product called VMAP¹⁰ was conceived as a standard, to be available on a near worldwide basis as a core operational readiness product. DMA representatives at the NATO Geographic Conference, in their role as US delegates, outlined the concept to the other national representatives, seeking the production support of other nations, over their own territory at least, with the offer in return for access to the worldwide series that would result.

Deployed Geographic Support System and TACISYS

To provide support directly to deployed forces, the lessons of the Gulf War led to the development and procurement of two major new equipments, a unit-based Geographic Support System (GSS) and the smaller formation-HQ-based Tactical Information System (TACISYS), to complement the already well proven TACIPRINT and Map Supply Point. There was also a demand to provide small portable PC or laptop systems designed for use by Geographic Sections deployed with formations that did not warrant a TACISYS.

In the commercial sector, Geographic Information Systems capabilities were advancing rapidly so that, following the Gulf War when Military Survey sought to initiate these procurements,

it was commercial-off-the-shelf products that provided the solution. The Geographic Support System and Tactical Information System were achieved in a remarkably short time, made possible by the relative financial freedom afforded by Agency status. Colonel A. P. Walker took over as Director of Geographic Field Support and in October 1993 began driving the project to obtain the two mobile systems; through intense staff work he saw the GSS enter service within two years, with TACISYS following shortly afterwards.

The GSS comprised all the components of a full map production system, housed in standard ISO containers and mounted on either eight- or fourteen-tonne trucks. The equipment could be deployed in various configurations to suit operational requirements and both 13 and 14 Squadrons were equipped with complete systems.

TACISYS was essentially a powerful, ruggedised computer system hosting a commercially available suite of software programs that provided geographic information systems and imaging functionality. Together with a variety of input and output devices, it was housed in a four-tonne truck-mounted box-body. The system had the capability to provide deployed formation staffs with a range of geographic products such as terrain analysis and visualisation graphics tailored to their immediate needs and



Geographic Information System (GIS) in use.

produced at short notice to tight deadlines, utilising all available source materials.

Small Geographic Systems

Towards the end of the Gulf War, the School of Military Survey received a new American PC-based terrain analysis system called the Digital Terrain Evaluation Program. However, the system was still in development, and it was not used for this particular operation, although the need for such a facility was recognised. A Unix workstation in a ruggedised container called 'Cougar' was introduced in 1993, but its very limited functionality and its considerable bulk meant that it was not an effective operational capability. Consequently, 42 Survey Engineer Group developed an alternative capability, the PC Interim Geographic System, quaintly acquiring the acronym 'PIGS'. This entered service in late 1994. The next step forward was the procurement of terrain visualisation systems utilising the 'Drawland' software developed by the United States Corps of Engineers. This in turn was followed by two further improved systems until the laptop-based PROGRESS equipment, hosting commercially proven Geographic Information Systems, became the standard tool of the Geographic Section for the last years of the century. The rapid introduction of these new systems was made possible by the budgets negotiated as part of Military Survey's Agency status.

Training and the Trades Structures

An MOD review of officer training in 1991 had concluded that the Army Survey Course was of Master of Science degree standard, and in 1994 Cranfield University, through the Royal Military College of Science, accredited a course revised better to reflect current defence needs and the geographic officer's role. Successful students from 80 Army Survey Course graduated with Master of Science degrees in Defence Geographic Information on 19 July 1996. The School also ran annual courses in photogrammetry for officers attending the Royal Military College of Science and covering photogrammetry and geodesy for officers on the Royal Navy Long Hydrography Course.

The Draughtsman Specialist Course was discontinued in 1994 as computer graphics packages replaced the need for this speciality. The Aids to Navigation Course that had been in existence for some years was revamped following the Gulf War, when GPS User Courses were established to meet a growing need as the equipment became more widespread. To meet this increasing requirement for navigation training, a Navigation Section was formed, which also provided ad hoc training to members of various United Nations and other deployments and expeditions. In 1998 instructors from the School taught a two-week terrain analysis course to Czech officers in Brno as part of the MOD outreach programme for Eastern Europe.

A review by Major G. C. (Geoff) Parkes in 1990 took into account the factors that had made the long-standing trade structure unworkable: the new role of direct field support rather than map production; the need for all military surveyors to have map-supply skills; the emergence of terrain analysis; and the impending reduction in numbers to be brought about by the *Options for Change* programme. The review recommended a single 'feeder' trade, the Geographic Technician, with specialisation into one of three new trades at Class 2 level: Topographic Technician, formed from the field and air surveyors; Terrain Analysis Technician, primarily the cartographers; and Reprographic Technician, which amalgamated the photographic and lithographic trades. These appeared to meet all the requirements and ensured that all military surveyors received the same higher technician rates of pay. In 1994 the apprentice soldier entry was discontinued.

With the cessation of map production work, the cross-discipline training provided by the Survey Staff Specialist course for SNCO and Warrant Officers was no longer relevant, and the course was replaced in 1991 by a shorter Geographic Warrant Officer course, which in turn was discontinued in 1995.

Only six years on from the Parkes review, the boundaries between the traditional production disciplines had largely disappeared to form an integrated automated process closely linked to increasing exploitation of imagery. By the mid-1990s at the School of Military Survey, digital technology formed the

core of the teaching environment. The growth of Terrain Analysis and disproportionate imbalance of trades resulted in the Employment Structure Review of 1996. The resultant trade structure was based on only two taught courses, Classes 2 and 1, and three trades but with initial training including a common skills phase, which included map supply and foundation geographic knowledge and skills. The Geographic Data Technician became responsible for the collection and generation of geographic data from field techniques and imagery, and the management of the Geo database; the Geographic Terrain Analyst focussed on the provision of enhanced terrain information; and the Geographic Production Technician encompassed all the skills associated with product design and compilation, as well as the traditional press operation. Each of these titles was prefixed with 'Military Engineer' in line with Corps practice, to emphasise both the soldierly nature of the trades and the Sapper connection. Overall, these changes were the most fundamental review of Survey trades for half a century.

Additionally, in April 1997, the small Royal Logistics Corps Printer trade was transferred to the Royal Engineers, and the personnel converted to reprographic technicians. Henceforth, Sapper surveyor-printers would be involved in the publication and printing of Media Operations and Information Warfare as well as mapping and intelligence.

The Balkans

Unlike the Gulf War, there is no short, sharp period of re-evaluation that punctuates and separates two eras. By the time of the Balkans conflict the direction of change had become clear but had considerable momentum of its own with the move of Military Survey into intelligence, the opening up of Eastern Europe and the maturing of the digital era. Nevertheless, the Balkans conflict arose at an opportune time to benefit from the concepts that had been developed.

The shape of that conflict, and the Military Survey part in it, as a part of the greater contribution of the Corps, is set out in

Chapter 7, but matters that impinged on Military Survey concepts and routines are addressed here.

One important aspect concerns capability, especially in respect of support to the deployed forces, where developments in field capability for the deploying squadrons and for Military Survey staffs in operational headquarters were extremely timely. The PC Interim Geographic System (PIGS) was the first capability to be deployed to Bosnia, immediately after introduction into service, to generate geographic data. It also resulted in a firm plan that operational deployable geographic systems would use PC-based application software instead of the UNIX platforms that had been procured in the past. In January 1996, 14 Squadron took a complete Geographic Support System to Bosnia in support of the NATO-led deployment. The equipment remained in theatre as 13 Squadron replaced the Germany-based squadron in July of that year, returning to its base location at the end of that deployment.

The Tactical Information System went straight into operational service in January 1996, systems being deployed directly from the development project into the Balkans to support IFOR. The School of Military Survey deployed instructors with these systems to teach the geographic technicians how to use this capability during the operation. The project was a great success, providing a well-used operational capability and forming an excellent platform for future development of GIS for use in operational theatres. The very rapid development of TACISYS and its immediate success on operations can largely be attributed to its highly effective and innovative Project Manager, Major David Swann, who drove this programme forward relentlessly. The introduction of TACISYS finally moved Geo support to the centre of operations management in the field, with the Geo staff physically next to the formation commander. This contrasts with the days of the 'train', when acceptance into the Rear HQ was almost impossible. These developments were subsequently to pay off when further intense deployment activity took place in Kosovo under Operation *Agricola*.

There were benefits too, in field surveying and in reproduction. Field Surveyors benefited in precise positioning:

geodetic receivers were introduced into service that were able to exploit the 'military only' coded GPS signals.

United Nations Support

A second aspect concerns the role of Military Survey officers in international coordination, notably in respect of the generation of the UN forces, which preceded the NATO deployments of 1996. The UN had not previously undertaken such an operation, and the basic command-and-control structure, procedures and support were not in place. Geographic data had not featured in the early thinking of UK force planning, and the Directorate of Military Survey persuaded the UN that it would be necessary to provide support to the UNPROFOR HQ at Zagreb, and to coordinate the availability of an agreed range of maps for all parties. A Chief Geographic post was established, Colonel A. P. Walker being the first incumbent, followed by Lieutenant Colonel I. F. G. (Iain) Whittington. These had the task of establishing the basic systems of support. Colonel C. G. A. (Chris) Nash continued this work, contributing to the New York Operational HQ Geographic Policy and negotiating with Croatia and Serbia for the use of their mapping and provision to all factions. The idea that opposing factions and those keeping the peace between them should all agree to use the same maps might well have been a first. Colonels I. A. (Ian) Ross and A. P. (Angus) Cross and Lieutenant Colonel R. M. P. (Richard) Nicklin continued these appointments until the deployment of the NATO-led Implementation Force (IFOR).

NATO Operations

Two other unusual roles manifested themselves during the NATO deployment. It fell to Lieutenant Colonel Nick Rigby, Chief Geo of the Allied Command Europe Rapid Reaction Corps (ARRC) in 1996, and therefore of IFOR, to contribute substantially to support for the Inter Entity Boundary Line (IEBL) commission and its depiction, and amendment, on agreed mapping¹¹ Lieutenant Colonel Rigby was later awarded



Surveying with GPS in support of the UN in Vitez.

the de Fleury Medal by the US Corps of Engineers for his part in the IEBL negotiation and demarkation. Additionally, Mr. A. D. (Andy) Fagg, the Military Survey liaison officer at UKSC(G), was the first Military Survey civilian staff officer to be deployed with NATO.

Finally, a welcome convergence of activity between the Corps mainstream and Military Survey ('Engineer' and 'Survey') arose. It had been the case in the past that the Military Survey elements had acted somewhat separately from the Corps as a whole. The Military Survey agency responsibility had been firmly in the CDI fold for a few years, but on deployment the Survey officers and soldiers (the 'Geo' staffs) still needed a close understanding of, and association with, the staff as a whole. So did the deployed Geographic Support Groups, who needed to be embedded (for instance) in the logistic and administrative chain, as well as work to their Operations and Intelligence taskmasters. During Operation *Resolute 1*, Colonel J. S. (John) Field, Commander Engineer Multi National Division (South West) oversaw the work of the Geo cell led by Captain Julian Brammer. As there were already a Survey officer and SNCO embedded within HQ 3(UK) Div in the UK, this reinforcement of the Geo cell worked very

well. The arrangement was to be replicated thereafter in-theatre and was a welcome strengthening not just of communication between the elements of the Corps, but of the position of the Geo staffs themselves. It facilitated their invaluable contribution to the overall plan, especially in the interpretation of minefield records and the making of minefield danger maps, which enabled the notion of freedom of movement to become a reality.

The Century Closes: The End of a Title

The digital developments of the first half and the middle part of the 1990s had connected UK base and field only in the sense that data could be placed on disk and shipped out to theatre. The plans and ideas, which had developed in embryo immediately after the Gulf War, could now take shape due to greater bandwidth and the expansion of powerful commercially available computing systems.

PETROS had been successfully implemented in the first part of the decade. A Military Survey Digital Geographic Information Systems study had been subsequently initiated to continue



Map supply during UN operations.

modernisation and provide a more productive, responsive and flexible means of supporting routine and crisis production. An evolutionary concept was adopted which would upgrade PETROS, consolidate information management and form the basis for the next generation of imagery exploitation capabilities, with much-enhanced flexibility of product design being a core feature. The project developed during the latter half of the decade with the intention of bringing together the many disparate production and information systems using a single commercial off-the-shelf open-architecture piece of software and the data warehouse concept to provide an enhanced provision of geospatial data to defence users.

The process was a constant experimentation with rapid-response techniques, which postulated that a product did not need to be finished, in the conventional meaning, before release to theatre. Rather, data relevant to force components and deployed weapons systems could, in principle, be separately updated over IT communications lines. This required a revolution in thinking by the Agency's civilian staff, matching that which uniformed staff experienced a few years earlier. Senior Operations and Intelligence staffs from the MOD, PJHQ and Capability staffs among others were invited to contribute via a stream of visits in which Agency staff demonstrated what might be available in hours, in a few days and in a few weeks. One Sapper contributor was the first commander of 16 Air Assault Brigade, Brigadier Peter Wall, who enlightened the Agency on the requirements of Apache AH 64 attack helicopter forces.

This also prepared the way for new imagery formats and handling processes. As the century drew to a close, the emphasis was on planning for the information and imagery management and exploitation processes of the next ten years and the development of requirements, concepts and an architecture design strategy, collectively known as Project PICASSO.

Funding and timing issues, together with some of the lessons learned from the experimentation, combined with concerns about the impending 'Millennium Bug'¹² led to a re-think in preparation for the 'Year 2000' (Y2K). All Military Survey's

systems were checked for Y2K-compliance, and problems were identified that had to be resolved before the end of 1999. A nervous core of the development staff assembled in Feltham in the first days of January 2000, but systems survived.

Defence Cost Studies

The momentum for organisational change delivered perhaps its most radical impact as the century closed. The various studies that had begun with *Options for Change* had evolved to produce a series of *Defence Costs Studies*. Study Number 18 (DCS 18) had covered the intelligence arena. This study had taken note of developments in the US in the mid- to late 1990s, in which the US had decide to merge the Defense Mapping Agency with some of the Imagery Exploitation functions of central US intelligence, to form the National Imagery and Mapping Agency. *DCS 18* recommended that this idea should be studied and adopted.

There had long been a synergy between Military Survey and the Joint Air Reconnaissance Intelligence Centre (JARIC), which had magnified as equipment to handle both source-material and the database arising from it had more and more in common. Brigadier A. P. Walker was appointed to lead the transition team, with representation from both JARIC and Military Survey from April 1999 with a view to creation of the new Agency on 1 April 2000.

The issue attracted considerable attention, including that of the House of Commons Select Committee on Defence, who heard evidence¹³ from the then Chief Executive, Brigadier P. R. (Phil) Wildman, OBE, his JARIC opposite number Group Captain Stephen Lloyd, RAF, and the superior of both, Air Vice Marshal Joe French, the then DGIGR.¹⁴

The New Agency and Other Repercussions

The new Agency came into being on 1 April 2000 as planned, as the Defence Geographic and Imagery Agency (DGIA), commanded by Brigadier A. P. Walker, OBE, with its HQ at Feltham. It incorporated all the components of the Military Survey agency, The components of Hermitage station and their subunits

farther afield were merged to become the uniformed business unit, the Geographic Engineer Group, with Colonel R. N. (Nick) Rigby at its head. Within that reorganisation, 42 Survey Engineer Regiment re-formed, with Lieutenant Colonel J. D. (John) Kedar as its first commander; 13 and 14 Geographic Squadrons, 16 Geographic Support Squadron and 135 Independent Geographic Squadron (V) constituted its subunits. The civilian-manned units of MCE (Feltham and Tolworth) and the 8 Map and Air Chart Depot were re-formed as the Defence Geographic Centre with the aim, once resources permitted, of moving all those operations to Feltham. JARIC remained at RAF Brampton.

In 1997, a geographic policy branch had already been established within the Defence Intelligence Staff, led initially by Colonel C. G. (Chris) Dorman as Assistant Director Intelligence (Geographic).

In Northern Ireland, Military Survey staff numbers had already increased considerably. The demands of digital map data led to the establishment of a Geographic Staff Officer and technicians to produce and maintain the Northern Ireland digital geographic database. The integration of the previously Royal Logistics Corps-manned Print Section produced a new fifteen-strong G3 Geographic Section with a capability ranging from paper products to terrain visualisation graphics. The unit expanded again on 1 April 2000 when it merged with the Reconnaissance Intelligence Centre (Northern Ireland) to form the Reconnaissance Intelligence and Geographic Centre at RAF Aldergrove, with representation in the Headquarters and all three brigades.

Looking Forward

2000 saw a smaller but more effective and busier survey/geographic element of the Corps than perhaps existed in 1980, highly focused on support to operations. Its soldiers had supported a number of operations in the 1980s and been continuously deployed since 1991, sometimes in considerable strength, into a variety of operational theatres. Its units and staff in formation HQ had closer ties to the Engineer management chain in the field.

At the same time, the formation of the DGIA resulted in the cessation of the Director of Military Survey appointment, Brigadier Wildman being the last to hold this title. While officers and soldiers in the Geographic Engineer Group would wear the Royal Engineer cap-badge, civilian staffs in other units would not have the same clear-cut connection with the Corps, as personnel changed over time. The embedding of Military Survey units and staffs within Intelligence would herald yet further change, the story of which will be told in a future volume.

NOTES

- 1 Mentioned also in Chapter 12 on the Reserve forces.
- 2 Much work on the analysis of terrain and its impact on operations was undertaken during the Second World War under the heading of 'Goings' but that expertise was subsequently lost.
- 3 Raster data is not unlike a digital TV picture: many pixels of data combining to create a visual impression comprehended by the eye. It had the added sophistication that the location (coordinates) of each pixel within the picture was encoded so that its geographical coordinates could identify a point on the ground.
- 4 These were not just minor technical opportunities. They reflected a coming together of a variety of influences that were having a profound effect on military and civil mapping organisations alike, around the world. The advent of modern navigation systems demanded accurate positional information on a worldwide frame of reference, demanding a major shift in production process. At the same time, the aspirations of users for more varied and powerful computer-led applications demanded a significant gain in productivity. Digital imagery provided the means to extract precise positions and other characteristics of the features in fundamental form. Stored as an electronic database, this accurate data could then be used to create many different products at different scales, for a range of purposes. The growth of capability in navigation, targeting and command, control and communication (C3) systems would have been impossible without a fundamental shift in data production processes.
- 5 As part of a wider MOD rationalisation of titles, two-star directors became known as Directors General in 1987.
- 6 To help with practical navigation in the desert, oil drums were placed out with coordinates painted on the side. Any lost vehicle would be able to fix its position from these markers.
- 7 Military Survey Defence Support Agency 'Framework Document', 1991.
- 8 While in Bucharest the visitors were taken around in two large black ZILs, and it was apparent that the head of the Romanian survey department and his officers treated the drivers with considerable deference – the drivers had to be members of the Romanian Security Service. This gave rise to a rather

absurd game during the return visit in 1986, when the driver of the contract minibus provided for the Romanians (there being no official limousines in the UK) was treated similarly by the Military Survey officers. For some time afterwards all were convinced that the driver's 'real' role would have been filed in the Securitate archives on their return.

- 9 In recognition of Brigadier Martin Hotine and his role in forging cooperation agreement and close working ties with the USA in the Second World War, from which current UK/US cooperation is descended.
- 10 Vector Smart Map (VMAP) is a vector-based collection of Geographic Information System (GIS) data about the Earth, providing considerable flexibility for data queries.
- 11 This later entailed physical marking on the ground to prevent misunderstandings, as it followed no obvious features for much of its length.
- 12 As the end of the twentieth century approached, the date change to the year 2000 (Y2K) was identified as a potential problem that might badly corrupt data or even prevent the operation of computer systems. Dates prior to 2000 had traditionally been rendered in many systems as simply the last two digits (e.g., '90' for 1990). This could not be continued into year 2000 and beyond without throwing up anomalies in the calculation of dates or timescales (for example, pensioners' ages would be in negative figures). The practice had existed for so long that many computer-system developers simply did not know how many such problems were buried in their software, and the computer world reacted with an increasingly hectic programme of review and re-writing of software leading up to the change to 1 January 2000.
- 13 House of Commons Select Committee on Defence, Minutes of Evidence, 8 December 1999.
- 14 The post first occupied by Major General Mike Wilson. The responsibilities were further widened shortly thereafter, and the post re-titled Director General Intelligence Collection (DGIC).

From Cold War to Hot Peace

Reserves and Volunteers

Introduction

Following the breakdown of the Communist regimes in the Soviet Union and Eastern Europe and the collapse of the Warsaw Pact, the last decade of the twentieth century saw the biggest change in the role of the Territorial Army since its formation as the Territorial Force in 1908, when it was seen as the alternative to conscription – its role being to defend the home base. That had left the Regular Army free to form the expeditionary force needed to enable the nation to meet the Continental commitment that it had undertaken four years previously. After the First World War the Special Reserve was re-formed as the Supplementary Reserve, which in its turn became, in 1973, the Army Emergency Reserve. Members of the Territorial Force saw themselves as being called out only when a major crisis threatened on the continent of Europe. The Territorial Army and the Army Emergency Reserve were merged in 1967 to form the Territorial and Army Volunteer Reserve (T&AVR), and this was renamed the Territorial Army Volunteer Reserve in 1977, reverting two years later to the name under which it had been known for most of the twentieth century, the Territorial Army.

The political, economic and social climate in the UK over the period of this history has been discussed in Chapter 1. The consequences for the Territorial Army of the pressures on the national economy and the changing political and strategic imperatives provide the main theme for this chapter. As to the social environment, the serious unemployment of the 1980s may well have had a temporary beneficial effect on recruitment; the prospect of a supplementary income from paid voluntary service was attractive, especially with negative equity in the housing market. An important factor in retention, however, was the sense

of purpose experienced during training as the support of society at large to military service, affecting Regular and volunteer alike, dwindled during this period.

Possibly the most significant social change, however, was the official recruitment of women, taken on strength for the first time during 1987, initially as members of the Women's Royal Army Corps until its demise in 1992. After widespread predictions of problems, perhaps the most common being that the wives of serving soldiers would not allow their husbands to remain in a mixed unit, within a few years women were employed not only as signallers, drivers, clerks or chefs but also to work alongside their male counterparts as combat engineers and vehicle mechanics. The difficulty of combining a full-time job, TA commitments and family responsibilities made it difficult to find female senior NCOs and officers. However, field officer numbers continued to rise, the first female squadron commander being appointed in April 1997.

The 1980s

In 1980 it was still the case that the vast majority of the TA saw themselves as being called up only in the event of World War Three. The 1981 Nott Review had assessed the threat as being posed by the Soviet Union, predominately in Europe, and had concluded that the defence of the home base should become a priority. Any war would be a short, intensive one, with little or no prior warning. Hence, to quote the then Engineer in Chief, Major General Peter Campbell, in June 1980, 'the TA provides an essential part of our BAOR orbat ...' At the beginning of the period covered by this volume, when the Royal Engineers TA would, in war, reinforce formations committed to NATO, there were two Engineer Brigade Headquarters, seven TA Field Regiments, eight independent Squadrons, ten Specialist Teams Royal Engineers, a Postal and Courier Group and around forty individual officers.

Of the eight independent squadrons, four were under direct command of either 29 or 30 Brigade. The other four were specialist squadrons, two EOD, initially part of the Regular 33

(EOD) Regiment; the other two were the Commando and Survey squadrons. The STREs, the Postal and Courier Group and the individuals were all specialists – 'specialist' not in the sense that they necessarily possessed specialist skills but more in the way in which a precursor of the Army Emergency Reserve was called the 'Special Reserve'. Their terms of service, however, were the same as those of the 'independent' units within the TA. The distinction between the two types of unit is explained below.

Independent or Specialist?

Unfortunately the terms 'specialist' and 'independent' were used in two senses. 'Specialist' could mean 'specialised' in the sense of the sub-unit's role or, in the case of the TA, it could also mean a formation recruited nationally and administered by a Central Volunteer Headquarters. 'Independent' could either mean a subunit not under command of a regimental headquarters or, again in the case of the TA, it described a formation recruiting locally and responsible for its own administration.

Independent units formed the bulk of the Territorial Army. They had their own TA Centres and a programme of weekly two-hour training periods throughout the year besides annual camp and weekend training. This was 'in the traditional mould of the public's perception of a territorial, locally trained, locally recruited ...' force.² Members of independent units had to complete an annual camp (fifteen days' continuous training) and at least a further twelve training days (usually taken as six weekends). However, many individuals put in much more time than the minimum required. To quote a regular training major, 'few company commanders do less than 100 days of training per year'. A Territorial commanding officer's view was that 'the company commanders do 60–130 days a year and average about 100 days. The platoon commanders do 35–60 days a year ... the platoon sergeants do 70–80 days. The average soldier puts in 56 days.'³ These statistics were based upon interviews with infantry units, but the situation did not differ substantially in regard to the other arms and services within the independent TA. In 71 (Scottish) Engineer Regiment (V) in the financial year 1988/9 the

average per officer was 70 days, for warrant officers and senior NCOs 97, and for soldiers 49 days. For all ranks the average was 56 days.⁴

Specialist units recruited nationwide and had a training commitment of nineteen days, comprising a fifteen-day camp and two weekends. They retained the concept of centrally administered special reserves (the old Army Emergency Reserve). In the main, they recruited individuals who already had, either through their civilian training and employment or through previous full-time military service, the skills they would need on mobilisation. For the Royal Engineers TA they consisted of 111 Regiment, with two field squadrons, 198 Engineer Park Squadron, a number of specialist teams, of which in 1980 there were ten, and the Postal and Courier Service TA.

Until 1987 specialist units had been called 'sponsored units'. This latter title had come into use in 1967 reflecting the fact that such units were administered by a central volunteer headquarters, one for each arm or service. In the case of the Royal Engineers this was CVHQRE (Field and Works) (Sponsored Units).

Last, but by no means least, the Engineer and Logistic Staff Corps continued throughout the period in its unique role of specialist engineer advisor. In 1980 it was called the Engineer and Railway Staff Corps, becoming the Engineer and Transport Staff Corps in 1985 before adopting its current title in 1996. Its valuable contribution to the Corps is covered in appropriate detail later in this chapter.

The TA Engineer Brigades

In the 1980s, on mobilisation, the two TA engineer brigades would deploy to the European mainland: 29 Brigade units to the Rear Combat Zone (RCZ), the area from the ports to 1 British Corps' rear boundary; and 30 Brigade units forward to provide the second engineer regiment for each of the divisions within 1 British Corps. 30 Brigade Headquarters itself had a war role commanding an all-arms force protecting the Weser valley (see also Chapter 4). Those units forward of the Corps rear boundary

would have been involved initially in helping to complete the Corps obstacle plan. Those in the Rear Combat Zone would have been involved in helping to ensure that the lines of communication were kept open and that the facilities that would be required in war were made available. Training needs did not therefore differ substantially, even though the emphasis within 30 Brigade would have tended to counter-mobility tasks, whereas mobility would have been more relevant to 29 Brigade's role at the beginning of the period.

While in the 1970s a three-year training cycle, rotating through individual, unit and collective training, had been the norm with an overseas camp every third year, the tempo quickened in the 1980s with an overseas camp every other year, during which units would participate in a major formation exercises. The first of these in 1980 was Exercise *Crusader 80*. It consisted of three elements: Exercise *Square Leg*, the defence of the Home Base, Exercise *Jogtrot*, the setting up of the lines of communication on mainland Europe; and Exercise *Spearpoint*, which rehearsed the role of 1 British Corps in containing an invasion of Western Europe by the Warsaw Pact. The Royal Engineers TA was involved in all three of these exercises.

For the Royal Monmouthshire Royal Engineers (Militia) (R Mon RE (M)), Exercise *Crusader 80* was followed in 1982 by the biennial Exercise *Spearpoint*. 1984 was the year of Exercise *Lionheart* (see also Chapter 3), with Exercise *Schwarzer Anker* taking place in 1986 and 1993. This was a joint exercise designed to practise interoperability between units of the TA and the German units with whom they would be working. The three exercises post-1984 took place in the Rear Combat (or Communications) Zone, 30 Engineer Brigade, of which R Mon RE (M) was part, having taken over responsibility for the zone from 29 Engineer Brigade. Overseas camps then returned to the pattern typical of the seventies, with overseas training taking place one year in three. This was a consequence of the end of the threat posed by the Soviet Union and the changes that were taking place in NATO. Following *Options for Change*, only one TA Regiment (71 Engineer Regiment) was tasked to support the

formations in Germany, so there was no longer a need to keep vehicles and equipment in Germany for issue on mobilisation, nor was there any longer a need to practise mobilisation procedures.

Movement to Germany aimed to reflect the process of going to war under mobilisation. Most of the equipment that units would need in war was pre-stocked in depots on the Continent. Normally a squadron in an independent unit with a role on the Continent would, in peace, hold only enough vehicles and equipment for squadron headquarters and a field troop. The experience of R Mon RE (M) in 1980 and 1982 is typical. They took between five and six hundred men to Germany, picking up their PUE (prestocked unit equipment) from Recklinghausen (for the vehicles) and Dulmen (for the G1098) on the way before moving out into the field, coming under command of HQ RE 2 Division and having detached a squadron (100) in support of 28 Amphibious Regiment. Their tasks included preparing bridges over the Weser for demolition, laying trackway, preparing defensive positions and, in the final phase of the exercise, acting as infantry.

Home Defence

In 1982 the RE TA was increased to enable each of the United Kingdom's Armed Forces Home Defence Regions to have its own dedicated Engineer staff. They were classified as 'Independent' but did not have to attend annual camp, although they had to complete the necessary training days to qualify for a bounty. In peacetime the Home Defence Staff consisted of a Commander Engineers Home Defence (lieutenant colonel), SO2 (Ops), SO2 (Resources), SO2 (EOD), SO3 Ops/Projects/Training, a Resources Specialist and a Chief Clerk. On transition to war the establishment would have been increased by the provision of extra watch-keepers and the formation of Home Defence squadrons from the staff of the training establishments. The Engineer staff were responsible, inter alia, for preparing dossiers on matters such as the key points in the region, a schedule of works that would be required should the home base come under

attack and information about engineer resources such as well points, water supplies and power requirements.

Annual Camp

Annual camp would normally last fifteen days, starting early on a Saturday and finishing two weeks later, usually on a Saturday but occasionally on a Sunday. For TA soldiers attending annual camp, some of whom would have arrived at their TA Centre straight from work or alternatively have to return to work immediately after a sixteen-day camp, it was important that everything was well-prepared, worked smoothly, was enjoyable and also that after a period of really hard work there was some time for relaxation. Without these conditions he or she might very well decide not to repeat the experience and leave the TA. Careful planning was therefore needed to ensure that at least one day off was included in a full and satisfying programme, particularly if it was an overseas camp, and that soldiers returned home feeling not only that it had been worthwhile but that they had had some fun. That said, everyone who attended camp had made a conscious decision to do so, was keen to learn and happy to work hard for long hours. The last thing that a CO wanted was anyone returning home thinking 'never again!'

Annual camp in the United Kingdom would concentrate on individual trade training, cadres for junior NCOs and young officers with a command-post exercise at regimental and squadron level. It might also involve Military Aid to the Civil Community (MACC) tasks ranging from building footbridges to creating walkways to link up with designated national footpaths. Even in the United Kingdom it was important to be aware of, and to observe, local customs – the R Mon RE (M) made the mistake one year, when building a footbridge for a local church, of moving some plant on the Sabbath. Despite the best efforts of the Regimental padre to find appropriate biblical authority for their action, they were still denounced from the pulpit the following Sunday as 'Soldiers of Satan' (by which time the bridge had been completed and was in use by the congregation, reducing the journey for some of them from five miles to a few

hundred metres). So far as is known, the congregation still use the footbridge.

Planning for an overseas camp would commence with a visit by the commanding officer, or (particularly where the CO was a TA Officer with a Regular as his second-in-command), the Regimental Second-in-Command, the Training Major and the Regimental Quartermaster to their sponsor unit in BAOR and to the depots where their PUE was stored. This enabled them to identify, and subsequently plan and train for, the types of tasks they would have to undertake and to ensure, so far as practicable, that administrative issues were addressed prior to deployment.

A small advance party would leave by road so as to arrive two or three days before the main body deployed. The main body would gather at their TA Centres either, where they lived sufficiently close to be able to do so, on Saturday morning or late on Friday evening, so as to be able to deploy with their unit the following day.

The overseas leg of the journey (except for the advance party) would be by air. On arrival at their destination airfield, those units with equipment to draw would travel by road or rail to the appropriate depots. Having drawn their vehicles and equipment, they would deploy to their host unit or to their exercise locations. On major exercises in BAOR this process would take three to four days from start to finish, so that the units might not be able to deploy until the Monday or Tuesday of their first week of camp. They would then participate in a major formation exercise for seven or eight days before withdrawing to their host-unit location to pack and hand back the stores they had drawn some eleven days earlier. The road party would leave on the Friday of the last week of camp to enable them to arrive back at their TA centres on Saturday.

Such experiences, available also to many individuals who were sometimes able to go to Germany in the role of liaison officers, watch-keepers or even troop commanders, in particular the participation in major exercises, had real operational purpose. They also helped to cement the idea of the 'One Army' concept, and units benefited enormously from the interplay between

Regular and volunteer. However, individual skills were often better acquired and tested in UK training camps such as Wyke Regis. For units with roles outside BAOR there were the occasional visits to exotic locations such as the Channel Islands, Cyprus or Gibraltar.

Weekend and Drill Night Training

A significant difference between Regular and TA units was that TA units were responsible for their own recruiting and for much of their trade training. Recruit training was centralised at Gibraltar Barracks, Minley, and some trade training was provided centrally. However, much of the training that a Regular soldier would receive at the RSME had to be carried out within the unit at weekends or during drill nights.

The priority for training was survival on the battlefield; hence the tests for bounty consisted of the Annual Personal Weapons Test, the Basic Fitness Test, First Aid, and Nuclear Biological and Chemical Defence. The second priority was training for role. In the Field Engineer Regiments this would cover combat engineer training, signalling, driving and plant operating. There was no artisan training although civilian qualifications were recognised. Signallers, drivers and clerks did not have to be combat engineers. Junior NCOs cadres would be run in-house, but TA Section Commanders and Field Sergeants courses were run at the RSME. Apart from some aspects of the Combat Engineer Class One Course, all combat engineer, signalling and basic driving training would be carried out within units.

Weekend training would typically start late on Friday evening and finish on Sunday afternoon. A variety of training would take place, some organised regimentally and some by subunits, perhaps one weekend a month, covering various aspects of individual training with another one involving the unit in collective training.

Drill-night training took place on a designated evening each week. The formal training would last two hours. However, particularly for the officers and NCOs it was an opportunity to catch up on outstanding administration or to plan future

training. The evening would end with socialising in the bar. While, given the limited time available, it could be difficult to make drill night training effective, there is no doubt that such evenings did play an important part in maintaining the cohesion of the unit as well as keeping members of the unit in the habit of attending.

Options for Change and the Strategic Defence Review

The foregoing describes the shape and modus operandi of the TA RE in the 1980s. It then had to undergo the two major upheavals of the 1990s, *Options for Change* and the *Strategic Defence Review* (SDR) (see chapter 2). *Options for Change*, the details for which were announced for the TA in 1990, was essentially a cost-cutting exercise incorporating the results of many studies that had been in progress for some years even before the demise of the Warsaw Pact; the SDR, announced in 1997, was a reappraisal of the UK defence posture in the post-Warsaw Pact era. The TA suffered a major reversal of fortune as a result of the different philosophies of these two reviews. Under *Options* the TA was to offset savings in the Regular order of battle, whereas the SDR, with its emphasis on the Army's possible intervention role, saw the TA principally as a reserve.

Options for Change

The outcome of *Options* for the TA was generally welcomed because it left a structure that could expand in time of emergency. It also envisaged a reasonably sized military presence spread around the country and the desirable civil-military links that this implied.

Of the existing regiments, 71 Engineer Regiment was included in the order of battle of 1st Armoured Division, the BAOR-based division. Its establishment was changed so that it consisted of two field squadrons (104 and 124), a plant squadron (117) and a field support squadron (102). Within the field support squadron there was to be a Medium Girder Bridge troop and a movement light section. In addition, two Continental TA troops were planned, with an additional STRE (Well Drilling) (V) also being formed.

The UK-based 3rd Division was to be supported by the Royal Monmouthshire Royal Engineers (Militia) (R Mon RE (M)) with the same establishment of two field squadrons (100 and 225), a field support squadron (125) and a plant squadron (143).

Headquarters squadrons were added to the establishment, their numbers being chosen to preserve the traditions of otherwise defunct units. This was also a practice adopted at that time by both Regular and Reserve units of the Royal Artillery, the Royal Signals and the Royal Logistics Corps. The independent squadrons were taken from 29 and 30 Engineer Brigades and brought under regimental control: 143 to R Mon RE (M), 117 to 71 Engineer Regiment, 105 to 72 Engineer Regiment and 125 to 75 Engineer Regiment. 74 Engineer Regiment was reduced to a single squadron with the same number; 76 and 77 Engineer Regiments were formed to provide RHQs for the existing ADR Squadrons; and 78 Engineer Regiment was formed to provide a general support regiment for 3rd Division.

The war establishment of 36 Engineer Regiment was to be augmented by the formation of a new wheeled field squadron (V) and, if funding allowed, by a further engineer squadron (V) to be equipped with M2/M3 rigs (see chapter 3). Within the Engineer Support Group commanded by 64 CRE (Wks) were to be two STREs (Wks) (V) and an STRE (Railway Const) (V). No changes were envisaged to 131 Independent Commando Squadron (V), whose role continued to be to provide support, in conjunction with 59 Independent Commando Squadron, to 3 Commando Brigade. 135 Independent Topographic Squadron (V) was to reinforce the regular geographic support to the Allied Command Europe Rapid Reaction Corps, but it was also to have increased responsibility for 'geo' product distribution and would include a specialist TA production element.

The engineer support of the UK base was to be enhanced. 30 Engineer Brigade was to take under command 72 and 75 Engineer Regiments, a new regiment (78 Engineer Regiment (V)) and 101 Engineer Regiment (EOD) (V). However, in pursuit of economy, Headquarters 29 Engineer Brigade was disbanded in 1992; Headquarters 30 Engineer Brigade survived only until

1995. 29 Brigade was resuscitated with the SDR. One consequence of the loss of the TA brigades was the formation of Headquarters RE TA in 1996, initially based in Gibraltar Barracks under a regular colonel, the TA Advisor to the Engineer-in-Chief (Army) becoming the Deputy Commander. HQ RE TA took over responsibility for the training and career management for both Specialist and Independent units.

The three engineer field regiments together had under command seven field squadrons and an amphibious engineer squadron. Operating M2/M3 rigs was a completely new role for the TA. Previously they had been limited to providing, on mobilisation, a field squadron (100 from R Mon RE (M)) in support of 28 Amphibious Engineer Regiment. The regiments were to be allocated in support of Eastern, Western and Southern Districts. Scotland was to be supported by the TA Field Squadron in Northern Ireland. A new Specialist Field Support Squadron (EOD) (198) was raised to strengthen 101 Engineer Regiment (EOD) (V), which in war would now be able to deploy an EOD Squadron in support of Scotland and the three large districts in England.

While the planning manual (*How to Amalgamate, Convert or Re Role Units*) suggested that 'the new CO should receive at least six months' warning of the date of conversion, assembling a conversion cadre to deal with transition problems and plan the conversion and retraining period ...' The COs of the new regiments that came into being on 6 April 1992 had a weekend in which to manage the process. Of these three regiments, 78 Engineer Regiment was unfortunate in having to form two new squadrons, unlike 76 and 77 Engineer Regiments which took over existing ones. The task was described as similar to mounting an expedition to Africa in the nineteenth century: 'One needed a clear aim and plenty of missionary zeal. There would be no route map to speak of, little of the right equipment, wary and occasionally hostile natives and the expectation of an occasional fight with a crocodile.'⁵

Given that the seven subunits of 78 Regiment from which the new regiment was to be formed (a gunner battery, an RCT

Squadron, two signals troops, a petroleum platoon RAOC, an infantry company and a workshops unit) were none of them sappers, that the workshop would have to become competent in handling the equipment (M2 rigs, CET and CVR(T)) with which the Regiment was to be equipped, and that on formation the Regiment had an effective strength of about 250 but an establishment over double that, the scale of the challenge must have been daunting.

Effectively the whole organisation had lost its cohesion. Yet within a year all the officers (up to and including the rank of major) and warrant officers had attended and passed the RE TA Troop Commanders Course, and the NCOs were well on the way to achieving the necessary Combat Engineer qualifications. By the end of 1994, 78 Engineer Regiment was over 600 strong. It was ironic that only four years later, under the *SDR*, the Regiment would be disbanded with only one squadron surviving.

The CREs (Home Defence) (V) and their staffs were to remain with a new TA post of CRE (Home Defence) being established in Northern Ireland.

A new organisation, the Military Works Force (Volunteer) (MWF (V)) came into being on 1 April 1994: it comprised all the



507 STRE (Rly)(V), Germany, 1996.

STREs (V) and RE Specialist Advisory Team (RESAT), formerly the Engineer Specialist Pool. The former appointments of Deputy Commander CVHQRE and Commander RESAT were amalgamated to become commander MWF (V). The only remaining CVHQ RE units that were not included in MWF (V) were 120 and 130 Field Squadrons and 198 Field Support Squadron (EOD). In 1995 120 and 130 Squadrons were disbanded and nine new STREs (Construction) were formed mainly from personnel from these two squadrons. MWF (V) had three CREs (V), which were supported by specialists from RESAT. MWF (V) was under the command of Commander Engineers LAND and was tasked, on mobilisation, to either the air support role or to the ARRC.

The role of the RE TA in supporting the Royal Air Force was considerably increased. 73 Engineer Regiment (V), in conjunction with 39 Engineer Regiment was to support RAF Germany and RAF Strike Command. They were allocated two STREs (Bulk Petroleum) (V) to provide fuel support. Two new Regimental Headquarters (ADR) (V) were to be formed, 76 and 77. They would each take command of four field squadrons (ADR) (V) in support of RAF Strike Command. While a new ADR squadron was to be formed (237 supporting RAF Lossiemouth) this was a replacement for 218 at RAF Honington, which was to be disbanded. Two small specialist TA squadrons were however to be formed to help the field squadrons (ADR) meet their role. Both of the new regiments were also allocated an STRE (Bulk Petroleum) (V).

Inevitably there were some reductions in establishment. In particular, HQ 29 Engineer Brigade and Signals Troop (V) was disbanded, and 74 Engineer Regiment was reduced to a squadron. While, as mentioned above, 218 Field Squadron (ADR) (V) was to be disbanded, this was balanced by the formation of a new squadron, 237 Field Squadron.

After 111 Regiment's camp in 1992, RHQ Squadron re-formed as 513 (Independent) Field Troop RE (V). 120 and 130 Field Squadrons were re-roled to Air Support, and 198 Engineer Park Squadron became 198 Field Support Squadron (EOD) as part of

101 Engineer Regiment (EOD) (V). 111 Regiment finally bowed out with a regimental disbandment ceremony and parade at Gibraltar Barracks during the weekend of 17/18 September 1994.

All this took place in the context of considerable change in the Territorial Army generally, with many units disbanding or re-rolling. As the then Engineer in Chief (Army), Major General J. A. J. P. (John) Barr, said in announcing these changes in July 1991 that the challenge inherent in the TA Orbat was considerable. He also mentioned that a tri-service study into the Regular/ Reserve force mix was being carried out in parallel with the work on *Options for Change*. This was to include, inter alia, recommendations on TA Terms of Service and early call-out. The Gulf War, which had ended some six months earlier, had involved the first mobilisation of a TA unit since the Second World War, with the call up of 205 (Scottish) General Hospital RAMC (V). This had highlighted the need for change in mobilisation procedures, which had been designed for an 'all-or-nothing' situation – if the situation on the continent of Europe was so grave as to justify calling up the Reserves, then the nation would be at war, and every member of the Territorial Army would be required, not merely selected units, to fill capability gaps.

Strategic Defence Review

Much of all this went into reverse for the SDR just seven years after *Options*. The philosophy of this review is covered in Chapters 1 and 2, but essentially the Home Defence role became subordinated to one perceived as of higher priority, back-up to the Regular Army in intervention operations. In a massive reduction of manpower, two field and three air support regiments were disbanded, the latter role being transferred to the Regular army.

29 Brigade was re-formed on 1 September 1997 as 29 (Corps Support) Engineer Brigade. Tasked to support the Allied Rapid Reaction Corps on mobilisation, it also served as HQ RE Territorial Army.

The effects of *Options* and the SDR on the TA (excluding Postal and Courier Services and the Engineer and Logistic Staff Corps)

are summarised in the table below. As Brigadier Ian McGill, the outgoing Engineer in Chief (Army) put it in 1998,

Apart from the essential need to generate a future reserve in times of crisis or future wars, now considered less critical in the planning assumptions because of expected longer warning times, our TA currently supports the Corps by backfilling our regular units with individual reserves on operations and exercises, by keeping the public informed about the Corps and by encouraging our healthy recruiting. Less obviously the Royal Engineer TA is a natural conduit to Industry and certain specialised, but vital, construction capabilities which the Regular Corps can no longer sustain, such as railways, docks, harbours and ports. We are remarkably fortunate to have unique links with some extremely influential 'captains' in the Construction Industry through the Engineer and Logistics Staff Corps as well as the expertise of the Military Works Force (V) ... The regular element of the Corps is too small to 'go

The Effect of Options for Change and the

1980			After Options for Change
Regiment	Location of RHQ	Sub-units	Regiment
R Mon RE (M)	Monmouth	3	R Mon RE (M)
71 (Scottish) Engr Regt	Glasgow	4	71 (Scottish) Engr Regt
72 (Tyne Electrical Engrs) Engr Regt	Gateshead	2	72 (Tyne Electrical Engrs) Engr Regt
73 Engr Regt	Nottingham	4	73 Engr Regt
74 (Antrim Artillery) Regt	Belfast	3	75 Engr Regt
75 Engr Regt	Manchester	4	76 Engr Regt
			77 Engr Regt
			78 (Fortress) Engr Regt
			101 (London) Engr Regt (EOD)
111 Engr Regt	Cove	14	MWF (V)
Indep field squadrons		8	
Total subunits		42	

it alone' in any future serious conflict and we need the support of the TA and British Industry as well as our allies ... towards 'Building the Peace' operations. This is much wider than simply a sapper contribution; it encompasses the whole of Civil Affairs, including contracts, law, educational and other aspects.⁶

Readiness states of 180 days between mobilisation and deployment gave a greater opportunity for operationally focused training to take place immediately before deployment. Operational roles also became less clearly defined. This, coupled with the recognition that the Regular Army with its frequent and less predictable deployments was becoming more heavily dependent on reinforcement for operations and training by individuals and small groups from the TA, led to the emphasis for TA training becoming more focused on individual rather than unit training.⁷

Strategic Defence Review on the Territorial Army

After the <i>Strategic Defence Review</i>					
Location of RHQ	Sub-units	Regiment	Location of RHQ	Sub-units	
Monmouth	4	R Mon RE (M)	Monmouth	4	
Glasgow	5	71 (Scottish) Engr Regt	Glasgow	3	
Gateshead	4				
Nottingham	6	73 Engr Regt	Nottingham	5	
Manchester	3	75 Engr Regt	Manchester	4	
Pitreavie	4				
Honington then Coningsby	5				
Southampton	3				
Catford	5	101 (London) Engr Regt (EOD)	Catford	4	
	18	CVHQ RE		9	
	4				
	62			27	

Three Special Independent Units

The order of battle also included three special field units, 131 Commando, 135 Field Survey and 873 Movement Light Squadrons (V), whose story throughout this period needs a particular mention. A fourth, the Engineer Specialist Pool, is tied in with the sponsored units, covered below.

131 Independent Commando Squadron Royal Engineers (Volunteers)

This squadron had converted to supporting 3 Commando Brigade Royal Marines in 1978, having spent the previous 31 years in support of the airborne forces. This privileged new position saw 131 as the only RE TA unit to fall directly within the order of battle of a Regular brigade, and the 1980s witnessed a steadily closer integration of the Squadron into its parent formation. Frequent exercises with the Royal Marines and with 131's recently adopted sister-squadron, 59 Independent Commando Squadron Royal Engineers, ensured that amphibious skills were developed, from the small-scale use of rigid raiders to the offloading of heavy engineer stores and plant from shipping using landing craft and MEXE-floats. Anyone joining the unit now had to attend and pass the TA All Arms Commando Course at the Commando Training Centre Royal Marines at Lympstone in Devon, and as many soldiers as possible also went through the rigours of either a two-week Arctic Survival Course or the full four-week Arctic Warfare course each winter in Norway. Military parachuting remained a popular activity for many of the Squadron's soldiers, and, combined with the demands of trade and promotion courses, the level of commitment required was very high.

1983 saw the reshaping of the Squadron's geographical footprint when its second field troop, 300 in Grangemouth, which had previously provided close engineer support to the 15th (Scottish) Battalion The Parachute Regiment (Volunteers), was relocated 500 miles south-west to 3 Commando Brigade Royal Marine's home town of Plymouth in Devon. Those

territorial soldiers remaining at Grangemouth were converted to Assault Engineers as part of the Royal Marines Volunteer Reserves Scotland, while the relocated 300 Troop had to recruit from scratch. Fortunately, many good volunteers came forward and combined with a significant number of ex-59 Commando Squadron soldiers living in the Plymouth area to form a thriving troop. The Squadron's other troops at Hull (299 Troop), Birmingham (301 Troop) and Kingsbury (SHQ and Sp Troop) survived this southward repositioning unscathed.

Typically an annual camp in the 1980s might see the Squadron providing the engineer support to a brigade exercise in Norway, Schleswig-Holstein or the UK, when 59 Squadron were committed elsewhere in the world. Alternatively, there might be a camp that concentrated on engineering skills, typically at Weymouth, or on Commando skills, such as that at the Royal Netherlands Marine Corps base at Texel Island in 1982. Small-scale opportunities for foreign travel continued to present themselves throughout the 1980s, those soldiers who could afford the time serving in Kenya, Canada, Cyprus and the United States.

131, like the remainder of the Territorial Army, came under increasing pressure in the 1980s to support the Regular Army both in training and on operations. In 1991 the Squadron provided a field troop to support 1st Queens on Exercise *Pond Jump West* in Canada. This superb training opportunity included a section being given the task of demolishing a 100-metre long, 30-metre high wooden railway bridge in the Rockies using plastic explosive. Closer to home, the Squadron won the prestigious Courage Trophy (awarded for a competitive test of military and physical skills, presented by the brewers and open to London TA units) in 1992, 1993 and 1994, bringing the total number of wins over the years to five. Prowess in various sporting competitions also continued through the decade, including several RE half-marathons and minor units cross-country wins.

Throughout the 1990s, support to 59 Commando Squadron and to 3 Commando Brigade became more and more frequent,

although often by small groups of soldiers rather than by formed subunits. Examples were the deployment of eight sappers to Cyprus as part of 29 Commando Regiment, Royal Artillery's UN tour in 1995 and, in the same year, assistance to 59 Commando Squadron Royal Engineers' humanitarian relief work in the Caribbean. 1996 witnessed the formation of the Squadron Diving Team, 131 being the only TA unit to have one. While most of the divers had originally been trained as such during their service in the Regular Army, there were those within the Squadron who had never served full-time but none the less had the necessary aptitude and were able to find the time to go through the weeks of training with the Regular Army needed to qualify as Divers RE.

The bulk of the Squadron carried out two-week annual camps in locations such as Holland, Weymouth, the Highlands of Scotland and the United States, but the highlight of the decade was the deployment of a troop in support of the Lead Commando Group, 40 Commando Royal Marines at that time, on the seven-month Exercise *Ocean Wave* in 1997. With 59 Commando Squadron Royal Engineers committed to a Northern Island tour, this left the troop to provide the close engineer support to 40 Commando in locations as far away as Brunei, Malaysia, Singapore, Egypt and South Africa. Part of the reason for such a large-scale Fleet deployment to the Far East at that time was to provide a significant British offshore presence during the handover of Hong Kong to China. Much of the remainder of the Squadron joined the troop for three weeks for Exercise *Seria Kawan* in Brunei, providing general engineer support to the Commando Brigade.

Members of the Squadron also deployed on peace-support operations in Bosnia with Regular Royal Engineer regiments during the latter half of the 1990s. At the same time the Squadron was sending troops and small teams to support training in Jordan, Oman, Egypt and even the Baltic States, while the annual winter deployment to Norway continued to take place. 1999 witnessed another first for the Territorial Army when the entire Squadron deployed to Romania's mountain-troops base, Camp Diham, to enable it to be used by 3 Commando Brigade.

Cross-training was conducted with Romanian engineers, and AK47 assault rifles were used by members of the Squadron during the field training exercises. This was repeated on a smaller scale in 2000 when a large number of the Squadron's artisans deployed back to Diham to add the finishing touches to the work that had been done the previous year. Most of those not attending annual camp at Weymouth that year were probably either on a trade course or deployed on operations in Kosovo supporting the Regular regiments of the Corps.

The last two decades of the millennium saw the Squadron fully integrated into a Regular brigade with a permanent Regular Army sister squadron – a relationship that was to bring even closer levels of cooperation and commitment as the twenty-first century opened.

135 Independent Topographic Squadron

135 Independent Topographic Squadron (the former 135 Field Survey Squadron until 1986) was Military Survey's sole reserve Army unit during the period covered by this volume. Based at Ewell in Surrey, its role in 1980 was to provide geographic support to HQ Allied Forces Central Europe (AFCENT), a role practised during Exercise *Crusader* that year. In 1981 a new role was developed as the reinforcement unit to Survey Directorate HQ BAOR/BRSC (British Rear Support Command), which also required its troops to support 14 Topographic Squadron and the Survey Production Centre Royal Engineers, both based in Germany. Its six-vehicle train of slow-moving, cumbersome and difficult-to-manoeuve articulated vehicles were replaced by TACIPRINT in time for Exercise *Wintex* in 1982.

While the HQ AFCENT role was discontinued in the mid-1980s, support to BAOR continued to be exercised regularly over the ensuing years. Other tasks of note were tasking to check the Cyprus Sovereign Base Areas boundary markers in 1991 and again in 1996, remapping the Gibraltar tunnels in 1988 and several field-survey projects in the Channel Islands. Operational support was provided in 1991 to 42 Survey Engineer Group and 8 Map and Air Chart Depot during Operation *Granby* (see chapter 6).

In 1992 the role changed with the emphasis moving to map supply and reinforcement to 42 Survey Engineer Group's Geographic Support System, a role exercised throughout the 1990s. Individuals from the Squadron again deployed on operations with the Squadron providing personnel on Full Time Reserve Service in Bosnia-Herzegovina and Kosovo in the latter half of the 1990s.

873 Movement Light Squadron

Based in Acton, 873 Movement Light Squadron was a frequent visitor to Salisbury Plain, where it gave movement light support to the Royal Military Academy Sandhurst, the Royal School of Military Engineering, the School of Infantry and the Junior Division of the Staff College, support that it continued to give until 1991.

Its role on mobilisation was to give battlefield illumination support to 1 British Corps, and it supported every major BAOR field-training exercise from 1979 to 1988. In the run-up to the 1991 Gulf War the unit organised and ran an intensive battlefield illumination and searchlight operators' course for 1 British Corps Lighting Troop. They were one of the five RE (TA) squadrons who gave active support to the Regular Army during that conflict. Under *Options for Change* they re-rolled to Explosive Ordnance Disposal as 220 (Searchlight) Field Squadron EOD, part of 101 (London) Engineer Regiment (EOD) (V).

Searchlights did not disappear immediately from the Corps' inventory, however. Searchlight troops were formed in the R Mon RE (M) and in 71 (Scottish) Engineer Regiment (V) on the demise of 873 Squadron. These, too, disappeared under the *SDR*, but the equipment remained in the R Mon RE (M) for some years afterwards.

The Growth of EOD Within the TA

In 1967 the EOD element of the TA had been reduced to a single small unit, 590 Specialist Team Royal Engineers. From 1975 onwards, however, TA EOD Squadrons began to be formed as part of 33 Engineer Regiment (EOD). 590 STRE had amalgamated

with 591 STRE (formed in 1973) in 1975 to form 590 EOD Squadron. 591 EOD Squadron was formed in 1979 and 579 and 583 EOD Squadrons in 1983. The need to command such a wide span of Regular and Territorial squadrons in 33 Engineer Regiment (EOD) brought about the devolution of the TA Squadrons into 101 (London) Engineer Regiment (EOD) (V) in 1988. *Options for Change* led to 590 and 591 Squadrons being combined as 221 Field Squadron (EOD) (V) and to 579 and 583 combining into 222 Field Squadron (EOD) (V). 873 Movement Light Squadron transferred from 73 Engineer Regiment (V), becoming 220 (Searchlight) Field Squadron (EOD) (V). The choice of numbers reinforced a link between 101 Regiment and units that had evolved from the 1st Middlesex Engineer Volunteers, and the 1st Tower Hamlets Engineer Volunteers founded in 1860 and 1861 respectively, all of which were London-based. In 1999 the wheel came full circle with 220 and 222 Squadrons disbanding, to be replaced by 579 Squadron formed from 127 (Sussex Yeomanry) Field Squadron at Tunbridge Wells and Reigate.⁸

The Sponsored Units, CV HQ RE and HQ RE TA

In 1980 Central Volunteer Headquarters Royal Engineers (CVHQRE), commanded by a colonel, was responsible for 111 Engineer Regiment, which consisted of an RHQ, two field squadrons (120 and 130) and an engineer park squadron (198), ten Specialist Teams Royal Engineers (STREs) and the Engineer Specialist Pool. Of the Specialist Teams, three were Bulk Petroleum, three were Works and the remaining four were Power Station, Engineer Procurement, Public Utilities and Railway Construction, formed from individual volunteers serving as civilians with the PSA in Germany. A further nine STREs, all Construction, were formed in 1995, only for eight of them to be disbanded in 1999; 509 STRE re-formed as 509 STRE (Utilities). The three Bulk Petroleum Teams that had been in existence in 1980 were also disbanded in 1999. In 1996 a new headquarters was established to take on the roles that the now-disbanded brigade headquarters had previously covered. This was Headquarters Royal Engineers Territorial Army, which

would now be responsible for training and career management for all Corps Specialist and Independent units. As a result, the post of Commander CVHQRE was downgraded to lieutenant colonel.

Until the 1980s the emphasis of 111 Regiment's camps had often been on construction tasks, but this changed when the Regiment left the United Kingdom Mobile Force Lines of Communication Group, moved to British Support Command and became part of 1 British Corps. Its role then was to provide engineer support on the west bank of the Rhine, and training concentrated on bridging, railway repair, mine warfare, water supply and the provision of trackway.

The Regiment camped as an entity about every second year. These camps normally took place in the United Kingdom and would involve training individuals in basic military skills, combat engineering and their specialist trade as well as a four- or five-day exercise. In other years the Regiment would split, part being deployed on a major formation exercise in Europe, the remainder being employed either on a different formation exercise or on a construction project.

The formation in April 1978 of the Military Works Force transformed the way in which the Engineer Specialist Pool and the STREs trained for their mobilisation roles. The plan was that in war the Military Works Force would be reinforced by the Engineer Specialist Pool, the STREs, and individuals from MES (Wks) and the PSA Germany Pool (V) to form the Engineer Works Organisation with the Commander MWF in command and Commander Engineer Specialist Pool (ESP) his deputy.

The Specialist Teams RE

The cycle of annual camps for the STREs changed to their having two in BAOR followed by one in a location such as Cyprus, Gibraltar or Hong Kong. Part of each camp, initially two but subsequently four days, would be set aside for military training. When in BAOR, apart from the time allocated to military training, the Works Teams would be employed on the preparation of dossiers for the installations that would be

required on going to war. These dossiers were in two parts, the first being a record of the existing structure and services and the second setting out in detail the work that would be required to convert the installation to its war role.

In the 1990s an STRE (V)'s annual camp cycle evolved to include at least two years overseas in locations that included Gibraltar, Cyprus (Sovereign Base and United Nations Areas),



507 STRE, Bologna, Italy, 1998.

Hong Kong, Ascension Island, Germany and Naples, with a third year being a 'military camp' in the UK concentrating on those collective military skills necessary to survive and work in an operational environment. Members of RESAT (until 1988, the Engineer Specialist Pool) regularly undertook individual specialist engineer reconnaissance, design and feasibility tasks in support of tri-service engineer units worldwide.

After the Cold War, dossiers continued to be produced but for installations destined to be handed back to the host nation which had been in NATO hands during the Cold War. The role of the works teams became one of providing a skilled technical design service across the main engineering and construction disciplines. The teams were also able to undertake artisan work and had a high level of project management and supervisory skills. The STREs (V) were also actively involved in both Berlin and Hong Kong on this work.

The Bulk Petroleum Teams' war role at the beginning of the 1980s was to help field squadrons (construction) in the construction, operation, maintenance and repair of bulk petroleum and Electrical and Mechanical facilities on RAF airfields in Germany. 503 STRE had the additional task of building and repairing emergency off-take points on the Central European Pipeline System within the British Rear Combat Zone. Two years out of three, the teams would practise their war role on annual camp. The third camp would be out-of-area, where the Teams would carry out fuels-engineering-related tasks for a variety of agencies.

The Railway Construction Team (507) was the primary source of specialist railway advice to the military. Their annual camp usually took place in Germany and involved the alteration or replacement of track. The 1990s saw close liaison and joint training with military engineer units in France, Italy and the United States.

It was anticipated that 520 STRE (Well Drilling), which was always commanded by a geologist, would in wartime amalgamate with its Regular counterpart, 521 STRE. It would often therefore relieve 521 on well-drilling operations worldwide.

Engineer Specialist Pool

The role of the Engineer Specialist Pool was to provide a pool of officers with professional skills not available in the Regular Army. They were able to provide advice on a wide range of disciplines in peace and in war. Following the formation of the MWF, members of the Pool were given specific war roles in the Engineer Works Organisation. Their training reflected the role that they had been given, members of the Pool carrying out tasks in their respective disciplines, which included the identification of projects that could then be undertaken by STREs during their camps.

The geologists serving with the Engineer Specialist Pool and the Royal Engineers Specialist Pool provided a vital resource available both in peace and war. They advised on terrain analysis, water location, the sourcing of construction materials and the location of sites suitable for landing strips and river crossings and ground conditions for construction projects. They took part in many of the major BAOR exercises as well as being involved in both Operation *Corporate* (the Falklands) and Operation *Granby* (the First Iraq War).

The Civil Affairs Group

In the 1990s the increasing importance was recognised of integrating civil affairs, known in NATO as Civil Military Cooperation (CIMIC), into military planning. The social, political, cultural, economic, environmental and humanitarian aspects of intervention operations such as in the Balkans, in which numerous different organisations, governmental and non-governmental, were involved, needed coordination with military action. British experience since the Second World War had always taken account of such matters but had not formalised the requirement into the dedicated staff responsibility subsequently known as Civil Affairs, or G5. In 1996 the Civil Affairs Group, a TA unit part of CV HQRE, was formed to meet the need. (The Group eventually became a joint plans (J5) organisation known as the Joint CIMC Group (JCG).).

The Civil Affairs Group was organised into three areas of responsibility. The Staff Augmentees were trained G5 volunteer staff officers to augment formation headquarters on operations.

The Field Teams provided officers to conduct the initial G5 assessments and act as project managers and liaison officers to civilian organisations such as those engaged in humanitarian relief; Field Teams could provide two groups, each consisting of an officer of senior rank, an administrative NCO and a driver. The third category was made up from the Specialist Teams, the expert individuals from a variety of civilian disciplines not confined to engineering, made available for the length of a particular commitment.

The Engineer and Logistic Staff Corps RE (V)⁹

This originates from the Engineer and Railway Volunteer Staff Corps of 1865, the original brief of which was to draw up a series of detailed plans for the movement of troops and stores to points selected by the War Department. By 2000 it had developed into a body of officers, all experienced professionals, who made themselves available to give advice to all three services on engineering and transportation matters. Rarely wearing uniform, they were unpaid – even being required to pay a joining fee and thereafter an annual subscription. The cost to the Ministry of Defence was an annual capitation grant of £20 for each officer.

The establishment was ten colonels, twenty lieutenant colonels and thirty majors. The Staff Corps was administered by a council made up of the colonels and lieutenant colonels and chaired by the OC, a colonel appointed from within the membership for a period not exceeding five years. The Acting Adjutant was the administrative officer acting as secretary, treasurer and main point of contact with the Ministry of Defence. He was called the 'Acting Adjutant' because, unlike in the rest of the Army, he was usually a lieutenant colonel or colonel. In 1994 Colonel R. M. (Mike) Stancombe was appointed Acting Adjutant, the first ex-regular officer to fill the post since the Staff Corps was founded.

Aspects of the way in which the Staff Corps did its business had already begun to change by the beginning of the 1980s. In 1982 the incoming OC, Colonel I. M. Campbell, who happened also to be Deputy Chairman of British Rail and a President of the Institution of Civil Engineers, set about ensuring that the Staff

Corps would become more proactive than it had been previously. A pamphlet was produced to show the Ministry of Defence, the Royal Engineers and the Royal Corps of Transport the capabilities of the Staff Corps. Two liaison groups were set up, one with the Royal Engineers and the other with the Royal Corps of Transport. Their remit was firstly to consider how the combined expertise of the members of the Staff Corps could best be applied to assist the two Corps with problems that they had identified, and secondly to discuss with them new techniques that might have application to their operations.

The increasing involvement of the Corps in support and reconstruction roles during the last two decades of the twentieth century led to an increase in its need for advice on civil design and on-site construction practice. Advice was sought in a wide variety of areas ranging from water treatment and processing to health and safety at work, from energy conservation to geotechnical matters, and from the rapid assessment of the strength of structures to the application of information technology to plant procurement.

Fortuitously the setting up of the liaison group with the RCT coincided with significant changes in their organisation and activities, including its subsequent incorporation (together with the Royal Army Ordnance Corps, the Royal Pioneer Corps, the Army Catering Corps and the Postal and Courier branch of the Royal Engineers) on 5 April 1993 into the Royal Logistics Corps (RLC). Advice from the Staff Corps as requested by the RE or RLC was given freely unless commercially confidential, in which case it was at the discretion of the member. Charges would only normally be levied, with the prior agreement of the OC and the MOD, if substantial information was required. Two comments by successive QMGs give some indication of the way in which the advice and expertise of the Staff Corps has been valued: 'we are indeed truly lucky that we have the support and ready advice that is on offer from the Engineer and Transport Staff Corps the members of which are men eminent in their respective professions ... Long may this association flourish!' and 'I must say the Staff Corps is a most extraordinary organisation and one which it seems to me we are very lucky to have. I am so glad you

have found such a good way for the Army to benefit from them."¹⁰

The outbreak of the Falklands War found the Staff Corps well able to cope with the demands placed upon it. In the main their assistance was sought on matters relating to reconstruction work required immediately after the conflict had ended. They advised on quarrying, moorings for barges, water supply, geotechnology and electrical problems. They also advised on the construction of the new airfield in the Falklands. In a similar way, their services were called upon as needed in 1991 during Operation *Granby*, where they were able to provide information on such things as ground conditions, the infrastructure, water supply and tackling petroleum fires. Their work in that campaign was characterised by the E-in-C (A) as being not only of direct benefit to the UK forces but also as helping them and the Corps of Royal Engineers to establish in the eyes of the allies a high degree of credibility for good intelligence which greatly improved cooperation and relations. In Bosnia too the Staff Corps advised the RE on the reopening of quarries and the repair of a geothermal well near Sarajevo. Their OC also visited Bosnia as part of their contribution to developing the policy for Building the Peace, a major initiative of the EinC during 1996. The aim was not only to improve the advice available to military commanders during periods of hostilities in such areas but also to provide UK industry with opportunities to participate in infrastructure reconstruction following the end of hostilities.

By the end of 2000 it was clear from these successes and the commitments of the Army foreseen for the years ahead under the concepts envisaged in the *SDR* that a body of professionally qualified and experienced individuals with authority within their own organisation, and often with particular skills in aspects of engineering, management or logistics, would become essential back-up to almost any campaign.

The Postal and Courier Service TA

In the early 1980s the Postal and Courier Service (PCS) TA consisted of Headquarters Forces Courier Service, four Home Defence Postal and Courier Regiments (5, 6, 7 and 8) and eight

squadrons with mobilisation roles in support of Regular regiments. These were 15 Squadron with 1 PC Regiment in support of 1 British Corps; 34, 35 and 36 Squadrons supporting 3 PC (Postal and Courier) Regiment in the BAOR Rear Combat Zone; 41 and 42 Squadrons supporting 4 PC Regiment providing courier services for SHAPE and AFCENT HQs; and 25 Squadron in 2 PC Regiment dedicated to support the Allied Mobile Force (Land). 12 Squadron – a composite of TA and Regulars (from 2 PC Regiment) was formed in 1984 to support 2 Infantry Division in its role with 1 British Corps.

After the restructuring of the Regular Postal and Courier Service units along regimental lines, a similar restructuring was applied to the TA Home Defence (HD) postal units in August 1983. Prior to that date each HD region was allocated an RE (PCS) TA squadron the main operational function of which after mobilisation was to provide a safe-hand courier service for classified and cryptographic material within its region. In addition there was an inter-regional service under the operational control of another TA unit (HQ PCS).

The reorganisation began with the command of the TA (PCS) transferring from the Commandant Postal and Courier Depot to an autonomous Commander PCS TA, Colonel J. W. Mackay, TD. Around this position a Group HQ (No. 1 Postal and Courier Group HQ (V)) was formed, and the old Home Defence Postal & Courier TA squadrons were restructured into four regiments (5, 6, 7, 8 Postal and Courier Regiment) of three squadrons each. The individual regiments were responsible for an HD region and reported to a Group HQ.

In addition, the old TA Postal units that had a mobilisation commitment to BAOR and NATO were formed into squadrons and allocated to each of the new regular Postal and Courier regiments. Under these circumstances members of these squadrons could expect to spend their annual training in BAOR or with the Postal and Courier squadrons in England, Cyprus and Hong Kong.

As part of the specialist TA, these units and subunits were all administered by the Postal and Courier CVHQ – a part of the

Training Wing of the Postal and Courier Depot at Mill Hill. This resulted in improved training standards and operational effectiveness and did much to reflect the 'one army' concept. Recruits, from within the Post Office, were trained at Mill Hill. The CVHQ also came under the command of the Commander PCS TA, although it became a part of the Training Wing of the Postal and Courier Depot.

At the time most of the 80 officers in the Postal and Courier Service TA were managers or directors at the Post Office, the remainder being ex-Regulars. They would have joined the Post Office after assessment at the Post Office Management College. Each year some 7,000–15,000 graduates would apply for 80–150 direct-entrant managers' places on a fast-track promotion system. Once trained, they monitored and inspected the mail network and the hundreds of main mail sorting offices. This involved much 'through-the-night' work and long hours. Likely candidates for commissioning into the PCS (V) were thus identified and invited to Mill Hill for a preview weekend. Those suitable and interested would then attend a selection weekend before joining a two-week recruit intake course as potential officers; they were then commissioned. As members of a specialist unit PCS (V), officers took no military promotion exams, although they did attend military skills courses. They had a commitment to train for two weekends and attend a fifteen-day annual camp, which they spent with their troops.

Most of the soldiers worked for the Post Office, and many had previous experience in the Regular forces, coming from a wide range of regiments and corps. Fitness was seldom a problem because most of them walked many miles every day carrying up to 50 pounds of mail on their delivery routes. When a TA soldier became a senior NCO he would be encouraged to apply for a manager's job within the Post Office. Membership of the TA benefited the TA, the Post Office and the individual.

The intimate overlap between the functions of PCS (V) and the major employer, the Post Office, created a positive empathy and excellent camaraderie. Regular officers respected the specialist skills of the TA. The Post Office admired the TA Postal

and Courier Service as a model of excellence. Nobody personified this relationship better than Colonel W. (Bill) Cockburn, who, after a full career in the Post Office, joined the Board of Royal Mail in 1981 and served two tours as Commander TA Postal and Courier Service from 1986 to 1992; he became Managing Director of Royal Mail from 1992 to 1995 after 26 years' TA service. As an example of strong employer support, the Post Office accepted the extra cost, estimated at about £100,000, of replacing individuals attending the more efficient single four-day training period introduced in the late 1980s in place of the previous two two-day weekends.

The Home Defence Regiments had their annual camps in the United Kingdom, while the eight Squadrons whose role was to support the Regular Army did their annual training with the Regular unit they would support on mobilisation. They might be training alongside their Regular counterparts to gain trade experience, taking part in adventure training or participating in formation exercises. Often Regular PC units based outside the United Kingdom would request TA assistance to enable them to continue providing their service while their soldiers were engaged on other training; cover would be provided by one of the Home Defence TA regiments, which all helped foster a healthy and enduring relationship between Regular and TA.

Exercise *Lionheart* in 1984 provided an excellent opportunity to test the capability of the Reserve element of the Postal and Courier service. As 1 PC Regiment, a Regular formation, deployed to support 1 British Corps on the exercise, they were joined by 15 PC Squadron (V) and 12 Composite PC Squadron (V). 15 Squadron provided the total resource required to run the main Corps mail centre in the field where all the mail for the Corps was handled. 8 PC Regiment (V) assumed responsibility for all the Forces Post Offices in 1 British Corps' peacetime locations. This made for a seamless integration of Regular and TA, both in garrisons and in the field. As the Army was reduced in size in the 1990s, so TA PC squadrons in support of Regular units were disbanded until only the Home Defence Regiments remained. 5, 7 and 8 were re-roled in support of formations, and

6 PC Regiment was allocated to support Mill Hill and the Defence Courier Service. The Group HQ continued to provide high-quality postal consultancy to the Chief Executive of the Defence Postal and Courier Service, with military and adventurous training being provided by one of the TA regiments.

Deployment on Operations and Exercises

The principles that lay behind the *SDR* brought about the most fundamental change in the way in which the TA was used, and this was to characterise its contribution to the nation's defence interests in the new century: the introduction of Full Time Reserve Service (see below) under the Reserve Forces Act of 1996, which came into force on 1 April 1997. While the Reserve Forces Act 1980 did 'not make it impossible to use territorials in the new and complex world ...' that had arisen from the ashes of communism it was 'clumsy and redolent of the old bipolar world of peace or war not the uncertain peace which characterises our times'.¹¹

Individual Royal Engineer TA reinforcements had been mobilised voluntarily in the early 1990s in support of 37 Engineer Regiment in the Falkland Islands and then routinely



Captain Barker, 507 STRE (RLY)(V), Croatia, September 1995.

deployed to Bosnia and Kosovo throughout the rest of that decade. Deployments were around 70 or 80 at any one time, the numbers rising in the winter when the UK construction industry was quieter. The introduction of Full Time Reserve Service did lead to a reduction in the numbers being mobilised, although the overall total number of those being deployed remained much the same. Typically a TA regiment would provide some 3% of their number for these deployments while at the same time continuing to provide support in other ways for the Regular Army.

In this way, R Mon RE (M) deployed a plant troop to Bosnia in support of 21 Engineer Regiment on Operation *Lodestar* from March to September 1997. The troop consisted of a captain, four sergeants, of whom three were TA and one Regular, and nineteen soldiers, of whom three were Regular. In that year they also provided a field troop for seven weeks in support of 1 Royal Welsh Fusiliers on Exercise *Pond Jump West 3* in Canada.

Until the late 1990s, to achieve full-time service even for a short period, a willing volunteer had to be discharged from the Territorial Army and enlisted in the Regular Army prior to their starting full time service, with the whole process being carried out in reverse on finishing it. The 1996 Act updated its predecessor



Major Cheetham, 507 STRE (Rly)(V), Bosnia, September 1995.

and introduced a new call-out power, enabling reservists to be mobilised when it appeared to the Secretary of State 'that it is necessary or desirable to use armed forces on operations outside the UK for the protection of life and property; or on operations anywhere in the world for the alleviation of distress or the preservation of life or property in time of disaster or apprehended disaster'.¹² New safeguards were introduced for reservists and their employers. The new Act also introduced the new concept of 'Full Time Reserve Service' which enabled members of the TA to volunteer for periods of full-time service with the Regular Army without having to be discharged from their current TA engagement. Volunteers were able to serve for periods of between three months and two years.

The increased frequency of deployments on full-time service revealed many administrative and organisational problems associated with the process of transforming TA soldiers and Regular reservists from civilian life into fully-fledged quasi-Regulars and back again at the end of their commitment. The Reserves Training and Mobilisation Centre (RTMC) came into being at Chetwynd Barracks, Chilwell in Nottingham, on 1 April 1999 to overcome these difficulties. The Centre, with a staff of 85 and responsible to the Adjutant General, was designed for an annual throughput of 3,600 soldiers (1,800 each on mobilisation and demobilisation) with a maximum capacity at any one time of 200. All reservists would undergo an initial two-day package covering medical and dental checks, clothing and equipment issue and administrative preparation and documentation, with professional clerical staff able to address individual requirements that included pay, allowances, wills, insurance and employment issues.

The administrative package was followed by an eight-day individual training module aimed at achieving Regular Army individual training standards in, for example, skill at arms, first aid and personal fitness, in accordance with mandatory requirements. The centre ran its first administrative and training course in May 1999, and by November 2002 it had mobilised more than 3,800 reservists on operations and demobilised 3,000.

The introduction of Full Time Reserve Service not only helped the Regular Army to fulfil its commitments but also proved to be an excellent way for the volunteer to sample the life of a Regular. In general, volunteers gained extra confidence and maturity by the experience, both as individual citizens and as reservists.

Overview

The highly turbulent period of *Options for Change* and the *SDR* led to deep regret within the TA at the loss of the two dedicated headquarters and the need to concentrate on a closely defined war role. A source of motivation for volunteers had been removed with the disbandment of the two TA Engineer Brigades; this led to a period after *Options for Change* when, despite a temporary increase in manpower, the RE TA was no longer as clear as it had been about its role and purpose. The re-formation of 29 Engineer Brigade helped to dispel that feeling, particularly as the Brigade Headquarters assumed the role of HQ RE TA, responsible for the training and career management for both Specialist and Independent units. The RE TA Training Plan provided a model that was much admired and eventually adopted for the remainder of the TA.

The growth in legislation and the loss of Crown immunity to prosecution under, for example, the Health and Safety Act also had an effect not only on training but also on the administrative load placed upon units and their management, a situation not helped by a reduction in permanent staff support. A reduction in the number of training areas coupled with the low readiness state of most TA engineer units led to a situation where cadet units had a higher priority during the summer months than TA units. Training needed to be planned many months ahead which led to loss of flexibility and an inability to respond to last-minute demands or changes.

Nonetheless, in retrospect it is clear that much had been done by the end of the twentieth century to enable the Territorial Army to fulfil the new mission placed upon it following the *SDR*, namely, 'To provide formed units and individuals as an essential part of the Army's order of battle for operations across all military

tasks in order to ensure that the Army is capable of mounting and sustaining operations at nominated states of readiness. It is also to provide a basis for regeneration, while at the same time maintaining links with the local community and society at large.¹³ Mobilisation procedures had been improved; there was a realistic approach to the need in appropriate circumstances to provide adequate financial compensation to reservists being mobilised; welfare issues were understood; and mechanisms were developed to deal with them.

NOTES

- 1 30 Engineer Brigade (V) was based at Stafford throughout its existence. Of the seven engineer regiments, six were independent units based on TA Centres and recruited locally while the seventh was a specialist unit recruited nationally.
- 2 Baldwin, Stanley Simm, *Forward everywhere: Her Majesty's Territorials*, Brassey's, 1994.
- 3 Walker, Colonel Wallace E., *Reserve Forces and the British Territorial Army: a Case Study for NATO in 1990s*, Tri-Service Press Ltd, 1990.
- 4 Moorhouse, Lieutenant Colonel J. C. H., 'Today's Territorial Army', in the *REJ*, 103/2, August 1989, p. 168.
- 5 Sutherland, Lieutenant Colonel N. A., 'Birth of a Regiment', in the *REJ*, 109/3, December 1995, p. 220.
- 6 McGill, Brigadier I. D. T., *Sitrep on the Royal Engineers, 12 May 1998* (unpublished).
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Corps Affairs

Developments in the Corps 'Family'

Corps affairs remained a 'cradle-to-grave' operation embracing a spectrum of Ministry of Defence funded matters conducted by the Engineer in Chief on behalf of the Army, which included recruiting, the Corps Band, management of the REHQ Mess and major events, together with the privately funded 'Corps family' business, which covered the Institution, the RE Association, the RE Museum and Library, Corps publications, sport and *Esprit de Corps* activities. However, the distinction between the two elements became increasingly blurred, and there was a degree of overlap between the sources of funding and control. Throughout the period covered by this volume, the Corps had to review continually the way in which it managed these matters, which were affected by structural changes (particularly the down-ranking of the post of Engineer in Chief to one-star status, and the rustication of his HQ to Minley), the pressure on public and private budgets and advances in information technology. The post of Regimental Colonel, established in 1976, played an important part in coordinating the different aspects of Corps affairs (see Annex E for a list of the incumbents). He was assisted by the Corps Secretary, who was also responsible for providing staff support to the Chief Royal Engineer. The responsibilities of the Corps Secretary were enlarged in 1990, when the incumbent also became Secretary of the Institution and the Editor of *Sapper* magazine.

Corps affairs were controlled by a rather cumbersome series of interlocking committees, which gradually evolved into a simpler and less time-consuming structure. The over-arching body was the Chief Royal Engineer's Committee, which met twice a year. The Engineer in Chief's Regimental Committee, a subsidiary body, became the Engineer in Chief's Regimental Affairs

Committee in 1999. Each individual element of Corps affairs, including the Institution, the RE Association, the RE Museum, Corps Funds and the RE HQ Mess, maintained its own committee structure but reported ultimately to the Chief Royal Engineer's Committee. Reports on the activities and finances of the Corps and the Institution were delivered annually at the Corps Annual General Meetings, which until 1991 were held at the Royal United Services Institute in London, followed by a Corps Dinner at the Naval and Military Club. Lack of support for the Dinner led to its demise, and thereafter the AGMs for different Corps charities were held separately. The annual Colonels Commandant Garden Party had moved from the Hurlingham Club in London to Minley Manor in 1974, and, following a review in 1993/4, the attendance at the Party was broadened to include guests of the Corps, senior serving officers and other officers who put their names forward. Despite the reduction in the size of the Corps throughout the 1990s, the number of Colonels Commandant serving the Corps remained at twelve; most at two-star level or above.

Corps Funds

An important foundation for all privately funded business was the health of Corps funds. The principal source of income remained the Day's Pay Scheme, and successive Treasurers took pains to maximise this by encouraging all soldiers to participate. Their success was measured by the fact that the subscription rate rose to over 99% during the period. Officers were expected to contribute two-and-a-quarter days' pay, of which three-quarters of a day's pay went to the REHQ Mess, the remainder being split equally between the Central Charitable Fund and the Institution. At the start of the period, the funds of the different elements of the Corps were managed separately, with the Association's being the wealthiest. After prolonged discussion, in 1987 the Chief Royal Engineer's Committee endorsed the proposal to centralise Royal Engineer funds under the Corps Treasurer to permit more efficient management. It was agreed that Corps Benevolence, as disbursed by the Association, would always have first call on the

CHIEF ROYAL ENGINEERS
during the period covered by this book



General Sir Hugh Beach, GBE, KCB, MC
1982



General Sir George Cooper, GCB, MC
1987



General Sir John Stibbon, KCB, OBE
1993



Lieutenant General Sir Scott Grant, KCB
1999

funds. Other regular expenditure was for *Sapper* magazine, Corps Sport, *Esprit de Corps* grants, and the RE Museum. On the formation of the Royal Logistics Corps in 1993, a substantial grant was made to the new Corps in respect of the transfer to it of the members of the RE Postal and Courier Service who had hitherto contributed to RE funds. Corps Enterprises, which supplied Corps-related uniform items and other goods, was expanded in 1994 and moved into a new, more accessible shop in Brompton Barracks under the management of a retired Warrant Officer Class I, D. (Dave) Moffat. The shop was incorporated as a limited company, Royal Engineers Corps Enterprises Ltd, in June 1995, and covenanted any profits to the Central Charitable Trust.

In most years Corps funds enjoyed a surplus of income over expenditure, and this, coupled with a rising stock market, allowed the value of the Corps investments to grow from £591,000 at the start of the period to £12 million at the end. However, the reducing strength of the Corps, and the concomitant effect on income, remained a concern at a time when there was little prospect of a reduction in Benevolence expenditure. The Corps' investments were managed by Cazenove until 1996, and thereafter by Schroders. The RE Officers' Widows Society continued to operate as a separate body, paying lump sums and pensions to the widows of RE officer subscribers. Despite relatively low numbers of subscribers, the benefits payable rose gradually during the period, and membership was opened to female officers.

Dress

As in previous years, Corps Dress continued to be contentious because everyone had an opinion on the subject. The most significant change was the introduction of mess dress and other uniforms for female officers, the Regimental Colonel finding himself becoming embroiled in such matters as the shade of tights to be worn in the various forms of female dress. Despite a number of proposals, hotly debated in the pages of the *RE Journal*, male dress changed little during the period, although there was a gradual reduction in the frequency with which the

more formal items of uniform were worn. A new khaki badge was approved in the late 1980s for officers and soldiers qualified in Explosive Ordnance Disposal (EOD) but serving outside EOD units; all personnel on the strength of RE EOD units continued to wear the red Second World War battle honour badge on the left sleeve. In 1996, the McLaren tartan was adopted formally by 76 Engineer Regiment (Volunteers).

RE Band

At the start of the period, the Corps had three Bands: the RE (Chatham) and RE (Aldershot) Bands and the Volunteer Band based at 28 Amphibious Engineer Regiment at Hameln. The latter, under the direction of Warrant Officer Class 1 Sleep, had been set up on the initiative of the then CCRE, Brigadier J. P. (John) Groom to supplement the musical support available to RE units in Germany. The 1985 review of Army bands resulted in the amalgamation of the Aldershot and Chatham Bands, and the RE Band in Germany was disbanded in 1990. The subsequent review of Army music in 1995 reduced the RE Band from an establishment of 49 to 35, making it much more difficult for it to cover simultaneous engagements in support of the many Regular and TA RE units. At the same time all bandsmen were transferred to the Corps of Army Music, and the Ministry of Defence took over responsibility for providing dress uniforms and instruments, hitherto provided from Corps funds. The first female musicians joined the Band in 1999. Throughout the period, very high standards of music and marching were maintained, and the Band delighted audiences at events all over the world. These included the Royal Tournament, the Edinburgh Tattoo, the 50th anniversary D-Day commemorations in Normandy, the opening of the Channel Tunnel, and tours in Australia, Bosnia, Cyprus, Dubai, the Falkland Islands, Germany, Gibraltar, Hong Kong and Jersey. A particularly memorable trip was that to *British Week* in Tashkent in October 1997. This had been arranged by a former Regimental Colonel during an Arms Control visit to Uzbekistan at the request of the British Ambassador, Barbara Hay, whose father had been a Second World War Sapper. The band flew to

Tashkent in an RAF aircraft that was delivering an Arms Control inspection team to Kazakhstan. A number of spectacular and much admired public performances were held, despite severe stomach discomforts suffered by many musicians. The performances were reported on the front page of the *Tashkent Pravda*. A second memorable trip was to South Korea in October 2000, where the Band had been invited by the Province of Kangwon to help commemorate the fiftieth anniversary of the start of the Korean War. Following the demise of the Royal Military Academy Band, the RE Band also had to take its turn to provide music at Sandhurst. The Band celebrated its 150th anniversary in July 2000, and to mark the occasion a new trophy was instituted, to be awarded to the most improved string player – Musician Fomes was the first recipient.

Recruiting

A small team led by the Engineer Recruiting and Liaison Officer (ERLO) was responsible for promoting the recruitment of officers and soldiers to the Corps. The team was based in RHQ RE at Chatham; however, in 2000 it moved to co-locate with HQ Engineer-in-Chief at Minley. Its work was directed principally towards officer recruitment, which required a more individual approach than for other ranks. Potential officers were referred to ERLO from a variety of sources, particularly the Ministry of Defence's Schools and University Liaison Officers. Following an interview and attendance on a familiarisation visit at RSME, which gave the potential officers an introduction to the roles of the Corps, non-binding RE sponsorship was offered to promising candidates. Until 1995, most attended a three-day Pre-Regular Commissions Board at Chatham, which tested them and made recommendations about their suitability to attend the Regular Commissions Board at Westbury. After 1995, all candidates attended a centralised Army Regular Commissions Board Briefing instead. Success at the Regular Commissions Board led to a commissioning course at RMA Sandhurst. A number of the more academically gifted candidates were awarded Army Cadetships and Bursaries at their universities; the Corps

continued to attract a high proportion of those in receipt of these awards. While at Sandhurst, all cadets were required to opt for a choice of Arm. Those listing the Corps as one of their choices were interviewed by a Corps Selection Board, chaired at the start of the period by the Deputy Engineer in Chief, and latterly by the Engineer in Chief himself. In the early 1980s, the Corps commissioned between 70 and 80 officers from Sandhurst each year, but following *Options for Change* this dropped to between 50 and 60, rising again slightly at the end of the period. The first female officers were commissioned into the Regular Corps in 1992, and at the end of the period twelve were serving.

The Corps continued to be a popular choice for potential soldier recruits. Until 1982 the selection of Junior Soldiers and Apprentices was carried out at centres at Deepcut and Harrogate; thereafter all selection was carried out at the Army Personnel Selection Centre at Sutton Coldfield until this closed in 1991. Personnel Selection Officers were then based at Army Careers Information Offices. In 1996 the Army Foundation Scheme began, allowing potential recruits to spend up to ten weeks at Army Training Regiments before going forward for recruit training. The closure of the Junior Leaders Regiment at Dover in 1991 and Army Apprentices College at Chepstow in 1994 were much regretted; they had been very successful in training the future NCOs who formed the backbone of the Corps. As a result of the Army's Equal Opportunities Policy, the Physical Selection Standards (Recruits) gender-free test was introduced in 1998 to permit the wider employment of women. Throughout the period up to 30 RE senior NCOs, many from the Long Service List, were employed as recruiters in Army Careers and Information Offices. Other NCOs served in Army Youth Teams and Cadet Training Teams, helping to bring the Corps to the attention of potential recruits. The Royal Engineers Mobile Display Team continued to tour the country during the summer months, appearing at county shows, public events and recruiting fairs. The Team was based at Long Marston until 1997, when it moved to Lodge Hill. It consisted of Scammell tractor and trailer units, light wheeled and combat engineer tractors and a CVR(T). It was manned by a

junior officer, NCOs and soldiers and proved to be a popular attraction, helping to encourage young people to consider a career in the Corps. The Team disbanded in 1999 and was replaced by the RE Youth Liaison Team, which was tasked with visiting schools and colleges throughout the UK.

Royal Engineers Headquarter Mess

Despite the increasing prominence of the Officers' Mess at Minley, the RE Headquarter Mess at Brompton continued to be the venue for Corps Dinners and major events. Three Corps Dinner Nights were held each year, invariably hosted by the Chief Royal Engineer and at which important guests were entertained, young officers were 'dined in' and retiring officers were 'dined out'. The young officers were expected to sing for their supper with a rendition of *Hurrah for the CRE*, the tunefulness of which perhaps improved as more female officers joined the Corps. In commemoration of the 75th anniversary of the formation of the Royal Corps of Signals, a joint Sapper/Signals Dinner was held in November 1995, at which the skills of the officers of the latter Corps were tested by the Chief Royal Engineer giving part of his address in Morse Code. Major T. B. D. (Tom) McMillen, MC, retired as Mess Secretary in 1984 after twenty-three years' service and was replaced by Major R. L. (Leslie) Smallman. The larger beech tree in the Mess gardens was brought down by the great storm of October 1987, unfortunately just failing to demolish the hideous 1960s kitchens. The Mess changed to a contract catering service in October 1988, which necessitated a number of changes in the way the Mess was managed, not all of which were welcomed. Fortunately, many of the long-serving Mess staff were re-employed by the contractor. The new Lintorn Simmons Annexe, providing 60 additional rooms and built on the site of the old squash courts, was opened by the Chief Royal Engineer in June 1995.

The Corps continued to commission new paintings and silver centrepieces, a number of which were loaned to other Corps Messes. Major new paintings included *The Last Despatch*, *Northern Ireland* and the *Falkland Islands Campaign* by Terence Cuneo,

representing the last of the fine collection of paintings commissioned by the Corps from this well-known artist. In 1993, the collection of Cuneos held by the RE Postal and Courier Service at Mill Hill were presented to the Corps. The Aden Campaign painting was moved into the RE Headquarter Mess, and a silver replica of the *Letter from Home* statue was presented to the RE Headquarter Mess. Three paintings were commissioned from the talented artist Johnny Jonas: *The Indian Sappers and Miners*, *The Gulf War* and *Entry Into Kosovo*. The rousing marine painting of *Ilex* rounding the Fastnet Rock was painted by Frank Wagner for the sesquicentenary of the Royal Engineers Yacht Club and unveiled in the presence of the Club's Patron, HRH The Duke of Edinburgh, in May 1996. Major silver commissions included the Falkland Islands Penguin, the Northern Ireland centrepiece, the RE 200 commemorative piece of 1987 and *Ubique*, which commemorated all the smaller campaigns from 1945 to 1988. The finely-detailed Centurion AVRE marked the 34 years this vehicle had been in service, and other pieces commemorated the 150th anniversary of RE Diving, the 50th anniversary of Bomb Disposal and the 40th anniversary of the Queen's Gurkha Engineers. In the early 1990s, the stock of vintage port in the Mess cellars was found to be excessive and some was in danger of passing its best, so the surplus was sold off to officers at discounted auction prices.

RE Association

The Headquarters of the RE Association continued running the network of branches for Corps veterans and for disbursing benevolence grants. All officers and soldiers who had contributed to the Day's Pay Scheme for a minimum of nine years were automatically eligible for Life Membership of the Association and were encouraged to join a branch of their choice. At the beginning of the period there were 107 branches, which natural wastage reduced to 104 by the year 2000. Branches were spread throughout the United Kingdom, with others in Gibraltar, Australia and Bulawayo. A number of branches were formed to represent the specialised units of the Corps, including Armoured

Engineers, Bomb Disposal, Junior Leaders, Postal and Courier, and Survey. Members continued to enjoy an Annual Dinner in London following the Annual General Meeting and attended the weekends at Chatham, Ripon and Aldershot in large numbers. Week-long visits for veterans and their wives to holiday camps at Weymouth and Pakefield became popular. In 1993 more formal arrangements were made by the Regimental Colonel to establish links between regiments of the Corps, the Royal Engineers Association and the Sapper in-pensioners of the Royal Hospital at Chelsea. Each of the in-pensioners, who averaged about thirty in number, was affiliated to a nominated unit, normally one in which they had served, which allowed individuals to be invited more easily to unit functions. The Association continued to be Chaired by a Colonel Commandant and was staffed by a small team headed by a retired officer as the Controller.

The Benevolence Committee was chaired by a retired one-star Deputy Chairman and met monthly, usually in London. Members included branch representatives, advisors with appropriate expertise, and lady members. Observers were also invited from regiments. The Committee reviewed those cases which were expected to exceed the delegated grant-making powers of the Controller. All RE serving soldiers, and anyone who had once served in the Corps, even if only for National Service, were eligible for grants. Reports on all cases were provided by local representatives from the Soldiers', Sailors' and Airmen's Families Association. In 2000, the Association made grants totalling £399,000 to some 1,084 beneficiaries. Typical grants were to help fund motorised wheelchairs, stair lifts, bath hoists and the clearance of some priority debts. Christmas cards and a small Christmas donation were sent to those in hospital or living on their own.

The Institution

In reviewing the work of the Institution from 1960 to 1980, Volume XI of this History asserted that by the end of the period, 'the Institution had indeed reaffirmed its aims and set its pattern for its next century of existence'. Events were to prove otherwise

even if, by its nature, change came slowly. Several factors contributed to this, particularly the defence economies that underlie the whole of this period, the social changes inside and outside the Army, the revolution in information technology and the dwindling numbers of former wartime and National Service officers who had formed the backbone of the retired element for so many years. Another important motivation for change was the philosophical argument about the position of the Institution within or alongside the Corps as a whole. Whereas during the immediate post-war years the Institution had been regarded as a powerful body in its own right, standing somewhat separate from the Corps, by the 1980s the trend was to look upon it more as an integral officers' learned society, and it remained structurally independent of the Corps.

The Institution's role was the subject of continued debate throughout the period. Perhaps the most important aspect was the question of military engineering qualifications. Council discussed this in the mid-1980s, and the matter was widely aired in the *Journal* and summarised in an article by the President. It was raised again as part of a major review of the Institution set up in 1997 asking the fundamental question: 'Do we need the Institution and if so, what changes if any, should be made?' After wide consultation, the review came to fruition in 1998. Despite the working party's efforts to encourage radical thinking, the proposed changes were relatively minor. The idea of granting some form of military engineering qualification was rejected, having received very little support. Full membership was, however, offered to warrant officers of the Corps.

The trend towards the integration of Corps affairs affected the custom by which the President was normally a Colonel Commandant, with the Engineer in Chief as one of the vice-presidents. On the completion of Major General J. A. M. (John) Evans' presidential tour of duty in 1993, the then Engineer in Chief, Major General G. W. (Geoff) Field took over. He was followed by his successor as Engineer in Chief, Major General K. J. (DZ) Drewienkiewicz. However, when the post of Engineer in Chief was downgraded to one-star status in 1996, it was felt that the

appointment of President should remain at two-star level. General Drewienkiewicz continued in the post with a retired two-star officer as one of the vice-presidents, being followed in 1997 by another serving officer, Major General A. D. (Tony) Pigott. At the same time, the balance of membership of the Council was changed from ten elected and seven *ex officio* to seven elected and eight *ex officio*.

At the beginning of the period there were four committees answerable to the Council: Finance, Publications, Kitchener Scholarship and Memorials, and Museum and Library. Each had its own accounts, and each account was balanced and approved quarterly, as were those of the Council. The time taken up in this administration both internally and by the members of the committees, all including busy appointments, was deemed to be unacceptable. After rationalisation, the number and frequency of meetings of the committees was reduced so that by the end of the period only two committees remained: the Budget, Investments, Membership, Scholarship, Memorial and Publications Committee (known as 'Budget, Membership and Publications'); and the Museum Executive and Library Committee (MELC). These committees eventually met only twice a year and Council twice, accounts being approved once a year.

The imminent expansion of the Museum accentuated the need for clarity in the above matters, and it became obvious that when such matters as funding, use by members of the Corps, the origin of the contents and the whole purpose of the Museum were considered, responsibility for the project must be embraced by the whole Corps. In 1987, in the spirit of bringing Institution and Corps affairs closer, the Institution funds were taken over by the Corps Treasurer although maintained separately from Corps funds. Shortly afterwards the posts of Institution and Corps Secretary were amalgamated to provide for a separate appointment of Museum Director. Prior to this the Institution Secretary had been *de facto* the Museum Director after the Museum had moved to the Ravelin Building in 1986. In 1990, Colonel G. W. A. (Gerald) Napier moved across to the Museum as Director, taking with him the responsibility of directing the development of the Museum on behalf of the Corps.

A significant activity of the Institution throughout this period was the maintenance of its links with the civilian professional bodies. The programme of Joint Professional Meetings mentioned in Volume XI continued, particularly the main annual event in London hosted by the Institution of Civil Engineers, a privilege accorded to no other national institution.

Among the business that had been tidied up before the hand-over of the funds were the trust funds administered by the Institution. Volume XI lists twelve Institution prizes funded by the trusts, in addition to the Kitchener Scholarship. Many of the trusts no longer held viable balances, and many of the awards had become too small to be a useful incentive to competition within the original purposes of the trusts. The several small trust funds were therefore amalgamated within the Institution's Memorials Fund and the prizes reviewed to make them more attractive and relevant to the Institution's needs. By the end of the period the awards funded and offered by the Institution were as shown in the Annex.

In 1994 the Institution Gold Medal was awarded to Colonel J. N. (John) Blashford-Snell in consideration of his remarkable work in leading and sponsoring expeditions, culminating in the creation of Operation *Raleigh*, which had brought great benefit to the scientific world and given opportunities to young people for character-building adventure. The medal was presented by the Lord Mayor of London at a fund-raising reception for the Museum held in the Mansion House on 13 June 1994. This was the first time the Gold Medal had been awarded since the presentations in 1964 to Major General C. H. Foulkes, Brigadier M. Hotine and Lieutenant Colonel E. W. C. Sandes.

The Kitchener Scholarship continued to provide assistance towards the education of the children of the widows of members of the Corps who died while serving: during the period 33 children were assisted.

On the publications side, 1986 saw the completion of a review of members' wishes for the form and content of the *RE Journal*. This had been undertaken against the background of the arrival of the computer age, the belief that publications were taking an

undue proportion of the Institution's budget, and imminent staff cuts. Following the review, the frequency of publication of the *Journal* was cut from four to three issues and the *Supplement* from twelve to six issues a year. Both underwent changes in appearance, but editorial policy for a professionally presented journal with a range of articles covering topics historical and forward-looking was maintained. The *RE List* retained its form but with certain additions, notably the inclusion of all Territorial Army officers whether or not members of the Institution, and later the inclusion of warrant officer members of the Institution.

As experience grew among the Institution staff, more savings in the publications budget were achieved by increasing the amount of in-house work. This paid off particularly when the Institution staff took over responsibility for producing *Sapper* magazine on the retirement of the Corps Librarian and then Editor of *Sapper*, Major J. (John) Hancock. Under the editorship of Major Hancock, *Sapper* had developed into a highly popular and readable magazine. By the year 2000, its circulation was some 7,000, distributed partly by mail to direct subscribers and partly in the form of unit bulk orders. In 1998 the printing of all Corps publications was placed in the hands of a company in Merthyr Tydfil, Stephens and George Magazines Ltd. All material for text and artwork was despatched to them electronically, in contrast to the typed manuscripts and manually corrected galley proofs from which local Kent firms had produced them twenty years earlier.

The Museum and Library

By 1980 several studies had been completed on possible new sites for the Corps Museum, the aim being to make it more accessible to the general public. Another factor was the need for more space to accommodate the collection and make provision for the many very large items of equipment that were being saved from disposal. The site of the Ravelin building, the original Electrical School of the School of Military Engineering, was chosen, and further accommodation was earmarked in the moat. The site offered the possibility of its own access from Prince Arthur Road,

separate from the Barracks main gate but still within the outer perimeter of the barracks, which gave it security. The top-floor offices of the building were allocated to Regimental Headquarters, the Institution and the RE Association. All Corps affairs would thus be concentrated under one roof. Authority was granted from District Headquarters for the use of the building for this purpose, so that maintenance costs would be borne by public funds, but the costs of any alterations to the building and of moving, conserving and displaying the collection would be a Corps responsibility. An appeal within the Corps raised over £50,000 to cover the initial move.

The problem that faced the Institution was that, whereas the Museum was in the trusteeship of the Council, the Museum clearly belonged to the whole Corps, not just the members of the Institution. A governance system was required that delegated the trusteeship of the Corps collection but left responsibility for financing and control in the hands of the Corps. The Chief Royal Engineer's Committee accepted overall control but set up two bodies, which became the pillars on which the Museum was to stand for the years ahead. These were the RE Museum Trustees Steering Committee and the RE Museum Foundation. The Trustees Steering Committee was chaired by the Institution President, and its membership included certain Colonels Commandant, as well as the Director of the National Army Museum, Ian Robertson, who agreed to provide the professional advice required by such a body and was co-opted to Council for the purpose. This committee evolved into the Museum Executive and Library Committee as the emphasis switched from capital development to running and management. Colonel Napier retired as the Museum's Director in 1993 and was replaced by Colonel J. E. (John) Nowers.

The origins of the Foundation lay in the recommendations of a fund-raising consultant who had been engaged to help find the funds for the planned stages of development after the money raised within the Corps had been committed. He strongly recommended a long-term fund-raising plan, which could cater for future unforeseen capital requirements as well as the

immediate future. The Foundation was independent of the Council, having its own trust deed. The Foundation's efforts to raise capital donations unfortunately coincided with the recession of the mid-1980s, which struck the construction industry particularly hard. Nevertheless by 1993 £700,000 had been raised and by the year 2000 a further £252,000 had been added. The Foundation has brought the Corps immeasurable benefits, not only in the shape of money for the Museum but also, less tangibly, invaluable contacts that impacted on the professional life of the whole Corps.

The Museum closed on the old site and work started at the end of 1984 in the Ravelin building. Initially units were tasked to provide teams of tradesmen to work on the project in turn. Later, on the recommendation of Major H. A. (Harry) Caulfield, the first Project Officer, it was found that the necessary standards could be achieved only by forming a project team from selected experienced tradesmen from the whole Corps, and this remained in existence for some ten years. Contributions were made from other sources as well, most notably the superb VC cabinet built in his own time by Bill Franks, the senior civilian instructor in the Carpenters' and Joiners' Workshop.

Initially the design was undertaken in-house, drawn up by the Curator, Lieutenant Colonel C. T. P. (Charles) Holland and continued by his successor in early 1985, Caroline Reed. Later, professional design consultants were engaged for different stages of the project. The first galleries were opened in August 1986 and Stage I, taking the story to the end of the Second World War, was complete the following March. However, as the work progressed it became clear that the earlier plans had several flaws and needed revision. By this time the committee system for planning and financing the Museum was in place and able to consider the matter more fully than had been possible earlier. Professional museum consultants were brought in, and in 1989 they recommended that development should be concentrated in the Ravelin building until such time as the Museum had established sufficient visitor numbers and income from all sources to justify further expansion.

The key element in the development plan was to be the roofing-over of the Ravelin building courtyard to provide a 50% increase in display space (designed to cover the post-war years) and give the whole building greater protection from the elements. The construction work was completed in 1990, and the displays were then put in place as funds could be raised. The courtyard was finally opened to the public on 3 October 1996. By this time space had been found for many large items of equipment in the outside area, but even these were only a small proportion of the holdings, and covered accommodation remained a major need at the end of the period covered by this History.

As well as those parts of the Museum that were on show to the general public, the development included arrangements for recording, maintaining and conserving the whole collection and for storing those items for which display space was unavailable. Marketing featured high in the programme, and the Museum became an important feature in the local and county tourism scene. Temporary exhibitions on topical and specialist themes were arranged to maintain public interest, as were events, most notably the reunion of National Servicemen in 1997, which brought in 3,000 people. The Museum established itself professionally, becoming registered early in its life and achieving 'Designated Status' by the Museums and Galleries Commission by 1998, one of only two military museums to be granted that status at the time. It achieved the Museum of the Year Award in 1997 in the 'museum of industrial or social history' category.

Despite all these efforts, visitor numbers and hence the income to the Museum never rose in line with the projections, remaining at about 20,000 a year. The 1989 consultancy had made unrealistic proposals for covering long-term running costs, which would rise rapidly if their recommendations, particularly for staffing, were to be met. If no other provision were made, an unacceptable burden would have to fall on Corps and Institution funds, and it was also foreseen that the staff provided from the public purse would be insufficient to meet the Museum's requirements; in any case, as budgetary pressures developed

these were likely to be subject to cuts. In 1992 the Chief Royal Engineer, General Sir George Cooper, set up an endowment fund to be subscribed to by past and present members of the Corps. Over the period of this History this fund built up to £450,000. By 1998, when the threat was raised of the total removal of public funding support for military museums, the Foundation began to turn its attention to the possibility of obtaining donations from the civilian engineering industry towards the endowment of the Museum.

The colossal effort that the Corps and the Foundation had invested in the Museum had little impact on the Library during this time other than to reinforce its value as a resource for historical information. It continued its slightly schizophrenic existence of trying to be both an up-to-date source of technical and military information and also the Corps archive, providing a valuable service to the general public as well as to the members of the Corps. Great strides were made by the introduction of a computer system, setting up the unique photographic collection in a controlled environment and in a programme, financed by sales for conserving many of the books that had been neglected over the years. But questions were raised from time to time as to the justification for maintaining the collection for such wide purposes. Amalgamation with the Museum was put forward as a possible solution, and responsibility for its management was placed under the Museum Director, but physical separation made for a *de facto* independence.

Corps Events

The Prince of Wales visited the Royal School of Military Engineering and 33 Engineer Regiment (EODI) on 20 March 1985. At Lodge Hill he saw displays of bomb-disposal techniques, fired a rocket wrench, examined a 1,000-kilogramme German bomb that had recently been recovered from Sheffield and met Colonel B. S. T. (Stuart) Archer, GC, who was a Second World War bomb disposal officer, and later chairman of the Victoria Cross and George Cross Association. At the bridging hard the Prince met members of the Young Officers' Course and

successfully crushed a Jaguar car at the controls of a Medium Wheeled Tractor. Crossing the Medway in a Combat Support Boat, he had lunch in the REHQ Mess before touring the Workshops. The Prince was shown the Gordon statue and presented with a photograph of the then Prince of Wales unveiling it on 19 May 1890.

In 1987 a series of events were held to celebrate RE 200, the anniversary of the granting of the title 'Royal' to the Corps title and the creation of the Royal Military Artificers. On 14 February, 5,000 people attended an evening in the Albert Hall, entertained by artists including Acker Bilk, who learnt to play his clarinet while in detention in the Canal Zone as a National Service Sapper. A Service of Rededication for the Corps was held in St. Paul's Cathedral on 18 March and was followed by a Reception in the Guildhall. The Duke of Edinburgh launched the new Corps yacht *Right Royal of Upnor*, and in early April the RE Games were held at Chatham. As the culmination of RE 200, the Queen visited the RSME on 20 May 1987. In Pasley Road, Her Majesty saw a 'Tunnel of Time' display, starting with a siege park of 1787 and embracing construction work carried out in the past 200 years, including tradesmen at work on a Northern Ireland construction task. After lunch in the RE HQ Mess, the Queen viewed a further display that included Support to the RAF, Explosive Ordnance Disposal, Search, Combat Engineering, Diving, Survey and Postal work. The Combat Engineering display included a simulated bridge demolition: the Queen was invited by Lieutenant Colonel P. J. (Peter) Williams to sign the authorisation form and fire the demolition. At the Ravelin Building, the Queen was presented with a cheque by the Queen's Gurkha Engineers team who had run from Vancouver across Canada in seventeen days, and then from Glasgow to Chatham to raise funds for the Museum and Gurkha Benevolence. Her Majesty then unveiled a plaque to open the new Museum before touring the exhibits. She also met the families of the late Staff Sergeant J. (Jim) Prescott, CGM, and Sapper W. (Wayne) Tarbard, killed in the Falklands conflict and whose medals had been loaned to the Museum. In June, 9 Parachute Squadron,

supported by the Corps Band, provided the Guard at Buckingham Palace, and the Corps also featured strongly at the Royal Tournament; the Corps Band was the resident band, and 220 recruits from 55 Training Squadron put on a dazzling and original display using structures made from pipes to illustrate Corps history.

Her Majesty visited the Corps again in Hameln on 3–4 November 1993. On arrival, she inspected a Royal Guard of Honour from 12 Field Squadron, commanded by Major P. (Paul) Lodge, and later that evening attended a reception in the Mess for 76 officers from across the Corps in Germany, before attending a Corps Guest Night in the Officers' Mess at Bindon Barracks. The Corps Light Orchestra was in attendance, and their performance concluded as usual with a rousing rendition of *Hurrah for the CRE*. The Queen's first visit next morning was to the town centre of Hameln to reflect the close links between the Corps and the Stadt. During her walkabout she met some of the thousands of people lining the streets and later signed the Stadt's Golden Book in the Hochzeitshaus. Later, at Upnor Hard, the Royal Party viewed an impressive demonstration of Sapper capabilities, involving nearly every Sapper unit in Germany and some from the UK, which had been organised by 32 Engineer Regiment. Her Majesty crossed the Weser on an M2 ferry, which flew the Royal Standard, probably the most unusual craft ever to have done so. On the far bank the Queen watched a combat demonstration, including a dramatic multiple launch of Armoured Vehicle Launched Bridges. A lunch in the Officers' Mess at Gordon Barracks for 180 officers, warrant officers, senior non-commissioned officers and their wives was followed by another walkabout, when she talked to junior non-commissioned officers, soldiers and their wives. The Sapper Free Fall Parachute Team then dropped in to present the Queen with a pair of scissors with which to cut the ribbon to open an autumn fair. At the fair she visited every stall and listened to a song about the Pied Piper performed by the children from Hastenbeck and Hameln British Forces Education Service schools. Later, Staff Sergeant D. K. Jones and Sergeants T. Hutchings and S. P. Moy

from the Royal School of Military Engineering presented the Queen with two garden chairs, a table and two bootscrapers that they had manufactured. After tea with some 80 wives and children at the Community Centre, Her Majesty left for Hannover Airport. As she drove away, the Corps hot-air balloon took off from the square flying the message 'Farewell from your Royal Engineers'. This was a most successful and happy visit in what had been a difficult year for the Queen. The visit broke new ground in several respects: it was the first time the Queen had visited the Corps in Germany, the first time she had dined with the Corps and apparently also the first time she had slept in a barracks. Much credit for the success of the event was due to the intricate preparation and hard work of the project team, headed by Lieutenant Colonel A. (Albert) Whitley and Major J. (John) Heminsley.

The Corps' historic record of service in Gibraltar came to an end in 1994 when the 1st Fortress Specialist Team RE was disbanded. It was decided that this occasion should be marked in an appropriate manner. The Chief of Staff in Gibraltar at the time, Colonel A. (Tony) Reed Screen, was a Sapper and thus well-placed to mastermind the commemoration. It was decided that a statue should be commissioned of a soldier artificer, in the uniform of 1772, to be sited in a prominent position in the main street. Colonel Reed Screen identified a British sculptor living in Spain, Jill Cowie Sanders, who was commissioned to produce the bronze statue (The Regimental Colonel stipulated that the statue should bear no resemblance to Col Reed Screen.) The unveiling ceremony was timed to take advantage of the presence on the Rock on exercise of 60 Field Support Squadron, and on 26 March 1994 the Squadron exercised the Corps' Freedom of Gibraltar, accompanied by the Corps Band. The magnificent statue on its massive stone plinth was then unveiled in the presence of the Chief Minister of Gibraltar, Field Marshal Sir John Chapple (the Governor, and son of a Second World War bomb disposal officer), General Sir William Jackson (a former Governor and Sapper), the Chief Royal Engineer and a large crowd. An engraved marble slab beneath the statue reads:

PRESENTED TO THE PEOPLE OF GIBRALTAR
BY THE CORPS OF ROYAL ENGINEERS TO COMMEMORATE
THE CONTINUOUS SERVICE GIVEN BY THE CORPS ON THE
ROCK OF GIBRALTAR FROM 1704, AND THE FORMATION HERE
IN 1772 OF THE FIRST BODY OF SOLDIERS OF THE CORPS, THEN
KNOWN AS THE COMPANY OF SOLDIER ARTIFICERS.

26 MARCH 1994

Later, in a ceremony in the historic Garrison Library, the Gibraltar Heritage Trust's Group Award was presented to the Chief Royal Engineer, who received it on behalf of the Corps. The Chairman of the Heritage Trust said that the people of Gibraltar would always be indebted to the Royal Engineers, who more than any other regiment or corps had made fortress Gibraltar what it was. A formal alliance between the Gibraltar Regiment and the Corps was later established; this was marked by a parade in 1996 at which the Corps was represented by 127 (Sussex Yeomanry) Field Squadron (Volunteers) and the Corps Band.

Many other commemorative events occurred in the 1990s. To commemorate the 50th anniversary of the formation of RE Bomb Disposal Sections a service was held in St. Paul's Cathedral on 25 May 1990 attended by 800 members of the Corps and invited guests. This was followed by a reception in London's Guildhall hosted by the City of London and presided over by the Lord Mayor. A silver centrepiece commemorating this event was presented to the Corps by the City of London. This was followed later in the year by a number of events to mark the 50th anniversary of Airborne Sappers. One of the most widely celebrated was that held in June 1994 for the 50th anniversary of D-Day. Although there are several memorials in Normandy that commemorate actions by individual Sapper units, there was no memorial to the enormous contribution made by the Corps as a whole to the invasion. It was therefore decided that a memorial should be commissioned and erected on the cliffs at Arromanches, overlooking the remains of the Mulberry Harbour. The design and building of the memorial was coordinated by Lieutenant Colonel P. (Peter) Hayward-Broomfield. An imposing

Portland stone edifice was designed by Malcolm Estell, whose services were provided by Colonel D. J. (David) Lee, the Commanding Officer of the Engineer and Transport Staff Corps. A large engraved stainless-steel plate was designed with assistance from the RE Museum showing a map of the invasion beaches, vignettes of Sapper activities and a description of the multifarious Sapper contributions to the success of D-Day. Stainless-steel plaques showing the signs of all the formations in which Sappers fought also formed part of the memorial's design. The components were transported to Normandy and assembled by volunteers from CVHQ during their annual camp in May. The unveiling ceremony took place on 7 June 1994, in the presence of the Chief Royal Engineer, the Mayor of Arromanches, about 500 veterans and spectators, and the Corps Band. After a service conducted by the Reverend T. (Tom) Hiney, MC, Chaplain of the Royal Hospital Chelsea and former Chaplain to the Chatham Garrison, the memorial was unveiled by Lieutenant General Sir David Willison, KCB, OBE, MC, who was wounded on D-Day while in command of 17 Field Company.

Although there were many surveys and maps produced for military purposes and by military personnel before 1747, the Military Survey of Scotland, which began in that year, was the first large-scale survey of an entire country designed and carried out by military personnel for an entirely military purpose. Military Survey traces its origins from that survey, and so in 1997 major celebrations were held to mark its 250th anniversary. The occasion was nominated as the Corps's main event for the year, and 73 separate activities took place. Many of these were relatively small in scale, but two large displays were produced, one telling the story of Military Survey in photographs, and the other showing the development of military mapping. These were hosted at sixteen events around the UK, including the Ministry of Defence Main Building in London and the Imperial War Museum at Duxford. The launch event for the celebrations was a re-measurement of the Hounslow Baseline, the base for the Triangulation of Great Britain, using global-positioning-system methods. This took place on 1 July 1997, the anniversary of the

death of the original surveyor of the base and founding father of both the Military Survey and Ordnance Survey, General William Roy. It is of note that after two-and-a-half centuries of development in techniques and equipment, the difference between the measurements was only some 11 centimetres. The most lasting result of the anniversary celebrations was the granting of the title 'Royal' to the School of Military Survey by the Corps' Colonel-in-Chief on 16 April 1997. However, it was not until 26 June 1998 that Her Majesty the Queen was able to visit Hermitage to unveil a commemorative plaque. During the visit Her Majesty visited all aspects of the work of 42 Survey Engineer Group, including a 'tactical' deployment of a Geographic Support Group, where she enjoyed a virtual helicopter tour over the Balmoral estate. The final commemorative events during 1997 were held at Hermitage in September 1997. An anniversary party was held for more than 3,000 serving and former members of Military Survey on 13 September, followed the next day by an Open Day with many technical and historic exhibitions and an arena display. Finally the Freedom of Newbury was granted to the Corps on 15 September, this following a 48-year association between the town and the School of Military Survey. 42 Survey Engineer Group, supported by contingents from 14 Independent Topographic Squadron and 135 Independent Topographic Squadron RE (V), marched through the town centre accompanied by a fly-past by a Canberra photo-reconnaissance aircraft.

At the close of the period covered by this volume, the Corps undertook a number of activities to celebrate the Millennium. In conjunction with the Worshipful Company of Tyllers and Bricklayers, Corps tradesmen constructed three sundials, which were unveiled in the grounds of the RE Museum, on the Meridian Line at Greenwich and on the Embankment in London. Each contained a time-capsule with lists of all officers and soldiers serving in the Corps. *Sapper 2000* was a sponsored run around the UK, ending at Greenwich on 31 December 1999, to coincide with the opening of the Millennium Dome. Finally, three expeditions were mounted to epitomize the pioneering spirit of Sappers: by 25 Engineer Regiment to Sabah; by 36

Engineer Regiment down the River Volta; and Military Survey went mountaineering in Kazakhstan.

Sports

The Corps continued to celebrate the sporting prowess of its teams and individuals. Corps teams won far more than their fair share of championships, and the successes are too numerous to chronicle in detail here. In previous volumes of this history, the results of the annual matches of the main team sports against the Royal Artillery have been recorded assiduously; however, although these matches were still hotly contested, they took place against an ever-expanding background of competitions and are therefore not listed in this volume. The earlier practice of holding annual RE inter-unit games in the United Kingdom and Germany rather fell away in the 1980s, largely due to the pressure of operational commitments. However, these games were revived in the late 1990s, first at Minley and later in Germany, and proved to be extremely popular.

In the football arena, 28 Engineer Regiment achieved unprecedented success in winning the Army Association Football Challenge Cup eight times. They won the Cup no less than five times in succession in the 1990s, two better than the hat-trick achieved by the Sherwood Foresters in 1931. In the twenty Army Cup Finals played in this period, a Sapper team from 28 Engineer Regiment or 1/3 Training Regiment was one of the finalists on seventeen occasions; on two occasions, in 1989 and 1995, these two Sapper units played each other in the Final. Not surprisingly, Sappers provided a substantial part of the Army team in these two decades.

Rugby remained popular, and the Corps team completed a hat-trick of wins against the Royal Artillery in the early 1980s, including a victory at Chatham in the centenary match. The Jones-Drake Trophy was presented thereafter, consisting of a mounted cannon ball and named after the Gunner and Sapper Chairmen at the time. The Sapper rugby team undertook a number of overseas tours, mainly in Europe, while in 1993 the team, led by Lieutenant Colonel R. J. D. (Knobby) Reid, visited the eastern USA. The first

Combined Services rugby tour to New Zealand took place in 1988. Colonel R. M. (Mike) Stancombe (then Chairman of the Royal Engineers Rugby Club) raised the necessary sponsorship and managed the team, which included three Sapper members, WO1 R. J. (Bob) Matthews, Sergeant C. (Chris) Spowart and Lance Corporal D. (Dean) Ryan, along with the tour manager and a referee (Major K. H. (Keith) Montgomery), who were both Royal Engineer officers. The touring team won three and drew two matches out of seven, at a time when most British teams were being soundly beaten by New Zealanders.

On the cricket field, one player merits particular attention. Sapper S. (Steve) Bunn played his first game for the Corps in 1980, opening the batting with Captain A. J. (Adrian) Bunting. He scored runs on that day, but more importantly, went on to score in excess of 20,000 runs over the ensuing 25 years (during which time he became Staff Sergeant Bunn), often scoring more than a thousand runs in a season. This is the highest known aggregate of runs scored by an individual cricketer for the Corps.

The Corps' success in the gruelling Devizes-to-Westminster canoe race was maintained; they were often the first service team home and also achieved team event wins in 1983 and 1989. 25 Engineer Regiment achieved distinction in fencing, winning the



Corps rugby players past and present at RE200 Games, April 1987.

Army and Inter-Service championships in 1983 and 1984, and the Army six-man event for four years in succession from 1988. 42 Survey Engineer Group, though counted as a minor unit for sports, achieved many creditable results, including the Army major units hockey championship, the Army Cricket Cup, and the Army minor units football trophy. Corps rowing was also notable at Army and Joint Services level; Lieutenant Colonel M. (Max) Heron and Major G. R. N. (Nick) Holland (a former Oxford rowing blue) were gold medalists at the World Veteran Rowing Championships in 1992.

Captain M. (Mike) Mumford was the British Pentathlon Champion in 1981, and four Sappers were in the British Pentathlon Team at the Winter Olympics at Sarajevo in 1984. This was the last of five consecutive occasions on which Sergeant G. (Graeme) Ferguson represented Great Britain. Later, as Captain Ferguson, he was selected to be team manager for the 1996 Winter Olympics. The manager, coach and four of the seven-man team in the British Olympic Biathlon squad in 1988 were Sappers, and Lance Corporal M. (Mike) Dixon was the first Briton to break the one-hour barrier in the 20-kilometre biathlon. In the 1992 Winter Olympics the top two British skiers and four of the five members of the biathlon team were Sappers; the then Sergeant Dixon was placed 12th, Britain's best ever result in this event. He subsequently received the Sportswriters' Winter Sportsman of the Year Award. Captain H. (Hugh) Hutchinson was the highest-placed Briton in the moguls event at the same Winter Olympics and in 1993 regained the moguls title at the British Freestyle Championships. At unit level, 35 Engineer Regiment continued to dominate in skiing, winning the Princess Marina Trophy for six years in succession from 1995.

Sailing continued to be a popular and successful Corps sport, and the Royal Engineers Yacht Club won three trophies on corrected time in the 1991 Fastnet Race, with Lieutenant Colonel A. R. M. (Ross) Wilson as skipper. This success had previously been achieved by the REYC in 1937 and 1951. Major R. (Richard) Williams skippered the first military yacht in the 1997 Sydney-to-Hobart Race; and Major (Steve) Pyatt was the Inter-Services Laser and National Bosun Dinghy champion in 1991.

Boxing achieved some notable successes in the late 1990s under the able direction of Warrant Officer Class 2 M. J. (Chad) Chadwick. This culminated in Corporal J. (Jesse) James's win in the Light Heavyweight Division of the Amateur Boxing Association finals in 2000. The Corps was also well represented in minority sports. Lance Corporal K. (Keith) Murray beat the World One-Hour Cycling record at the Manchester Velodrome in 1997. He was later reserve for the Olympic Cycling Squad in 2000 and improved or eclipsed all the Army track and time-trial cycling records, many of which dated back to the 1950s. The Corps team won the Army and Joint Service Skydiving Championships in 2000.

Golf remained a popular sport, and the Corps won the Inter-Corps Championships for the first time in 1982. The centenary match against the Royal Artillery in 1995 was won by the Sapper team, which included Lieutenant Colonels I. S. (Ian) Keelan and P. V. (Pat) Huyshe, who had first partnered each other in 1939. The Royal Engineers Golfing Society celebrated its 75th anniversary in 2000, and the Corps teams won all major corps trophies at Deal that year.

In the field of extreme sports, Second Lieutenants R. M. (Ruth) Loyd, K. (Kath) MacPhee and K. (Kate) Unsworth formed the first all-woman team to enter and complete the Marathon des Sables in 2000; this near-suicidal international event is run across 235 kilometres of the Sahara in Morocco.

Just to emphasise the enduring spirit of Corps sport, Corporal L. (Lee) Innes must be the only Sapper in this period to have represented the Combined Services, the Army and the Corps at no less than three different sports – boxing, football and rugby.

Adventure Training expeditions continued by land and sea to penetrate to the wilder outposts of the world, though inevitably constrained at times by units' intense operational workload. Increasing regulation meant that expeditions had to be planned meticulously. To help defray individuals' expenses, particularly for junior ranks, grants were provided for a number of expeditions from Corps Funds and from the Blythe Sappers Adventure Training Fund.

Contributors

to this volume

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Brig. T. H. E. Foulkes
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Col. G. K. Gibbs
Brig. S. R. Gilbert
Col. D. M. Gill
Maj. A. Green
Col. G. B. Grossmith
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Col. R. A. Hyde-Bales
Maj. V. Iwanek
Gen. Sir Michael D. Jackson
Brig. I. S. James
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Col. J. A. Pinel
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Col. R. D. Richards
Brig. C. Rose

Maj. Gen. P. J. Russell-Jones
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Gen. Sir Rupert Smith
Col. D. P. Stephenson
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Brig. R. Wheatley
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Lt. Col. A. D. Wilson

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Mr. R. Lloyd Owen
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Ms. J. Richards
Mrs. J. Thorndick

Institution staff.
RE Library staff.
RE Museum staff.

With apologies for any omissions.

Annex A

Roll of Honour

This annex lists those killed on operational service during the period covered by this volume of the Corps History. The official Roll of Honour is kept in the Kitchener Chapel of St Paul's Cathedral.

DATE	RANK	NAME	REMARKS
3 Feb 80	Sapper	F. Jones	Northern Ireland
16 Feb 80	Colonel	M. E. Coe, OBE	Terrorist activity, BAOR
18 Feb 80	Acting Sergeant	K. J. Robson	Northern Ireland
2 July 80	Sapper	Siribahadur Mall	Hong Kong
20 May 82	Warrant Officer Class 2	L. Gallagher	Falkland Islands
23 May 82	Staff Sergeant	J. Prescott, CGM	HMS <i>Antelope</i> , Falkland Islands
28 May 82	Sapper	P. K. Gandhi	Falkland Islands
28 May 82	Corporal	M. Melia	Falkland Islands
8 June 82	Corporal	A. G. McIlvenny	Falkland Islands
8 June 82	Sapper	W. D. Tarbard	Falkland Islands
12 June 82	Corporal	S. Wilson	Falkland Islands
12 June 82	Corporal	C. A. Jones	Falkland Islands
14 June 82	Lance Corporal	J. B. Pashley	Falkland Islands
11 Nov 82	Corporal	Krishna Kumar Rai	Falkland Islands
8 Feb 83	Corporal	T. Palmer	Northern Ireland
6 Oct 86	Lance Corporal	D. Hurst	Northern Ireland

DATE	RANK	NAME	REMARKS
1 Aug 88	Lance Corporal	M. F. J. Robbins	Terrorist activity, UK
15 Sept 88	Corporal	P. J. Cassidy	Northern Ireland
23 Aug 89	Staff Sergeant	D. McV Hull	Northern Ireland
12 June 90	Staff Sergeant	J. H. Hardy	Northern Ireland
1 July 90	Sergeant	M. Cashmore	Northern Ireland
31 Jan 91	Lieutenant Colonel	A. J. Wright	Gulf
4 Feb 91	Major	J. S. Kinghan	Gulf
4 Feb 91	Sapper	R. A. Royle	Gulf
12 Feb 91	Corporal	D. E. Denbury, MM, QGM	Gulf
17 March 91	Corporal	S. J. Lane, MM	Gulf
19 March 94	Corporal	B. D. Warburton	Former Yugoslavia
16 Aug 94	Lance Corporal	B. J. Nicholas	Former Yugoslavia
18 Mar 96	Lance Corporal	C. S. McLeish	Bosnia
8 Dec 98	Sapper	S. A. Stewart	Bosnia
21 June 99	Lieutenant	G. J. M. Evans	Kosovo
21 June 99	Sergeant	Balaram Rai	Kosovo
11 Sept 99	Corporal	P. J. Bradley	Bosnia

Annex B

Honours and Awards 1980–2000

by Theatre and Category

GCB

Gen Sir George Cooper

KCB

Lt Gen S. C. Grant

Lt Gen J. J. Stibbon

KCMG

H. B. Walker Esq. Gulf War 1991

KCVO

Lt Col J. H. Neill

CB

Maj Gen J. A. J. P. Barr

Maj Gen E. W. Barton

Maj Gen L. F. H. Busk

Maj Gen A. N. Carlier

Maj Gen K. J. Drewienkiewicz

Maj Gen C. L. Elliott MBE

Maj Gen J. A. M. Evans

Maj Gen P. F. Fagan

Maj Gen G. W. Field

Maj Gen S. C. Grant

Maj Gen J. P. Groom

Maj Gen M. Matthews

Maj Gen R. A. Oliver

Maj Gen R. L. Peck

Maj Gen C. J. Popham

Maj Gen C. J. Rougier

Maj Gen P. J. Sheppard

Maj Gen G. B. Sinclair

Maj Gen C. N. Thompson

Maj Gen E. G. Willmott

Maj Gen W. N. J. Withall

CMG

Maj Gen K. J. Drewienkiewicz

CBE

Col	J. S. Field	Former Republic of Yugoslavia
Col	I. S. Mercer	Gulf War 1991
Brig	W. E. Shackell	Gulf War 1991
Col	E. H. Barker	
Brig	J. A. J. P. Barr	
Brig	F. G. Barton	
Col	P. M. Blagden	
Brig	M. A. Browne	
Col	D. Brownson	
Dr	P. S. Bulson, HonMInstRE	
Brig	C. H. Cowan	
Lt Col	D. L. Davies	
Col	W. T. Dennison	
Col	J. G. Evans	
Brig	R. N. R. P. James	
Brig	R. J. N. Kelly	
Lt Col	D. J. Lee (E&TSC)	
Brig	D. J. London	
Brig	I. D. T. McGill	
Col	J. H. McKeown	
Brig	J. D. Moore-Bick	
Maj Gen	K. O'Donoghue	
Lt Col	A. Osborne	
Col	G. R. Owens	
Brig	A. D. Pigott	
Maj (Hon Col)	J. P. Rettie	
Lt Col	M. J. Rouse	
Professor	R. T. Severn	
Maj Gen	P. J. Sheppard	
Col	D. N. Spratt	
Brig	F. G. Sugden	
Brig	D. H. A. Swinburn	
Col	J. A. Thorpe	
Lt Col	R. D. Udall	
Brig	A. E. Whitley	
Brig	J. B. Wilks	

MVO

Maj R. Morgan
 Lt Col C. M. G. de Planta de Wildenberg

OBE

Mr	M. J. Beynon	South Atlantic Campaign
Lt Col	P. J. Saunders	South Atlantic Campaign
Lt Col	R. J. D. Reid	Northern Ireland
Lt Col	D. Stephenson	Northern Ireland
Lt Col	J. G. Barber	Northern Ireland
Col	A. C. Mantell	Northern Ireland
Lt Col	G. A. Nield	Kosovo/Macedonia
Lt Col	G. Taylor	Kosovo/Macedonia
Lt Col	M. G. le G. Bridges	Gulf War 1991
Lt Col	S. K. E. Clarke	Gulf War 1991
Col	B. A. McCandlish	Gulf War 1991
Lt Col	J. D. Moore-Bick	Gulf War 1991
Lt Col	C. G. A. Nash	Gulf War 1991
Lt Col	R. Pridham	Gulf War 1991
Lt Col	D. R. Burns	Former Republic of Yugoslavia
Lt Col	N. M. Fairclough	Former Republic of Yugoslavia
Lt Col	J. S. Field	Former Republic of Yugoslavia
Col	M. A. C. Hughes	Former Republic of Yugoslavia
Col	J. K. Johnson	Diplomatic List
Lt Col	N. F. Mulliner	Cambodia
Lt Col	A. E. N. Black	
Col	J. N. Blashford-Snell	
Lt Col	M. H. H. Brooke	
Lt Col	A. N. Carlier	
Lt Col	I. M. Caws	
Col	S. H. Clark	
Lt Col	M. G. Coulson	
Col	A. S. Craig	
Lt Col	W. M. Crawshaw	
Mr	T. T. Cuneo	Artist
Lt Col	K. W. Dale	
Col	G. C. Dodds	
Lt Col (V)	R. Ewen, TD	
Col	G. W. Field	
Lt Col	D. H. Flower	
Maj	R. O. Gerrard	
Lt Col	D. A. Grove	
Col	A. D. Harking	
Lt Col	R. C. Hart	
Lt Col	W. J. Heminsley	
Lt Col	A. G. R. Holman	
Lt Col	J. P. Hoskinson	

Lt Col	S. Jardine
Lt Col	J. F. Johnson
Lt Col	H. H. Kerr
Lt Col	R. W. Killick
Lt Col	S. C. Kirkwood
Lt Col	J. N. H. Lacey
Lt Col	R. J. Lampard
Col(V)	G. A. Leech, TD
Lt Col(V)	D. W. Lewis, TD
Lt Col	T. A. Linley
Lt Col	T. J. Ludlam
Lt Col	D. J. Martin
Col	T. McG. Brown
Col	R. A. M. S. Melvin
Lt Col	C. A. Mildinhal
Lt Col	R. J. Milsom
Lt Col	J. Morgan
Lt Col	P. M. Naylor
Lt Col	R. A. Oliver
Maj	P. M. Oliver
Lt Col	R. J. F. Owen
Lt Col	M. G. Paterson
Lt Col	A. D. Pigott
Col	B. S. Read
Lt Col	A. J. Reed Screen
Lt Col	R. I. Reive
Lt Col	R. A. Ridings
Lt Col	J. W. G. Rogers
Col	P. G. Rosser
Lt Col	P. J. Russell-Jones
Lt Col	B. J. Sanderson
Lt Col (V)	D. A. Scott, TD
Lt Col	B. M. Semple
Lt Col	F. Sewel
Lt Col	D. S. Shaw
Lt Col	P. J. Sheppard
Lt Col	S. F. Sherry
Lt Col	R. N. C. Smales
Brig	T. S. Sneyd
Lt Col	J. Speight
Maj	H. G. H. Stafford
Col	D. P. Stephenson
Lt Col	D. C. Stevens

Lt Col	P. G. Sugden
Lt Col	N. A. Sutherland
Maj	K. Taylor
Lt Col	A. R. Waitson
Lt Col	A. P. Walker
Lt Col	P. A. Wall
Lt Col	P. R. Wildman
Lt Col	R. H. Williams
Maj	J. A. Williams
Lt Col	A. A. Wilson
Lt Col	J. M. Wyatt

MBE

Maj	C. M. Davies	South Atlantic Campaign
WO1	R. G. Randall	South Atlantic Campaign
Maj	I. S. James	Rwanda
Cpl	S. S. Angel	Northern Ireland
Capt	M. J. Banwell	Northern Ireland
Cpl	P. A. Beck	Northern Ireland
WO2	C. Corlett, BEM	Northern Ireland
Maj	M. E. Daubney	Northern Ireland
A/Lt Col	R. J. Griffiths	Northern Ireland
Maj	M. R. Gritten	Northern Ireland
Capt	D. C. Hudson	Northern Ireland
Maj	N. Inglis	Northern Ireland
Capt	M. W. Jenks	Northern Ireland
WO2	K. M. Lane	Northern Ireland
Maj	S. R. Lewis	Northern Ireland
Maj	P. J. Mackie	Northern Ireland
Maj	A. M. Mackenzie	Northern Ireland
Maj	H. M. Morgan	Northern Ireland
Maj	S. J. Pearce	Northern Ireland
Maj	D. A. Selmes	Northern Ireland
Maj	D. L. Strawbridge	Northern Ireland
WO2	D. T. Weaver	Northern Ireland
Lt Col	J. D. Wootton	Northern Ireland
Cpl	W. R. Bale	Kosovo/Macedonia
WO2	J. P. Gaughan, BEM	Kosovo/Macedonia
Maj	R. K. Tomlinson	Kosovo/Macedonia
Maj	D. R. Burns	Gulf War 1991
Maj	J. F. Crompton	Gulf War 1991
Maj	P. M. Davies	Gulf War 1991
Maj	W. D. Fawkner-Corbett	Gulf War 1991

Capt	C. S. Goddard	Gulf War 1991
Maj	G. B. Grossmith	Gulf War 1991
Maj	J. M. Heron	Gulf War 1991
Maj	R. F. Ingram	Gulf War 1991
WO1	J. S. Manning	Gulf War 1991
Maj	R. A. M. S. Melvin	Gulf War 1991
Maj	M. Perry	Gulf War 1991
Sgt	R. Anderson	Former Republic of Yugoslavia
Cpl	H. McC. Clark	Former Republic of Yugoslavia
Capt	A. J. Coltart	Former Republic of Yugoslavia
Maj	R. R. Davies	Former Republic of Yugoslavia
Maj	P. Gill	Former Republic of Yugoslavia
WO1	K. J. Grantham, QGM	Former Republic of Yugoslavia
SSgt	G. Grieveson	Former Republic of Yugoslavia
A/Maj	J. M. Grimshaw	Former Republic of Yugoslavia
Cpl	D. Hartley	Former Republic of Yugoslavia
A/Capt	D. McKeown	Former Republic of Yugoslavia
Capt	I. Sinclair	Former Republic of Yugoslavia
Cpl	J. S. Till	Former Republic of Yugoslavia
Sgt	N. E. Tully	Former Republic of Yugoslavia
Capt	R. M. Wilson, BEM	Former Republic of Yugoslavia
Lt	S. J. Lake	Cambodia
Maj	P. S. Adams	
WO1	M. Adams	
WO2	J. N. Adlington	
Maj	J. M. Allen	
Maj	D. S. Armitage	
WO2	C. L. Aston	
Maj	W. A. Bailey	
Maj	J. G. Baker	
Capt	A. J. Banks	
WO2 (V)	J. H. Barber	
Maj	J. F. Batty	
Sgt	A. R. Beard	
Maj	M. G. Beazley	
Maj	A. D. Bellinghall	
Maj	M. W. B. Best	
Maj (QGO)	Bhimbahadur Gurung, QGE	
Lt Col	I. J. Blanks	
LCpl	C. Blezard	
Maj	P. H. Blundell	
Maj	D. C. Bowen	
Maj	E. A. Boyd	

Cpl	K. V. Bradbury
Capt	J. C. Brannan
Capt	T. E. Broughton
Maj (V)	F. D. Burgoyne
Maj	S. A. Burley
Capt	R. N. Butcher
WO2	T. Byrne
WO2	A. C. Canessa
Maj	J. W. Castle
Maj	S. Cheetham
WO1	D. Clegg
Cpl	R. O. Clydesdale
WO2	M. I. Collarbone
Lt Col	M. D. Cooper
Maj	C. F. Cooper, Bt
Maj	R. G. Covell
Maj	C. W. Crawford
WO2	A. E. Curran
WO2	R. Davies
Capt (V)	V. C. L. Davies
WO2	P. J. Denham
Maj	J. E. Deverill
WO2	J. M. J. Devine
Maj	G. C. W. Dodds
Capt	G. Donald
Capt	W. R. Donald
Maj	J. R. Donovan
Maj	A. H. Douglass
Maj	R. A. Dudin
Maj	E. Erskine
Cpl	E. A. Espley
Capt	G. Ferguson
Capt	J. A. Field
Maj	L. T. Flower
Maj	D. B. Folwell
Maj	S. C. Freeland
Capt	W. H. Freeman
Maj	J. B. Frost
Cpl	C. A. Gardiner
SSgt	B. D. Gates
Capt	J. P. Geany
Maj	B. F. Gerhard
Lt Col	R. D. Gibson

Cpl	M. S. Gill
Cpl	A. W. Girvan
Cpl	E. W. Golaub
Maj (V)	A. P. Golland
Capt	C. M. P. Gosling
Maj (V)	G. W. Gray
Capt	R. S. F. Greene
Capt (QGO)	J. Gurung, QGE
Lt Col	D. N. Hamilton
Maj	J. R. Harrison
Cpl	C. A. Harvey
Maj	R. C. Hendicott
WO1	A. Hewson
Capt	P. A. Heyes
WO2	A. Hill
Cpl	R. F. Hirst
Capt	G. W. Hobbs
Maj (V)	G. W. Hodgson
Maj	P. Hollerhead
Maj	D. M. Holloway
A/WO2	K. Houghton
WO2	D. J. Howard
Cpl	D. Huddart
Maj	C. D. S. Ince
Maj	F. Inman
Maj	R. Jackson
SSgt	C. L. Jackson
Capt	K. M. Jeffery
Maj	M. R. Jones
WO2	D. J. Kells
WO1	G. J. Kelly
Lt Col	H. F. M. Killip
SSgt	Krishnadhoj Sahi, QGE
Maj	M. A. Launder
Maj	B. J. Le Grys
WO1	T. Leversuch
Maj	P. Lilleyman
Lt Col	M. H. Lipscomb
Capt	B. Lloyd
Capt	L. A. Lloyd
Cpl	R. Lovegrove
Maj	G. S. Lucas
Maj	R. Macdonald

Maj	R. C. A. MacGregor
WO2	J. Mackinnon
Lt Col	D. A. MacLean
Maj	J. R. Manley
Spr	C. J. Mann
A/Maj	R. Maxwell
WO1	P. Middlehurst
Maj (QGO)	Milanchandra Gurung, QGE
WO2	E. W. Miles
WO2 (V)	R. Milestone
WO2	M. C. Mogford
Maj	N. C. Moody
Maj	W. M. G. Morris
Maj	J. G. Mullin
Capt	M. R. Neville
Maj	R. A. Newns
Capt	R. A. Nicholls
Cpl	D. A. O'Connor
SSgt	T. F. O'Grady
Maj	J. P. J. O'Sullivan
Maj (V)	C. W. Pagan
Maj	P. B. Page
Maj (V)	A. S. Parker
Maj	J. E. Passmore
Maj	J. R. Pawson
Lt Col	C. McF. Peebles
Maj	J. F. Pelton
Capt (V)	R. L. S. Philpot
Maj	S. Pickles
Lt Col	R. Plenderleith
Maj (V)	R. J. Pope
Lt Col	A. C. Pope
WO1	D. A. Preece
Capt	J. Prestwood
Maj	D. E. Pryce
Maj	L. T. Quinn
WO2	R. Reuby
Maj (V)	C. S. Rigby
Maj (V)	D. C. Rodger
Maj	P. E. Rogers
A/Maj	D. Ronksley
Maj	W. M. Rush
Maj (V)	I. K. Russell

SSgt	L. Rutherford
WO2	P. A. Sanderson
Capt	R. Schofield
Maj	W. H. Scott
Capt	R. Senior
Cpl	D. Seymour
Lt Col	J. W. Shanahan
Maj	A. C. Sheppard
Maj	M. J. Smee
WO2	S. Smith
WO2	P. Sowden
WO2	N. G. Spencer
WO1	I. Stobbs
WO1	J. T. Stoddart
Maj	R. C. Swanson
WO2	D. J. Tape
Maj	J. C. M. Taylor
Maj	M. F. Thompson
Maj	G. H. Thorneycroft
Maj	J. A. Thorp
WO2	A. M. Tustin
Maj	T. R. Urch
Maj	T. D. Vaughan
Maj	J. Waddington
Maj	A. J. Wakeman
WO2	C. K. Walker
Maj	P. A. Wallace-Tarry
Maj	J. C. Walmisley
Maj	G. E. Ward
Maj	J. P. Watkinson
Maj	G. C. Watts
Maj	D. M. Webb
Maj	J. A. H. Welch
SSgt	R. G. Weller
Maj	J. F. Wheeley
Maj	C. G. L. Whennell
Maj	M. W. Whitchurch
Maj	J. R. White
Maj	W. F. Whiting
Maj	A. E. Whitley
Maj	G. J. Whitty
Maj	N. C. Wilkins
Lt Col	C. L. Wilks

Maj	N. T. Williams
Maj	N. F. Winder
Maj	F. Windle
Maj	D. Winship
WO2	D. J. G. Wood
SSgt	J. S. Wood
Capt	H. A. Wright
	D. W. R. Wright, MInstRE
WO1	S. M. Wyan
Maj	J. R. Wyatt
Maj	T. W. Wye

DSC

WO2	J. H. Phillips	South Atlantic Campaign
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MC

Capt	P. J. Bassett	Former Republic of Yugoslavia
WO2	C. J. Clark	Former Republic of Yugoslavia

La Croix Militaire de Deuxième Classe

Lt Col	P. G. C. Druitt
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CGM

SSgt	J. Prescott	South Atlantic Campaign
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MM

Cpl	D. E. Denbury, QGM	Gulf War 1991
LCpl	I. M. Dewsnap	Gulf War 1991
Cpl	J. A. Foran	South Atlantic Campaign
Cpl	S. J. Lane	Gulf War 1991
Sgt	R. H. Wrega	South Atlantic Campaign

QGM

Maj	J. A. Craib	
Capt	A. J. Crawford	
SSgt	N. H. Daly	
Cpl	D. E. Denbury	Gulf War 1991
Cpl	G. A. Fisher	
Capt	C. S. Goddard	
WO1	K. J. Grantham	
Maj	R. G. R. Hall	
WO2	T. R. Lee	
Capt	M. J. Lobb	
LCpl	K. Porter	

Capt	P. Shields	
LCpl	J. P. Wright	
Cpl	N. K. Pettit	Former Republic of Yugoslavia
Sgt	R. R. Pickford	Former Republic of Yugoslavia
Spr	T. G. C. Palmer	Northern Ireland
WO2	M. A. Christy	Northern Ireland
A/Sgt	P. Cleaver	Northern Ireland
SSgt	P. G. B. Ellis, QGM	Northern Ireland
SSgt	G. R. Turner	Northern Ireland
LCpl	R. C. Acott	Northern Ireland

RVM

Gaya Prasad Pradham

BEM

SSgt	E. G. Bradbury	South Atlantic Campaign
Sgt	R. J. Brown	South Atlantic Campaign
SSgt	E. D. Dent	South Atlantic Campaign
Mr	R. Ford	South Atlantic Campaign
Cpl	N. J. Hall	South Atlantic Campaign
Sgt	D. R. Pasfield	South Atlantic Campaign
SSgt	P. Rayner	South Atlantic Campaign
Sgt	A. Worthington	South Atlantic Campaign
SSgt	J. L. Barry	Northern Ireland
Sgt	M. R. Bassett	Northern Ireland
SSgt	M. A. Christy	Northern Ireland
Sgt	P. A. Clark	Northern Ireland
Sgt	W. J. Downs	Northern Ireland
SSgt	R. S. McCance	Northern Ireland
SSgt	W. Miles	Northern Ireland
Sgt	C. L. Rhodes	Northern Ireland
SSgt	S. P. Simonini	Northern Ireland
Sgt	G. J. D. Strettle	Northern Ireland
Sgt	I. R. D. Strettle	Northern Ireland
SSgt	E. H. Tomiczek	Northern Ireland
Sgt	T. W. Wood	Northern Ireland
Sgt	C. C. Abraham	Gulf War 1991
Sgt	A. J. Cork	Gulf War 1991
Sgt	R. C. Dicken	Gulf War 1991
LCpl	C. H. McLuckie	Gulf War 1991
SSgt	T. Parker	Gulf War 1991
SSgt	E. A. Ratcliffe	Gulf War 1991
LCpl	D. G. Sayers	Gulf War 1991

SSgt	C. R. Stables	Gulf War 1991
Sgt	N. Stapleton	Gulf War 1991
SSgt	K. Tindale	Gulf War 1991
Sgt	G. L. Venables	Gulf War 1991
Sgt	P. Willey	Gulf War 1991
Sgt	R. J. C. Williams	Gulf War 1991
Sgt	S. E. Wright	Gulf War 1991
Cpl	R. G. Adams	
Sgt	J. A. Allerhead	
SSgt	I. D. Arbuckle	
SSgt	K. C. Augustus	
A/SSgt	R. Axten	
SSgt	A. J. Baily	
WO2	J. A. Baldock	
Sgt	P. P. Barman	
Sgt	D. T. Bayliss	
Sgt	A. Behenna	
SSgt	R. Bell	
SSgt	R. Bint	
Sgt	C. J. Bleasdale	
Cpl	D. K. Blyth	
SSgt	C. G. Boocock	
Sgt	D. Bowden	
SSgt	J. H. Brooks	
Cpl	T. J. R. Brothers	
Sgt	R. M. Brown	
Sgt	S. M. Bruen	
SSgt	A. C. Bryant	
SSgt	T. A. Bufton	
WO2	N. J. Burke	
Cpl	B. Burns	
Sgt	G. W. Burroughs	
SSgt	A. G. Buxton	
Cpl	E. Byrne	
Cpl	S. F. Cameron	
Cpl (V)	A. V. Carson	
WO2	R. A. Clarkson	
Cpl	G. J. Clough	
SSgt	S. J. Cole	
Cpl	M. G. Coles	
Cpl	M. A. Collins	
SSgt	L. Cook	
Sgt	G. D. Cowie	

SSgt	C. A. Cunningham
SSgt	A. M. Davie
Sgt	K. N. Davies
Sgt	S. R. Davies
Cpl	P. Dawson
SSgt	L. C. Dean
SSgt	M. J. Dent
Sgt	M. F. Dixon
SSgt	R. J. Dorey
SSgt	I. W. Douglas
SSgt	A. C. S. Douglas
SSgt	M. R. England
Cpl	P. D. Faithfull
SSgt	R. N. K. Falconar
Sgt	M. A. Falconer
SSgt	D. K. L. Felton
Sgt	G. Ferguson
SSgt	K. M. Gale
SSgt	G. J. Geary
SSgt	G. A. Gleeson
Cpl	P. A. Glover
Cpl	B. F. Gorman
SSgt	J. W. Gray
Sgt	F. J. Hair
Sgt	E. Hanratty
Cpl	Haribahadur Rai, QGE
SSgt	M. W. Harrison
SSgt	Heaton
SSgt	D. S. Henney
WO2	R. J. Hickton
SSgt	T. Higgs
Cpl (V)	J. D. Horgan
SSgt	G. A. P. Hughes
LCpl	R. A. Jones
WO2	W. S. F. Kennedy
SSgt	Kulbahadur Tamang, QGE
Cpl	D. Laidler
SSgt	A. D. Laing
SSgt	L. Lomas
Sgt	G. A. Marshland
Cpl	P. J. Martin
Sgt	D. A. McCurdy
SSgt	E. McEleny

SSgt	I. McKay
Sgt	J. M. McN Bisset
SSgt	D. McQuade
Sgt	M. A. McQuoid
Sgt	S. R. Mears
SSgt	P. Middlehurst
Sgt	L. J. Moore
SSgt	J. H. Moregan
SSgt	J. W. Nelson
SSgt	J. Newland
SSgt	Osguthorpe
Sgt	K. J. Parsons
Sgt	C. M. Pascoe
SSgt	M. D. Pears
Sgt	D. R. Pearson
SSgt	R. Penman
Sgt	Prakash Rai, QGE
SSgt	D. Quinn
SSgt	D. K. Rackham
Sgt	P. R. D. Reed
Sgt	C. A. Rennie
Sgt	M. G. Riley
Cpl	G. M. Roberts
SSgt	M. W. Roberts
SSgt	S. J. Roberts
SSgt	S. J. Robertson
Cpl	M. J. Robertson
Sgt	C. J. Robinson
Cpl	C. Roper
SSgt	K. G. Royce
Sgt	W. H. Rudland
SSgt	E. Ryan
SSgt	B. D. Sanders
Sgt	J. O. Sawyer
SSgt	E. S. Scholey
LCpl	Shibraam Gurung
SSgt	D. A. Skelly
Sgt	R. I. Smallwood
Sgt	N. S. C. Smith
Sgt	M. L. C. Smith
A/SSgt	D. J. Spears
SSgt	B. N. Stainthorpe
SSgt	C. W. Staton

SSgt	D. Steadman
Cpl	N. S. Stock
SSgt	A. J. Stockley
LCpl	A. Stoner
SSgt	D. J. Stott
Sgt	P. L. Summerhayes
SSgt	L. J. Taylor
Cpl	B. A. Thorniley
SSgt	P. A. Thorpe
Cpl	C. R. Tomlinson
SSgt	J. J. Turner
SSgt	M. J. Tyler
Sgt	J. E. Van Looy
A/Sgt	P. H. Vowles
SSgt	R. J. Wadsworth
Sgt	S. P. Wagstaff
SSgt	K. D. Walker
Cpl	P. Ward
A/WO2	C. O. Webb
LCpl	H. White
LCpl	S. G. Wilkinson
Sgt	R. M. Wilson
WO2	G. A. Wood
WO2	M. A. Woods

MID

LCpl	R. Gillon	
Sgt	C. G. Hooks	
SSgt	B. Jameson	
Cpl	J. Y. K. Reid	
SSgt	T. Robinson	
SSgt	T. J. Barnard	Former Republic of Yugoslavia
Maj	J. W. Mitchell	Former Republic of Yugoslavia
Cpl	J. B. Winder	Former Republic of Yugoslavia
Sgt	G. P. Adam	Northern Ireland
Cpl	R. J. Adams	Northern Ireland
SSgt	B. G. Andrews	Northern Ireland
Capt	W. A. Bailey	Northern Ireland
Spr	R. W. Billington	Northern Ireland
A/WO2	T. E. Bridges	Northern Ireland
WO2	C. J. Castree	Northern Ireland
SSgt	M. A. Christy	Northern Ireland
Maj	A. S. Craig	Northern Ireland

Cpl	S. P. Crossman	Northern Ireland
Lt Col	F. A. F. Daniell	Northern Ireland
Capt	J. J. D. Day	Northern Ireland
A/Maj	J. Dee	Northern Ireland
Cpl	M. D. Dix	Northern Ireland
SSgt	P. C. Eley	Northern Ireland
SSgt	G. D. Frost	Northern Ireland
SSgt	K. Glancey	Northern Ireland
SSgt	W. A. Hannah	Northern Ireland
Capt	J. F. Harper	Northern Ireland
Maj	D. M. Holloway, MBE	Northern Ireland
Maj	D. Holmes	Northern Ireland
Capt	C. J. Hurran	Northern Ireland
Capt	D. G. Jones	Northern Ireland
Capt	D. A. Joyce	Northern Ireland
WO2	P. S. Kershaw	Northern Ireland
Capt	R. S. Kirk	Northern Ireland
SSgt	D. Knowles	Northern Ireland
Sgt	R. K. Laing	Northern Ireland
Cpl	K. M. Lane	Northern Ireland
Capt	R. A. Leonard	Northern Ireland
Cpl	L. Levick	Northern Ireland
Maj	P. Lilleyman	Northern Ireland
Sgt	R. G. W. Lindsay	Northern Ireland
Maj	D. J. Martin	Northern Ireland
Maj	A. E. Montgomery	Northern Ireland
Cpl	S. Morris	Northern Ireland
Maj	J. N. R. Moss	Northern Ireland
Cpl	R. M. Phillips	Northern Ireland
Maj	J. A. Pinel	Northern Ireland
Spr	S. G. Rafferty	Northern Ireland
Maj	J. E. Snape	Northern Ireland
SSgt	N. K. Solomon	Northern Ireland
Sgt	K. J. Staples	Northern Ireland
Capt	N. Sutherland	Northern Ireland
A/Capt	R. Symons	Northern Ireland
Cpl	K. Thompson	Northern Ireland
Maj	G. E. Ward	Northern Ireland
Capt	J. F. Wheeley	Northern Ireland
Sgt	M. Worstenholme	Northern Ireland
Sgt	A. A. Young	Northern Ireland
Spr	G. Coxon	Gulf War 1991
SSgt	S. B. Crowfoot	Gulf War 1991

Lt Col	A. R. E. Hutchinson	Gulf War 1991
Sgt	F. A. Nelson	Gulf War 1991
Maj	C. M. Sexton	Gulf War 1991
Maj	R. S. Small	Gulf War 1991
WO2	C. G. Teeling	Gulf War 1991
SSgt	T. Collins	South Atlantic Campaign
Cpl	D. Ford	South Atlantic Campaign
LCpl	R. Gillon	South Atlantic Campaign
Maj	R. B. Hawken	South Atlantic Campaign
Lt	R. C. Hendicott	South Atlantic Campaign
Cpl	S. D. Iles	South Atlantic Campaign
Lt	C. R. Livingstone	South Atlantic Campaign
Maj	R. Macdonald	South Atlantic Campaign
LCpl	J. D. Maher	South Atlantic Campaign
LCpl	B. J. Randall	South Atlantic Campaign
Sgt	I. Roy	South Atlantic Campaign
LCpl	W. A. Skinner	South Atlantic Campaign

Queen's Commendation for Bravery/Brave Conduct

Capt	G. B. Jones	
SSgt	R. E. Elms	
SSgt	M. Cayliss	
SSgt	J. R. Evans	
SSgt	A. G. Liddicoat	
Spr	Tekbahadur Tamang, QGE	
Cpl	C. J. Winter	
Cpl	M. E. Kieras	Africa
Cpl	P. P. McCarten	Africa
LCpl	D. J. Glyde	Former Republic of Yugoslavia
Cpl	L. S. King	Former Republic of Yugoslavia
Cpl	K. H. Prescott	Former Republic of Yugoslavia
Sgt	A. J. Seccombe	Former Republic of Yugoslavia
Spr	J. Hosking	Northern Ireland
Sgt	M. A. Langley	Northern Ireland
SSgt	K. M. Otter	Northern Ireland
Spr	I. J. Smith	Northern Ireland
WO1	R. Brown	Rwanda

MB (Canadian Medal of Bravery)

WO2	S. Carr
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Queen's Commendation for Valuable Service

Col	T. P. Grimshaw
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SSgt	M. J. Hall	
Cpl	D. J. Nelson	
Maj	A. G. L. P. Troulan	
Capt	M. P. Walton-Knight	
Maj	W. D. Whitting	
WO2	R. Harrison	Angola
Maj	C. J. Rose	Angola
Sgt	R. M. Barclay	Former Republic of Yugoslavia
Cpl	A. P. Beeton	Former Republic of Yugoslavia
SSgt	D. G. N. Best	Former Republic of Yugoslavia
Maj	C. J. Boag	Former Republic of Yugoslavia
Maj	R. H. Brown	Former Republic of Yugoslavia
Sgt	S. M. Coshall	Former Republic of Yugoslavia
Maj	R. J. Cripwell	Former Republic of Yugoslavia
Capt	R. R. Davies, MBE	Former Republic of Yugoslavia
Maj	J. E. Deverill	Former Republic of Yugoslavia
Maj	G. C. W. Dodds, MBE	Former Republic of Yugoslavia
SSgt	S. Ferguson	Former Republic of Yugoslavia
SSgt	R. W. Fyvie	Former Republic of Yugoslavia
WO2	R. S. Gagan	Former Republic of Yugoslavia
Capt	P. T. Green	Former Republic of Yugoslavia
Lt Col	R. C. Hendicott, MBE	Former Republic of Yugoslavia
Lt	C. Holt	Former Republic of Yugoslavia
Cpl	D. C. Jones	Former Republic of Yugoslavia
Capt	C. Jones	Former Republic of Yugoslavia
Spr	C. J. Mann	Former Republic of Yugoslavia
Col	M. F. N. Mans	Former Republic of Yugoslavia
Cpl	D. McBain	Former Republic of Yugoslavia
Capt	K. I. McCambridge	Former Republic of Yugoslavia
Brig	I. D. T. McGill, CBE	Former Republic of Yugoslavia
WO2	D. A. McGinnis	Former Republic of Yugoslavia
Lt Col	G. A. Nield	Former Republic of Yugoslavia
Maj	P. A. Pendlebury	Former Republic of Yugoslavia
Cpl	P. A. Rendell	Former Republic of Yugoslavia
Col	N. H. Rollo	Former Republic of Yugoslavia
Lt Col	N. H. Rollo	Former Republic of Yugoslavia
WO2	T. P. Scott	Former Republic of Yugoslavia
Spr	A. A. Taylor	Former Republic of Yugoslavia
Lt Col	J. W. R. Thorn	Former Republic of Yugoslavia
Col	P. A. Wall, OBE	Former Republic of Yugoslavia
Capt	R. J. Walton-Knight	Former Republic of Yugoslavia
Maj	C. C. Benfield	Kosovo/Macedonia
Maj	P. J. Fuller	Kosovo/Macedonia

Lt Col	J. G. Mullin, MBE	Kosovo/Macedonia
Maj	A. D. Norris	Kosovo/Macedonia
Maj	S. P. Simonini, BEM	Kosovo/Macedonia
Maj	C. N. R. Skeat	Kosovo/Macedonia
Maj	D. Wilson	Kosovo/Macedonia
Cpl	P. M. Beardall	Northern Ireland
Capt	J. Burke	Northern Ireland
WO2	M. D. Costen	Northern Ireland
SSgt	R. Crook	Northern Ireland
Sgt	G. F. Cusack	Northern Ireland
LCpl	B. M. Dunsmore	Northern Ireland
Cpl	D. A. E. Guildford	Northern Ireland
Lt Col	S. P. Hodder	Northern Ireland
Sgt	M. A. Jenkins	Northern Ireland
Capt	D. K. Johnson	Northern Ireland
Spr	M. L. Kingshott	Northern Ireland
SSgt	M. A. Langley	Northern Ireland
Cpl	M. Loughrey	Northern Ireland
Capt	W. H. K. Mainwaring	Northern Ireland
Cpl	M. Mitchell	Northern Ireland
Capt	A. D. Norris	Northern Ireland
Cpl	D. J. Palmer	Northern Ireland
Cpl	C. M. Preece	Northern Ireland
Maj	L. T. Quinn	Northern Ireland
Capt	N. J. Sealy-Thompson	Northern Ireland
Cpl	P. J. Walthew	Northern Ireland
Cpl	S. E. Watton	Northern Ireland
SSgt	S. R. Webster	Northern Ireland
LCpl	D. M. Williams	Northern Ireland
Cpl	S. J. Willis	Northern Ireland
Capt	M. H. W. Workman	Northern Ireland
Lt	P. V. Fountaine	Rwanda

C-in-C Fleet's Commendation

WO2	T. R. Andrews	South Atlantic Campaign
LCpl	K. A. Durose	South Atlantic Campaign
SSgt	D. A. Hornby	South Atlantic Campaign
Lt	P. M. Naylor	South Atlantic Campaign
Spr	S. P. Robinson	South Atlantic Campaign

GOC's Commendation

2Lt(V)	A. A. Harding	
LCpl	B. W. Dobson	HQ Land Command

WO2	P. Fisher	HQ Land Command
SSgt	J. K. Barraclough	Northern Ireland
Lt	S. J. Broadhurst	Northern Ireland
Cpl	N. K. Deppe	Northern Ireland
Cpl	A. R. Duroe	Northern Ireland
LCpl	E. T. Frazer	Northern Ireland
Spr	C. J. Galtrey	Northern Ireland
LCpl	S. E. Gresty	Northern Ireland
Sgt	D. J. Harwood	Northern Ireland
Cpl	K. R. MacKenzie	Northern Ireland
Spr	S. Parker	Northern Ireland
Cpl	M. A. Pengelly	Northern Ireland
Cpl	C. M. Preece	Northern Ireland
LCpl	A. J. Wells	Northern Ireland
Spr	D. J. Williams	Northern Ireland

C-in-C's Commendation

Capt	R. I. Green	Former Republic of Yugoslavia
Spr	P. Lloyd	Former Republic of Yugoslavia
LCpl	P. A. Rendell	Former Republic of Yugoslavia

Air Officer Commander-in-Chief's Commendation

Capt(V)	K. J. Collins
Capt(V)	A. J. Hall
Capt	M. S. Herrington

Joint Commanders' Commendation

Lt	N. D. Witcombe	Central America
Maj	S. J. Ruxton	Falkland Islands
Spr	M. N. Davey	Former Republic of Yugoslavia
SSgt	A. R. Davies	Former Republic of Yugoslavia
Spr	C. B. Ellmer	Former Republic of Yugoslavia
Cpl	R. W. Garland	Former Republic of Yugoslavia
WO2	P. A. Granville	Former Republic of Yugoslavia
Maj	G. R. W. MacGinnis	Former Republic of Yugoslavia
Lt	A. D. Norris	Former Republic of Yugoslavia
Maj	N. A. Page	Former Republic of Yugoslavia
Cpl	M. Penna	Former Republic of Yugoslavia
Capt	G. V. Baker	Kosovo/Macedonia
Cpl	D. Balloch	Kosovo/Macedonia
Capt	I. J. Church	Kosovo/Macedonia
SSgt	A. M. Jones	Kosovo/Macedonia
Cpl	C. Newbrook	Kosovo/Macedonia

SSgt	P. A. Sullivan	Kosovo/Macedonia
Maj	C. L. Tickell	Kosovo/Macedonia
Spr	R. W. Copsey	Bosnia and Rwanda
Sgt	A. Davies	Bosnia and Rwanda
Capt	W. A. Forbes	Bosnia and Rwanda
Sgt	S. Lapsley	Bosnia and Rwanda
Lt	R. N. Smith	Bosnia and Rwanda
Capt	R. C. Thompson	Bosnia and Rwanda
Spr	K. J. Whitehead	Bosnia and Rwanda
Capt	K. Ball	Kosovo
Maj	M. D. Berrill	Kosovo
WO2	D. I. Forrest	Kosovo
Maj	M. S. Handscomb	Kosovo
SSgt	D. P. Hudson	Kosovo
Maj	M. A. Ropel	Kosovo
Maj	M. A. Sullivan	Kosovo
Maj	A. P. Taylor	Kosovo
Maj	N. T. Williams	Kosovo
Spr	M. Cuerden	Operation <i>Puladine</i>
LCpl	D. Abel	Bosnia
Cpl	C. J. Button	Bosnia
Capt	S. W. Davies	Bosnia
Maj	M. J. Levett-Scrivener	Bosnia
Spr	W. C. Connor	Bosnia
Maj	P. J. M. Godsall-Stanton	Bosnia
Cpl	C. S. Parnell	Bosnia
Cpl	A. Steele	Bosnia
SSgt	S. D. Booth	Gulf War 1991

C B F Belize's Commendation

Lt	P. D. Cook
SSgt	D. Watret
Spr	J. B. Winder

Commendation for Bravery

WO2	P. D. Gibney
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Annex C

Principal Royal Engineer Appointments

Chief Royal Engineers

1982	Gen Sir Hugh Beach, GBE, KCB, MC
1987	Gen Sir George Cooper, GCB, MC
1993	Gen Sir John Stibbon, KCB, OBE
1999	Lt Gen Sir Scott Grant, KCB

Engineer in Chief

1980	Maj Gen G. B. Sinclair, CB, CBE
1983	Maj Gen M. Matthews, CB
1985	Maj Gen C. J. Rougier, CB
1988	Maj Gen R. L. Peck, CB
1991	Maj Gen J. A. J. P. Barr, CB, CBE
1993	Maj Gen G. W. Field, CB, OBE
1994	Maj Gen K. J. Drewienkiewicz
1995	Brig I. D. T. McGill, ADC
1998	Brig A. E. Whitley, CBE, ADC

Deputy Engineer in Chief

1979	Brig R. A. Blomfield, ADC
1984	Brig C. W. Woodburn
1986	Brig F. G. Bevan
1988	Brig M. J. F. Stephens
1990	Brig E. H. Barker, CBE

Director Military Survey (Director General in 1988, Director 1995)

1980	Maj Gen E. W. Barton, CB, MBE
1984	Maj Gen C. N. Thompson
1987	Maj Gen P. F. Fagan, MBE
1990	Maj Gen R. Wood
1993	Maj Gen M. P. B. G. Wilson
1995	Brig A. J. Hoon
1996	Brig P. R. Wildman, OBE

Chief Executive Defence Geographic and Imagery Intelligence Agency

2000 Brig AP Walker, OBE

Director Engineer Services

1980 Brig N. R. Sturt
1982 Brig F. G. Barton
1986 Brig J. N. S. Drake
1989 Brig N. H. Thompson, CBE, ADC

Director Engineer Support

1991 Brig R. A. Bradbury
1994 Brig C. C. Galloway
1997 Brig K. H. Cima

Director Army Postal and Courier Services

(Director Defence Postal and Courier Services from 1987)

1980 Brig D. J. London, OBE
1983 Brig R. N. R. P. James, CBE
1986 Brig D. L. S. Streatfield
1986 Brig R. J. N. Kelly
1991 Brig M. A. Browne

Commandant RSME

1979 Brig A. C. D. Lloyd
1981 Brig G. B. Fawcus
1983 Brig J. A. J. P. Barr
1985 Brig D. A. Grove, OBE
1987 Brig J. M. Lucken
1989 Brig A. D. Pigott, OBE
1992 Brig P. J. Russell-Jones, OBE
1994 Brig R. Pridham, OBE
1997 Brig D. R. Burns, OBE
2000 Brig C. M. Sexton

Colonel RSME (Chatham)

(Commander Construction Engineer School from 1997)

1993 Col J. B. Bennett
1995 Col R. Watt
1999 Col I. M. Tait

Commandant Postal and Courier Depot

1979 Col R. N. R. P. James, CBE

1983	Col D. L. Streatfield
1986	Col P. Westcott
1989	Col M. A. Browne
1991	Col B. Linden

Officer IC RE Manning and Records Office

1978	Col G. W. A. Napier
1981	Col P. E. Morrison, MBE
1986	Col R. M. R. Luxton
1988	Col A. J. Sandiford
1991	Col W. J. R. Hughes

Assistant Adjutant General AG7 (Colonel PB7 in 1985)

1978	Col K. J. Marchant
1982	Col J. K. Chater
1984	Col G. W. A. Napier
1985	Col E. H. Barker, CBE
1986	Col J. N. H. Lacey, OBE
1990	Col P. J. Williams
1993	Col P. S. Adams, MBE

**Officer IC Combined PB7/RE Manning and Records
(Col RE Manning and Career Management Division from 1997)**

1995	Col P. A. J. Sheridan
1997	Col A. A. Peebles

Col TA/Civil Affairs HQ EinC (A)

1996	Col R. J. Griffiths, MBE
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**Commander 42 Survey Engineer Group (Director Geographic
Field Support / Commander 42 Survey Engineer Group 1995)**

1985	Col R. Wood
1987	Col M P. B. G. Wilson
1990	Col A. J. Hoon
1993	Col A. P. Walker, OBE
1997	Col C. G. Dorman
2000	Col R. N. Rigby

Commander Geographic Engineer Group

2000	Col R.N. Rigby
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Colonel (W) GS (OR) 7 (Col (W) OR 13 Engr/NBC in 1984, LSOR5 in 1985, DDOR (Engr & NBC) in 1995 Col ES21 from 1987)

1979	Col A. Whitehorn
1982	Col F. M. K. Tuck
1985	Col G. B. L. Campbell
1988	Col J. H. McKeown, CBE
1990	Col R. A. Bradbury
1991	Col P. B. Page, MBE
1993	Col A. A. Wilson, OBE
1995	Col A. R. R. McAslan
1995	Col J. D. C. Anderson
1997	Col G. W. Dawson

Project Manager General Engineer Equipment (Procurement Executive) (Colonel ES 42 1997)

1979	Col P. M. Blagden
1983	Col N. A. L. Curtis
1985	Col P. R. Ievers
1988	Col C. P. R. Bates
1992	Col T. H. E. Foulkes

Project Manager Weapons 4 (Procurement Executive) (Project Manager Mines and Demolitions in 1992)

1977	Col H. A. Roland-Price
1982	Col D. W. Williams, OBE
1984	Col M. W. Stott
1987	Col R. A. Bradbury
1990	Col A. A. Wilson, OBE
1993	Col K. H. Cima

Regimental Colonel

1979	Col J. B. Wilks
1982	Col N. M. White
1984	Col W. T. Dennison, OBE
1987	Col B. J. Sanderson, OBE
1988	Col M. R. Cooper
1992	Col C. P. R. Bates
1995	Col R. J. Sandy
1997	Col I. M. Tait
1998	Lt Col C. J. Rose
1999	Col M. H. H. Brooke, OBE

Commander Military Works Force

1979	Col J. N. S. Drake
1982	Col R. Jukes-Hughes, MBE
1984	Col D. A. Johnson
1987	Col H. E. Vialou Clark
1989	Col J. B. Bennett
1993	Col M. W. Foster
1996	Col M. D. Reynolds
2000	Col A. P. Carruth, TD

Commander Military Works Force (Volunteers)

1994	Col G. R. Marsh, TD
1998	Col W. R. Barker, TD

Commander Engineer Resources (Colonel Engineer Resources 1997)

1977	Col P. E. Morrison
1981	Col G. J. Olley, MBE
1984	Col J. R. M. Hill, OBE
1985	Col W. M. Crawshaw, OBE
1988	Col J. F. Johnson, OBE
1992	Col D. P. Stephenson, OBE
1995	Col T. J. Ludlam, OBE

Commandant Army Apprentices College Chepstow

1980	Col W. M. R. Addison
1983	Col A. E. N. Black, OBE
1986	Col A. E. Houlton
1988	Col A. G. R. Holman, OBE
1992	Col C. W. Haskell

Commander 29 (Corps Support) Brigade

1997	Col R. J. Griffiths, MBE
1998	Col J. M. Heron, MBE

Engineer in Chief's TA Adviser

1987	Col A. F. George, TD
1991	Col C. W. Pagan TD, MBE
1994	Col R. S. Eyre TD, ADC
1997	Col C. A. Gardiner, TD

Chief Engineers, Brigade and Group Commanders

**Chief Engineer BAOR (Chief Engineer BAOR from 1981;
Command Engineer HQ BAOR from 1984)**

1979	Maj Gen J. P. Groom, CBE
1982	Maj Gen C. R. Grey, CBE
1984	Brig T. S. Sneyd
1987	Brig M. J. F. Stephens
1988	Brig W. I. C. Dobbie

Commander Corps Royal Engineers

(Commander Engineers 1 British Corps, 1982)

1980	Brig F. G. Bevan
1982	Brig N. H. Thompson
1984	Brig F. G. Sudgen, OBE
1986	Brig P. J. Sheppard, OBE
1988	Brig T. R. Wright
1990	Brig K. O'Donoghue

Chief Engineer ACE Rapid Reaction Corps

1992	Brig A. R. E. Hutchinson
1994	Brig J. D. Moore-Bick, OBE
1996	Brig A. E. Whitley, CBE
1998	Brig J. P. Hoskinson, OBE
2000	Brig R. A. M. S. Melvin, OBE

Chief Engineer United Kingdom Land Forces

(Commander Engineer Support and Commander Engineers
UKLF Commander Engineer Land)

1979	Brig R. A. S. Rickets
1981	Brig H. F. Everard
1983	Brig D. H. Bowen
1984	Brig J. B. Wilks, CBE
1986	Brig E. H. Barker, CBE
1989	Brig P. M. Hill, OBE
1992	Brig I. D. T. McGill
1995	Brig A. S. Craig, OBE
1997	Brig D. R. Bill

Colonel Engineer Services G4 MES HQ LAND

1997	Col A. R. M. Wilson
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Commander 11 Engineer Brigade/Group

1980	Brig C. W. Beckett
1983	Brig A. N. Carlier, OBE
1985	Brig G. W. Field, OBE
1987	Brig G. B. L. Campbell
1989	Brig K. J. Drewienkiewicz
1991	Brig R. Macdonald, MBE

Col RSME (Minley) (Commander Combat Engineer School 1997)

1992	Col A. T. Brett
1994	Col R. A. Hyde-Bales
1996	Col N. A. Sutherland, OBE
1999	Col M. H. G. Croft

Commander 12 Engineer Brigade

1982	Brig D. H. Bowen, OBE
1983	Brig A. J. V. Kendall
1985	Brig J. S. Symons
1988	Brig H. H. Kerr, OBE
1991	Brig S. R. Gilbert
1997	Col W. A. Bailey, MBE

Commander 29 Engineer Brigade (V)

1979	Brig F. G. Barton, CBE
1982	Brig J. R. M. Grear, OBE
1984	Brig T. R. M. Pulverman
1986	Brig D. Brownson, CBE
1988	Brig B. J. Sanderson, OBE
1991	Brig W. E. Shackell, CBE

Commander 30 Engineer Brigade (V)

1980	Brig E. G. Willmott
1984	Brig N. M. White
1987	Brig G. A. Hewish, MBE
1990	Brig J. N. H. Lacey, OBE
1993	Brig C. C. Galloway

Formation Commanders Royal Engineers**Divisional CRE (Commander Engineers from 1982)**

1ST ARMoured DIVISION	
1978	Col R. A. Pinder

- 1981 Col G. W. A. Napier
- 1983 Col F. G. E. Grainger
- 1986 Col M. R. Cooper
- 1988 Col A. J. Reed Screen, OBE
- 1991 Col J. D. C. Anderson

1ST (UK) ARMoured DIVISION

- 1992 Col J. D. C. Anderson
- 1994 Col A. C. Mantell, OBE
- 1998 Col G. B. Grossmith, MBE

2ND ARMoured DIVISION

- 1979 Col J. H. Edwards

3RD ARMoured DIVISION

- 1980 Col N. M. White
- 1983 Col D. Brownson, CBE
- 1985 Col M. J. Payne
- 1987 Col R. I. Reive, OBE
- 1989 Col. M. A. Evans

3RD (UK) DIVISION

- 1992 Col R. Pridham
- 1994 Col J. S. Field, CBE
- 1997 Col R. C. Hendicott, MBE
- 2000 Col I. M. Caws

4TH ARMoured DIVISION

- 1980 Col J. S. Symons, OBE
- 1981 Col J. E. Kitching
- 1983 Col R. M. R. Luxton
- 1986 Col H. H. Kerr, OBE
- 1988 Col C. C. Galloway
- 1990 Col T. J. Ludlam, OBE

CRE NORTHERN IRELAND

- 1980 Lt Col R. M. Stancombe
- 1982 Lt Col F. A. F. Daniell
- 1984 Lt Col J. G. Barber
- 1986 Lt Col D. P. Stephenson
- 1988 Lt Col S. W. Hesketh
- 1990 Lt Col C. W. Crawford, MBE

Commanders Engineer and Transport Staff Corps

(Engineer and Logistic Staff Corps from 1996)

- 1997 Col J. R. Hennessy
- 1997 Col W. Hogbin

Regimental Commanding Officers

DEPOT REGIMENT

- 1978 Lt Col D. H. G. Corsellis
- 1981 Lt Col M. B. Mounde, MBE
- 1983 Lt Col W. J. Chesshyre
- 1986 Lt Col D. R. Humphrey
- 1988 Lt Col A. F. M. Douglas
- 1991 Lt Col W. J. H. Clark
- 1993 Lt Col G. W. Dawson

12 RSME REGIMENT

- 1980 Lt Col M. R. Cooper
- 1983 Lt Col R. K. Fawcus
- 1986 Lt Col P. J. Williams
- 1988 Lt Col P. M. Taylor
- 1990 Lt Col M. S. Norbury
- 1993 Lt Col S. C. Court

1 RSME REGIMENT

- 1995 Lt Col N. J. Edwards
- 1997 Lt Col J. B. Olley
- 2000 Lt Col D. S. Armitage, MBE

JUNIOR LEADERS REGIMENT

- 1978 Lt Col F. T. Fisher
- 1981 Lt Col A. E. Houlton
- 1983 Lt Col J. A. Cooper
- 1986 Lt Col J. M. Wyatt
- 1988 Lt Col G. P. Chilton

1 TRAINING REGIMENT

- 1979 Lt Col S. R. Gilbert
- 1982 Lt Col B. F. Cox
- 1984 Lt Col D. J. Martin
- 1987 Lt Col R. A. Hyde-Bales
- 1989 Lt Col D. R. Summers
- 1992 Lt Col R. C. Hart

3 TRAINING REGIMENT

- 1980 Lt Col R. J. Christie
- 1982 Lt Col P. J. Bambury
- 1985 Lt Col A. J. Reed-Screen
- 1987 Lt Col C. E. E. Sloane
- 1990 Lt Col J. R. Pawson
- 1992 Lt Col I. M. Tait

3 RSME REGIMENT

- 1994 Lt Col G. B. Grossmith
- 1996 Lt Col D. C. Stevens

1999 Lt Col P. J. Francis
APPRENTICE WING RSME (Minley)

1994 Lt Col G. M. McNamara
21 ENGINEER REGIMENT

1979 Lt Col J. A. J. P. Barr
1982 Lt Col G. Hyde
1984 Lt Col T. R. Wright
1986 Lt Col C. L. Elliott, MBE
1988 Lt Col J. D. Moore-Bick
1991 Lt Col J. A. Pinel
1993 Lt Col M. F. N. Mans
1996 Lt Col A. D. Harking
1998 Lt Col G. A. Nield
2000 Lt Col J. M. Ruddy

22 ENGINEER REGIMENT

1980 Lt Col H. H. Kerr, OBE
1983 Lt Col A. F. S. Baines
1985 Lt Col K. J. Drewienkiewicz
1988 Lt Col J. D. C. Anderson
1990 Lt Col A. S. Craig
1992 Lt Col D. R. ff Innes
1994 Lt Col N. H. Rollo
1997 Lt Col J. D. Wootton, MBE
1999 Lt Col C. J. Boag

23 ENGINEER REGIMENT

1982 Lt Col J. M. Lucken
1985 Lt Col J. A. Thorp, MBE
1988 Lt Col P. J. Russell-Jones, OBE
1990 Lt Col D. J. Beaton

25 ENGINEER REGIMENT

1979 Lt Col G. B. L. Campbell
1983 Lt Col A. D. Pigott, OBE
1986 Lt Col K. O'Donoghue
1988 Lt Col A. T. Brett
1990 Lt Col J. P. Hoskinson
1992 Lt Col A. C. Mantell
1994 Lt Col M. G. McAlpine
1996 Lt Colonel I. M. Caws
1998 Lt Col C. R. J. Sloane
2000 Lt Col C. L. Wilks

26 ENGINEER REGIMENT

1982 Lt Col S. C. Grant
1984 Lt Col R. H. Whittington, MBE

1987 Lt Col J. R. Harrison, MBE

1989 Lt Col T. G. Hoddinott

1992 Lt Col A. E. Whitley, MBE

2000 Lt Col J. J. J. Lemay

28 AMPHIBIOUS ENGINEER REGIMENT

1979 Lt Col E. H. Barker, OBE

1982 Lt Col J. J. J. Thompson, MBE

1984 Lt Col J. C. M. Taylor, MBE

1987 Lt Col J. W. F. Sweeting

1989 Lt Col T. H. E. Foulkes

1992 Lt Col S. F. Sherry

28 ENGINEER REGIMENT

1992 Lt Col S. F. Sherry

1995 Lt Col R. A. M. S. Melvin, MBE

1997 Lt Col J. G. Mullin, MBE

1999 Lt Col A. M. Mills

32 ARMoured ENGINEER REGIMENT

1979 Lt Col W. M. Crawshaw

1982 Lt Col J. H. McKeown

1984 Lt Col P. J. Mackie

1986 Lt Col M. A. Evans

1988 Lt Col A. R. E. Hutchinson

1991 Lt Col G. R. C. Munnoch

1992 Lt Col R. D. Richards

1992 Lt Col P. A. Wall

32 ENGINEER REGIMENT

1993 Lt Col P. A. Wall

1996 Lt Col S. P. Hodder

1999 Lt Col B. J. Le Grys, MBE

33 ENGINEER REGIMENT (EOD)

1979 Lt Col R. H. Aylmore

1981 Lt Col A. Howgate

1984 Lt Col C. P. R. Bates

1986 Lt Col A. A. Wilson, OBE

1988 Lt Col M. H. H. Brooke, OBE

1991 Lt Col I. M. Daniell

1994 Lt Col C. M. Sexton

1996 Lt Col P. M. Davies

1998 Lt Col G. K. Gibbs

2000 Lt Col J. W. Shanahan, MBE

35 ENGINEER REGIMENT

1980 Lt Col P. R. Ievers

1982 Lt Col P. J. Sheppard, OBE

- 1984 Lt Col J. D. R. Streeten
- 1987 Lt Col B. R. Isbell
- 1990 Lt Col J. S. Field
- 1993 Lt Col J. R. Durance
- 1995 Lt Col N. M. Fairclough, OBE
- 1997 Lt Col G. C. W. Dodds, MBE
- 1999 Lt Col S. A. Burley MBE

36 ENGINEER REGIMENT

- 1980 Lt Col G. W. Field, OBE
- 1983 Lt Col R. A. Oliver, OBE
- 1985 Lt Col I. D. T. McGill
- 1988 Lt Col R. MacDonald, MBE
- 1990 Lt Col C. N. Guthkelch
- 1993 Lt Col D. R. Burns, MBE
- 1995 Lt Col R. C. Hendicott
- 1998 Lt Col M. P. Carter
- 2000 Lt Col A. C. Sheppard, MBE

37 ENGINEER REGIMENT

- 1982 Lt Col P. R. Ievers
- 1984 Lt Col F. A. F. Daniell

38 ENGINEER REGIMENT

- 1979 Lt Col N. A. L. Curtis
- 1982 Lt Col M. W. Stott
- 1984 Lt Col J. N. H. Lacey, OBE
- 1986 Lt Col C. M. Davies, MBE
- 1988 Lt Col G. MacDonald, MBE
- 1991 Lt Col K. H. Cima
- 1993 Lt Col A. W. H. H. MacLeod
- 1996 Lt Col J. W. R. Thorn
- 1998 Lt Col T. P. Grimshaw
- 2000 Lt Col I. S. James, MBE

39 ENGINEER REGIMENT

- 1979 Lt Col M. J. Payne
 - 1982 Lt Col D. M. Adamson
 - 1985 Lt Col R. A. Bradbury
 - 1987 Lt Col D. M. Gill
 - 1990 Lt Col R. Pridham
 - 1992 Lt Col D. R. Bill
 - 1994 Lt Col M. A. C. Hughes
 - 1997 Lt Col A. D. Macklin
 - 1999 Lt Col C. J. Rose
- 40 ARMY ENGINEER SUPPORT GROUP
- 1982 Lt Col P. H. Macbeth

1984 Lt Col J. F. Johnson, OBE

1987 Lt Col P. B. Page, MBE

1989 Lt Col A R. Waitson

42 SURVEY ENGINEER REGIMENT

1980 Lt Col N. H. Charles

1983 Lt Col J. A. C. Read

42 ENGINEER REGIMENT (GEOGRAPHIC)

2000 Lt Col J. D. Kedar

QUEEN'S GURKHA ENGINEERS

1980 Lt Col P. J. Worthington

1983 Lt Col M. Gaffney

1985 Lt Col P. Cook

1987 Lt Col J. G. Baker

1990 Lt Col C. McF. Peebles

1992 LT COL P. H. BLUNDELL

CENTRAL ENGINEER PARK/CO ENGR PARKS

1980 Lt Col B. M. Iles

1982 Lt Col R. J. B. Williams

1995 Lt Col C. P. Bouwens

1996 Lt Col P. M. Naylor

SCHOOL OF MILITARY SURVEY

1980 Lt Col J. A. N. Croft

1984 Lt Col J. .P Elder

ROYAL MONMOUTHSHIRE ROYAL ENGINEERS (MILITIA)

1980 Lt Col A. F. George, TD

1982 Lt Col R. N. C. Smales

1985 Lt Col J. G. H. Robertson

1987 Lt Col N. F. Mulliner

1990 Lt Col A. S. Tuggey

1994 Lt Col P. J. Gilbert

1995 Lt Col P. Lodge

1999 Lt Col J. W. Sage

2000 Lt Col I. C. Thompson

71 ENGINEER REGIMENT

1979 Lt Col M. T. Whitworth

1982 Lt Col D. A. Scott

1984 Lt Col I. S. Mercer

1986 Lt Col J. C. H. Moorhouse

1989 Lt Col P. Lilleyman

1991 Lt Col S. K. E. Clarke

1994 Lt Col A. A. Peebles

1996 Lt Col D. J. Chisholm

2000 Lt Col R. D. Gibson

2000 Lt Col S. C. Freeland

72 ENGINEER REGIMENT

1979 Lt Col R. T. Homeshaw

1981 Lt Col A. J. Sandiford

1984 Lt Col L. McLeman, TD

1986 Lt Col W. J. R. Hughes

1989 Lt Col M. Masterman, TD

1991 Lt Col P. A. J. Sheridan

1994 Lt Col C. N. Holman

73 ENGINEER REGIMENT

1980 Lt Col C. J. F. Jarvis

1983 Lt Col J. C. G. Cragg

1984 Lt Col R. Eyre, TD

1988 Lt Col C. W. Haskell

1991 Lt Col A. C. Farmer

1993 Lt Col W. A. Bailey

1995 Lt Col J. M. Heron

1998 Lt Col I. D. Wright

2000 Lt Col N. H. W. Fenn

74 ENGINEER REGIMENT

1979 Lt Col B. J. Sanderson

1981 Lt Col W. E. Shackell

1983 Lt Col D. F. Clements

1985 Lt Col J. W. G. Rogers, OBE

1987 Lt Col T. J. Ludlam

1990 Lt Col S. C. Kirkwood

75 ENGINEER REGIMENT

1980 Lt Col A. D. Jolley

1982 Lt Col R. I. Reive, OBE

1985 Lt Col R. B. Hawken

1987 Lt Col E. T. Bootland, TD

1989 Lt Col R. J. Griffiths, MBE

1991 Lt Col S. K. E. Clarke

1994 Lt Col M. H. G. Croft

1996 Lt Col T. J. Greathead

76 ENGINEER REGIMENT

1992 Lt Col M. G. Paterson

1995 Lt Col G. C. Watts, MBE

1998 Lt Col R. D. Gibson

77 ENGINEER REGIMENT

1992 Lt Col M. C. McCabe

1994 Lt Col A. R. Turner, TD

78 ENGINEER REGIMENT

- 1992 Lt Col N. A. Sutherland
- 1994 Lt Col C. A. Gardiner, TD
- 1997 Lt Col G. S. Lane

101 ENGINEER REGIMENT (EOD)(V)

- 1988 Lt Col J. P. Marsh
- 1990 Lt Col D. W. Lewis
- 1993 Lt Col G. J. Whitty, MBE
- 1995 Lt Col R. W. Murfin, TD
- 1998 Lt Col J. M. Gunns, MBE

111 ENGINEER REGIMENT

- 1977 Lt Col J. Moore, TD
- 1981 Lt Col A. A. F. Terry, TD
- 1984 Lt Col J. N. B. Stuart
- 1986 Lt Col R. H. B. Bennett, TD
- 1989 Lt Col C. J. Hall, TD
- 1992 Lt Col S. A. Brown

62 CRE

- 1979 Lt Col J. T. Stokes
- 1982 Lt Col R. J. C. Meston
- 1984 Lt Col W. H. T. Spaight
- 1986 Lt Col P. M. R. Hill, OBE
- 1988 Lt Col W. M. Davidson.
- 1992 Lt Col R. Watt
- 1995 Lt Col A. P. Carruth
- 1997 Lt Col G. Taylor
- 1999 Lt Col J. D. McIlroy

63 CRE

- 1999 Lt Col R. N. Cobbold

64 CRE

- 1978 Lt Col M. J. E. Adams, MBE
- 1981 Lt Col J. W. R. Mizen
- 1987 Lt Col P. C. Hornby
- 1989 Lt Col M. G. leG. Bridges
- 1991 Lt Col N. Munro
- 1993 Lt Col I. D. Edwards
- 1995 Lt Col P. C. Marsh
- 1997 Lt Col J. A. R. Strong
- 2000 Lt Col I. R. A. Wright

CRE RHINE AREA

- 1979 Lt Col H. E. Vialou Clark

CRE AIRFIELDS

- 1979 Lt Col C. P. Allain

- 1982 Lt Col L. J. Kennedy, MBE
 1992 Lt Col A. R. M. Wilson
 1994 Lt Col G. C. Kershaw
 1995 Lt Col R. M. Crosskey
 1998 Lt Col A. P. Burnside
 1 POSTAL AND COURIER REGIMENT
 1980 Lt Col M. A. Browne
 1983 Lt Col D. Swanson
 1987 Lt Col T. Mc G. Brown
 1989 Lt Col P. J. Grimes
 2 POSTAL AND COURIER REGIMENT
 1979 Lt Col P. Westcott
 1983 Lt Col W. F. Butt
 1985 Lt Col M. A. Browne
 1987 Lt Col B. A. McCandlish
 1989 Lt Col F. H. Lea
 3 POSTAL AND COURIER REGIMENT
 1980 Lt Col F. H. Lea
 1983 Lt Col P. Westcott
 1985 Lt Col J. R. Platt
 4 POSTAL AND COURIER REGIMENT
 1979 Lt Col R. J. N. Kelly
 1983 Lt Col F. H. Lea
 1987 Lt Col J. Cash
 1989 Lt Col H. P. Stanley
 512 SPECIALIST TEAM RE
 1977 Lt Col A. E. H. Matthews
 1980 Lt Col R. Wood
 1983 Lt Col A. J. Hoon

RE Officers in Lieutenant Colonel Non-RE Command Appointments

UOTCs

- | | | |
|------------|------------------|--------------|
| April 1978 | J. D. Ransom | (Sheffield) |
| May 1980 | K. A. Hook | (Exeter) |
| July 1981 | A. Cowie | (Birmingham) |
| March 1982 | M. W. H. Day | (Cambridge) |
| Aug 1985 | J. B. Bennett | (London) |
| Jan 1988 | P. S. Adams, MBE | (Cardiff) |
| April 1987 | M. W. M. Warren | (Cambridge) |
| July 1988 | J. A. F. Walpole | (Aberdeen) |

Aug 1989	R. J. Sandy	(Cambridge)
March 1993	A. R. R. McAslan	(Cardiff)
April 1994	I. K. Hamilton (V)	(Edinburgh)
Sept 1995	A. Brown	(London)
March 1998	N. M. Holland	(London)
Aug 1998	S. L. Naile	(Birmingham)
Nov 2000	G. H. L. Baxter	(Oxford)
Sept 2000	C. M. Hainge	(Sheffield)

Other

Dec 1981	C. C. Galloway	Comdt Belize Defence Force
April 1984	A. G. R. Holman	UK Support Unit, SHAPE
March 1985	B. W. Norris	21 SAS (V)
Aug 1985	R. J. D. Reid	7/10 UDR
Dec 1986	R. J. F. Owen	Force Troops Belize
Sept 1986	R. M. R. Hunt	HQ Regt 1 (BR) Corps
Oct 1986	R. A. Hills	UK Support Unit, SHAPE
May 1988	A. M. Mackenzie	Hong Kong Military Service Corps
April 1989	J. A. Ris	UK Support Unit, SHAPE
Aug 1998	R. J. N. Stewart	Apprentice Training Regiment Bassingbourne
Nov 1997	R. G. R. Hall, QGM	Defence Diving School
June 1998	J. W. Mitchell	Army Apprentices College, Arborfield
Nov 2000	A. D. Wilson	Engineer Training Regiment Sierra Leone

Annex D

Officers in Non-Royal-Engineer Senior Appointments

General Officer Appointments

DATE	OFFICER	APPOINTMENT
1980	Gen Sir Hugh Beach, GBE, KCB, MC	MGO
1980	Lt Gen Sir George Cooper, KCB, MC	GOC SEDIST
1980-2	Maj Gen W. N. J. Withall, CB	DAAC
1980-1	Maj Gen J. P. Groom, CBE	CE BAOR
1980-2	Maj Gen C. J. Popham, CB	ACOS(Int)SHAPE
1980-1	Maj Gen M. Matthews	DPS(A)
1981-3	Gen Sir George Cooper, KCB, MC	AG
1982	Maj Gen J. P. Groom, CBE	Head of Study Army Trg Org
1982-4	Maj Gen C. J. Rougier	ACGS (Trg & CD)
1983-4	Maj Gen J. J. Stibbon, OBE	Comdt RMCS
1985-6	Maj Gen J. J. Stibbon, OBE	ACDS OR (LAND)
1985-6	Maj Gen J. A. M. Evans	Comdt RMCS
1986	Maj Gen E. G. Willmott, OBE	President Ordnance Board
1986-7	Maj Gen G. B. Fawcus	Chief JSLO Bonn
1986-8	Maj Gen L. F. H. Busk	DAAC
1987-8	Lt Gen J. J. Stibbon, OBE	MGO
1987-9	Maj Gen E. G. Willmott, OBE	DGW(A) (PE)
1987	Maj Gen A. N. Carlier, OBE	Comd BFFI

DATE	OFFICER	APPOINTMENT
1988-90	Gen Sir John Stibbon, KCB, OBE	MGO
1988-90	Maj Gen G. B. Fawcus	COS & Hd UK Del LIVE OAK
1988-9	Maj Gen A. N. Carlier, OBE	Chief JSLO Bonn
1989	Maj Gen J. A. J. P. Barr, CBE	DCOS (Support) HQ AFNORTH
1989-90	Maj Gen F. G. Sugden, CBE	COS HQ BAOR
1990-1	Maj Gen A. N. Carlier, OBE	Team Leader QMG Logistic Support Review
1990-2	Maj Gen G. W. Field, OBE	DGLP(A)
1991	Maj Gen S. C. Grant	DGT&D(A)
1991-2	Maj Gen P. J. Sheppard, OBE	COS HQ BAOR
1992	Maj Gen S. C. Grant	DGT&D(A)
1992	Maj Gen D. A. Grove, OBE	Team Leader AG's Study Team
1993	Maj Gen S. C. Grant S C	Team Ldr Army Comd Structure Review
1993	Maj Gen P. J. Sheppard, CBE	DGLP(A)
1993	Maj Gen A. D. Pigott, CBE	COS HQ ARRC
1994	Maj Gen S. C. Grant	COS HQ UKSC(G)
1994-5	Maj Gen P. J. Sheppard, CB, CBE	COS HQ QMG
1994-6	Maj Gen A. D. Pigott, CBE	Comdt Staff College
1994-5	Maj Gen R. A. Oliver, OBE	DCOS HQ Land Command
1995	Maj Gen M. P. B. G. Wilson	DGIGR
1995-7	Maj Gen K. J. Drewienkiewicz	D Sp HQ LANDCENT
1995	Maj Gen C. L. Elliott, MBE	Mil Adviser ICFY (Des Ch Cbt Sp ARRC)
1996-8	Maj Gen R. A. Oliver, OBE	COS HQ AG
1996	Maj Gen C. L. Elliott, MBE	DGIT
1996-8	Maj Gen K. O'Donoghue, CBE	COS HQ QMG (Des ACGS)

DATE	OFFICER	APPOINTMENT
1997-9	Maj Gen A. D. Pigott, CBE	DGD&D (Des DCDS(C+S))
1997-8	Maj Gen C. L. Elliott, MBE	DG ATRA (Des COS HQ QMG)
1997-8	Maj Gen P. J. Russell-Jones, OBE	ACDS(OR)Land
1998	Lt Gen S. C. Grant, CB	QMG
1999	Lt Gen Sir Scott Grant, KCB	QMG
1999	Maj Gen C. L. Elliott, CB,	COS HQ QMG
		MBE
1999-2000	Maj Gen K O'Donoghue, CBE	ACGS
1999	Maj Gen P. J. Russell-Jones, OBE	Capability Mgr (Manoeuvre)
1999	Maj Gen J. D. Moore-Bick, CBE	Team Ldr The Vision for Shrivenham Study (Des MA to High Representative Bosnia)
2000	Lt Gen A. D. Pigott, CBE	DCDS(Cts)
2000	Maj Gen C. L. Elliott, CB, MBE	DGD&D
2000	Maj Gen J. D. Moore-Bick, CBE	MA to High Representative Bosnia (Des General Offr Comd UKSC(G))

Brigadier Appointments

1980-1	Brig H. J. Goodson, OBE	D of D Ops
1980-2	Brig R. W. Dowdall	ACOS(Int) HQ AFCENT
1980-1	Brig C. R. Grey, CBE	Special Asst for Comd HQ AFCENT
1980-1	Brig C. J. Rougier	COS NI
1980-2	Brig C. W. Woodburn	DA Bonn
1980-3	Brig J. H. Hooper, OBE	Head of BMM to SANG

DATE	OFFICER	APPOINTMENT
1980	Brig J. A. M. Evans	Comd Berlin Inf Bde
1980-2	Brig A. J. V. Kendall	Comd BMAT/CI Bangladesh
1980-2	Brig P. L. Newth, OBE	Brig GS(W) DLWP
1981	Brig J. H. Hooper, OBE	D Comd Wales
1981	Brig J. J. Stibbon, OBE	D Comd 4 Armd Div/Comd Detmold Gar
1981	Brig J. A. M. Evans	Comd Berlin FF
1982-4	Brig C. W. Beckett	DOR3A ACGS (OR)
1982-4	Brig A. C. D. Lloyd	ACOS (Int) HQ AFCENT
1982	Brig D. H. A. Swinburn	D of DP(B) ACDS (Pol)
1982	Brig F. G. Bevan	NATO
1982	Brig R. L. Peck	Comd 19 Inf Bde
1982-3	Brig R. C. Plummer	MA Moscow
1983	Brig F. G. Bevan	Language Tig
1983-4	Brig J. A. M. Evans	D Comdt Staff Coll
1983-4	Brig E. G. Willmott, OBE	D Comdt RMCS
1984	Brig F. G. Bevan	Ch of Mission BRIXMIS
1984	Brig L. F. H. Busk	BGS ACGS 1
1984	Brig G. B. Fawcus	DCOS G1/G4/G5 HQ 1 British Corps
1984	Brig R. L. Peck	DDPS(A)
1984	Brig G. R. Gathercole	DSOP
1985-8	Brig C. W. Beckett	DCT
1985-7	Brig A. C. D. Lloyd	DCIS (Army)
1985	Brig F. G. Bevan	Study Offr MOD
1985	Brig E. G. Willmott, OBE	President Ordnance Board

DATE	OFFICER
1985	Brig L. F. H. Busk
1985	Brig G. B. Fawcus
1985-6	Brig R. L. Peck
1985	Brig N. H. Thompson
1985-7	Brig P. M. Blagden, CBE
1985	Brig D. Brownson, CBE
1985-6	Brig J. H. Edwards
1985	Brig P. F. Fagan, MBE
1986-8	Brig D. H. A. Swinburn
1986-7	Brig N. H. Thompson
1986-7	Brig J. A. J. P. Barr
1986-7	Brig F. G. Sugden, OBE
1986	Brig P. F. Fagan, MBE
1986-7	Brig W. M. R. Addison
1986-7	Brig G. Hyde
1987-8	Brig S. C. Grant
1987	Brig R. Wood
1988	Brig N. H. Thompson
1988	Brig J. A. J. P. Barr
1988	Brig F. G. Sugden, OBE
1988-9	Brig G. W. Field, OBE
1988-9	Brig D. A. Grove, OBE
1988	Brig W. M. R. Addison
1988-90	Brig P. J. Sheppard, OBE

APPOINTMENT
DMO
Chief JSLO Bonn
D Pers
DMP(A)
SMO RARDE
COS & CLF BFFI
Brig. Bde of Gurkhas
DSOP
D Exams and Courses
DM(A)
DASD
DMO
Director DSOP & Prod Planning Control Unit
Hd of BDLS & Def Advr Canada
Comd 12 Armd Bde
Comd 33 Armd Bde
Director DSOP & Prod Planning Control Unit
DMS(A)
DCOS (Support) HQ AFNORTH
COS HQ BAOR
D Def Programmes MOD(A) ACDS
DMS(A)
Team Leader, Army Presentation Team
D Army Plans ACDS (Prog)

DATE	OFFICER	APPOINTMENT
1988-9	Brig R. A. Oliver, OBE	Comd Berlin Inf Bde
1989-92	Brig G. Hyde	D Doctrine (Army)
1990-1	Brig G. B. L. Campbell	D Log Ops (Army)
1990	Brig S. C. Grant	Army Member 2PUS Support Wkg Gp
1990	Brig J. M. Lucken	ACOS G3 Indiv Trg HQ UKLF
1990-2	Brig T. R. Wright	ACOS G4 HQ BAOR
1990-1	Brig C. L. Elliott, MBE	Comd 6 Armd Bde
1991-2	Brig A. D. Pigott, OBE	Team Leader ARRC
1991	Brig G. B. L. Campbell	D Log Ops (Army)
1991-3	Brig J. M. Lucken	COS HQ IGDt
1991	Brig R. A. Oliver, OBE	ACOS G1/G4/G5 1 British Corps
1992-3	Brig R. A. Oliver, OBE	ACOS G1/G4/G5 HQ ARRC/HQ UKSC(Fwd)
1992-3	Brig K. J. Drewienkiewicz	D Manning (Army)
1992	Brig C. L. Elliott, MBE	D Comdt Staff College
1992-3	Brig W. E. Shackell, CBE	DRFC ACDS (Pers & Res)
1993-4	Brig H. H. Kerr, OBE	Comd/Rhine Area
1993	Brig T. R. Wright	D Log Ops(A)
1993-4	Brig C. L. Elliott, MBE	DMO
1993-5	Brig K. O'Donoghue	DOSO SHAPE
1993-5	Brig J. H. McKeown, CBE	Brig(W) PD DRA Farnborough
1993-4	Brig A. J. Sandiford	Project D APCIT
1994-7	Brig A. R. E. Hutchinson	ACOS Int Div HQ AFNORTHWEST
1994-7	Brig P. J. Bambury	SMA UKDEL OSCE (Vienna) AFCENT
1995	Brig H. H. Kerr, OBE	Asst Comd 3 (UK) Div

DATE	OFFICER
1995-6	Brig P. J. Russell-Jones, OBE
1995-7	Brig R. A. Bradbury
1995	Brig B. R. Isbell
1995	Brig A. A. Wilson, OBE
1995-6	Brig J. A. Thorp, CBE
1996	Brig B. R. Isbell
1996-8	Brig J. D. Moore-Bick, OBE
1996-8	Brig A. A. Wilson, OBE
1997	Brig A. S. Craig, OBE
1997-8	Brig J. A. Thorp, CBE
1997	Brig J. P. Hoskinson, OBE
1998-9	Brig A. R. E. Hutchinson
1998-9	Brig P. J. Bambury
1998-9	Brig A. A. Wilson, OBE
1998	Brig I. D. T. McGill, CBE
1998-2000	Brig J. G. Baker, MBE
1998	Brig K. J. Drewienkiewicz
1998	Brig T. H. E. Foulkes
1998	Brig P. A. Wall, OBE
1998/9	Brig K. J. Drewienkiewicz
1999-2000	Brig I. D. T. McGill, CBE
1999-2000	Brig B. R. Isbell
1999-2000	Brig A. S. Craig, OBE
1999-2000	Brig R. Pridham, OBE

APPOINTMENT

DIO
 Brig(W) Kuwait Programme Office
 ACOS Resources Div, HQ AFCENT
 ACOS Civil Affairs ARRC
 Comd 15 Bde
 DA Bonn
 DASD
 Comd 107 (Ulster) Brigade
 Comd Recruiting, HQ AG Pers & Trg Comd
 Brig Gen Staff HQ LAND
 D GCHA Study, DIO
 SMA UKDel OSCE (Vienna)
 Adviser Dayton Agreement, OSCE Vienna
 ACOS Logman AVCENT
 Deputy Ch J3 Ops HQ SFOR
 DA Seoul
 MA to OHR Bosnia
 Project Manager Capital HQ LAND
 Col(W) PM Tracer DGLS
 Comd Kosovo
 Comd ITG
 DA Berlin
 Comd Recruiting, HQ Recruiting Gp
 DOSO SHAPE

DATE	OFFICER	APPOINTMENT
1999	Brig J. A. Thorp, CBE	BGS HQ LAND
1999	Brig A. A. Wilson, OBE	ACOS J3/7 AFNORTH
1999-2000	Brig K. H. Cima	ACOS Ops, HQ AG (Pers & Trig Comd)
1999	Brig P. A. Wall, OBE	Comd 24 (Airmob) Bde
1999-2000	Brig T. H. E. Foulkes	ACOS Estates & Works HQ LAND
1999-2000	Brig A. C. Mantell, OBE	MA BAS Washington
2000	Brig A. R. E. Hutchinson	ADO (MS) JSSU Oakley
2000	Brig P. R. Wildman, OBE	Team Ldr DIS Study
2000	Brig D. R. Bill	BGS HQ LAND
2000	Brig D. R. Burns, OBE	COS KFOR
2000	Brig J. P. Hoskinson, OBE	President RCB
2000	Brig P. A. Wall, OBE	Comd 16 Air Asslt Bde
2000	Brig N. H. Rollo	Comd HQ 19 Mech Bde
2000	Brig M. A. C. Hughes, OBE	D Army Resources and Plans

Other Public Appointments

1978-82	Gen Sir William Jackson, GBE, KCB, MC*	Governor and CinC of Gibraltar
1991-7	Maj Gen F. G. C. Sugden, CB, CBE	Lieutenant Governor, The Royal Hospital

Annex E

**Regimental Headquarters
Appointments**

Regimental Colonels

1979	Col J. B. Wilks
1982	Col N. M. White
1984	Col D. R. Whitaker
1984	Col W. T. Dennison, OBE
1987	Col B. J. Sanderson, OBE
1988	Col M. R. Cooper
1992	Col C. P. R. Bates
1995	Col R. J. Sandy
1997	Col I. M. Tait
1998	Lt Col C. J. Rose
1999	Col M. H. H. Brooke, OBE

Institution Secretaries

1972	Col E. E. Peel
1985	Col G. W. A. Napier

Corps Secretaries

1978	Lt Col F. J. Beringer
------	-----------------------

Corps and Institution Secretaries

1990	Lt Col F. J. Beringer
1992	Col R. I. Reive, OBE
1994	Col M. R. Cooper
2000	Lt Col D. N. Hamilton, MBE

Corps Treasurers

1977	Brig L. Bennett
1989	Lt Col A. J. Hicks
1996	Lt Col R. F. Wilsher

REA Chairmen

1977	Maj Gen R. W. T. Britten
1984	Maj Gen C. P. Campbell
1989	Maj Gen H. E. M. L. Garrett

1993	Maj Gen W. N. J. Withall
1997	Maj Gen D. A. Grove
2000	Maj Gen R. Wood

REA Controllers

1980	Col G. S. Harris
1988	Maj C. F. Cooper
1993	Lt Col J. W. Ray
1999	Lt Col J. R. McLennan

RE Museum Directors

1988	Col G. W. A. Napier
1993	Col J. E. Nowers

Foundation Chairmen

1986	Col P. F. Williams
1989	Col Sir Idris Pearce
1992	Capt J. H. Fitzmaurice
1997	Mr B. Pearce

Annex F

Unit Development

Regular Army Units

Special Abbreviations AES, Amph Engr Sqn; AdES, Armd Engr Sqn; AF Amalgamated to form; AW, Amalgamated with; Be, Became; Di, Disbanded; EODS, EOD Sqn; EODSS, EOD Sp Sqn; EP, Engr Park; ER, Engr Regt; Fo, Formed; FF, formed from; FPS, Field Park Sqn; FS, Fd Sqn; FS(Am), Fd Sqn (Airmobile); FS(AS), Fd Sqn (Air Sp); FS(EOD), Fd Sqn (EOD); FSS, Fd Sp Sqn; Gu, Gurkha; HQS, HQ Sqn; HQ&SS, HQ & Sp Sqn; PIP, Plant Park; PIS, Plant Sqn; Refo, re-formed; TF, Transferred from; TS, Trg Sqn; TSS, Trg Sp Sqn; TT, Transferred to; UC, Under Command

Regular Army Regiments

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
Depot Regt	1980	Chatham	Depot Sqn, 36 RSME Sqn	
	1994		Be 1 RSME Regt	
Junior Leaders Regt	1980	Dover	54 Jnr Ldrs Sqn, 66 Jnr Ldrs Sqn, 82 Jnr Ldrs Sqn	
	1993		Di	
1 Trg Regt	1980	Cove	27 HQ & Volunteer TS, 28 TS, 56 (MT) TS	
	1994		AF 3 RSME Regt, 28TS and 56 (MT) TS Di	
1 RSME Regt	1994	Chatham	24 and 36 TSS	FF Depot and 12 RSME
	Regts			
3 Trg Regt	1980	Cove	HQ Tp, 57 TS, 55 TS	

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
1981			63 Trg Sp Sqn Fo	
3 RSME Regt	1994	Cove	27HQS, 55 and 57TS, 63 TSS	FF 1 Trg Regt
12 RSME Regt	1980	Chatham	17 RSME Sqn, 18 RSME Sqn, 40 PISS, 24FS	17 Sqn for tpt sp, RCT OC
	1994		Be 1 RSME Regt, 24FS Be 24TrgSS, 17 & 18 RSME Sqns and 40 PISS Di	
1 Armd Div Engr Regt	1980	Nienburg	1FS, 4FS, 7FS, 45FSS	7FS in NI Nov-March 81 Be 21ER
2 Armd Div Engr Regt	1980	Osnabrück	12FS, 16FS, 39FS, 43FSS	Oct-Feb 80 NI in Inf role
	1982			Be 25ER
	1983		39FS TT 23ER, 43FSS Be 43 PIS	
3 Armd Div Engr Regt	1980	Iserlohn	5FS, 25FS, 30FS, 2FSS	Jan-April in NI
	1982			Be 26ER
4 Armd Div Engr Regt	1980	Hameln	29FS, 37FS, 42FS, 44FSS	37FS in NI Feb-June 29FS in NI June-Nov 42FS in NI March-July
	1981			Be 35ER
	1982			FF 1 ADER
21 Engr Regt	1981	Nienburg	1FS, 4FS, 7FS, 45FSS	45FSS to 1AD
	1984		1FS, 4FS, 7FS	7FS in NI March-Sept
	1992			

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
	1994		7FS Be 7HQS	
22 Engr Regt	1980	Tidworth	3FS, 8FS, 52FS(Const), 6FSS	
	1981			3FS in NI March-July
	1989		52FS(Const) mov	RAF Brüggen
	1992		52FS(Const) Di	
	1993		6FSS Be 6HQS, 5FS TF 26ER, 3FS, 8FS Be 8AdES,	5FS mov 1994
	1994			8AdES in NI Sept-March 95
23 Engr Regt	1983	Osnabrück	39FS TF 2 ADER 73FS TF 73 Indep FS	
	1984		25FS TF 26ER	25FS mov 1984
	1993		RHQ, 39FS, 73FS Di	
25 Engr Regt	1982	Osnabrück	12FS, 16FS, 39FS, 43FSS	FF 2 ADER
	1983		39FS TT 23ER. 43FSS Be 43PIS	
	1992	Antrim	RHQ, 12FS, 43PIS, 33FS UC, 16FS Di, 43PIS Be 43FSS	
	1993		12FS TT 28ER	Hameln 12FS in NI March-Sept
	1994		12FS TF 28ER, Be 12HQS	
26 Engr Regt	1982	Iserlohn	5FS, 25FS, 30FS, 2FSS	FF 3 ADER
	1984		5FS, 25FS, 30FS	2FSS UC 3AD
	1992		30FS Di	
	1993		5FS TT 22ER	
	1994		RHQ, 25FS, 30FS Di, 2FSS Be 2HQS & TT 32ER	

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
28 Amph Engr Regt	1980	Hameln	23AES, 64AES, 71AES(HQ & Trg)	64AES in NI March-July
	1984		71AES(HQ & Trg) Be 71AESS	
	1991		65FPS TF 65 Corps Sp Sqn	23AES in NI March-Oct
	1992		64AES Be 64HQS. Regt Be 28ER	
	1993		71AESS Di	23AES in NI Sept-March 94
32 Armd Engr Regt	1994		12FS TF 25ER, Be 25HQS	
	1980	Munster- lager	RHQ, 26AdES, 31AdES	RHQ at Verden until 1981
	1982		77 Armd Engr Sqn Fo	
	1993	Hohne	Be 32ER. 2HQS TF 26 ER	Initial Div affiliations: 1/26, 3/77, 4/31
	1994			26AdES in NI March-Sept
33 Engr Regt (EOD)	1980	Chattenden	49EODS	590 & 591 EODS(V) also under comd
	1983		58EODS Fo	
	1986		22EODSS Fo	
	1988			579 & 583 EODS(V) Fo
	1990		21EODS Fo	
35 Engr Regt	1992		22EODSS Be 22HQS(EOD)	
	1993	Wimbish	All EODSs Be FSs(EOD)	
	1982	Hameln	29FS, 37FS, 42FS, 44FSS	FF 4 ADER
	1984		29FS, 37FS, 42FS	44FSS uc 4AD
	1991			42FS in NI Oct-March 92

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
	1992	Bosnia		Nov 92 to April 93 29FS in NI Sept–March 93
36 Engr Regt	1994		44FS Be 44HQS	
	1980	Maidstone	20FS, 50FS (Const), 61FSS, 9 Para Sqn, (Aldershot) UC	9Para Sqn in NI Oct–March 81
	1993		50FS(Const) Be 50HQS, 69GuFS TF 69 Gu Indep FS (Roulement Sqns)	Mov from Chatham 1994
37 Engr Regt	1982	Falkland Islands		
38 Engr Regt	1985		Di	
	1980	Ripon	11FS, 32FS, 51FS(Const), 15FSS	
	1982		51FS(Const) Be 51FS	32FS in NI April–Aug
	1982	Falkland Islands	RHQ Be RHQ 37ER simultaneously	
	1988		51FS Be 51FS(Am)	
39 Engr Regt	1995		32FS Be 32HQS	
	1980	Waterbeach	34FS, 48FS, 53FS(Const), 60FSS	34FS in NI Feb–June 48FS in NI July–Dec
	1981			
	1983		48FS Be 48FS (Const)	
	1994		53FS(Const) Be 53FS(AS)	
	1995		60FSS Be 60HQ&SS. 34FS Be 34FS(AS)	

UNIT TITLE	YEAR	LOCATION	SUB-UNITS	REMARKS
40 Army Engr Sp Gp	1982	Willich	303EP, 305EP, 306PIP, 21EBW, 211MCAG (Sennelager), 217MCAG (Arsbeck), 221MCAG (Dortmund), 232MCEG (Krefeld), 256MCPG (Hannover)	
	1991		RHQ AW 28ER, Gp Di	
42 Survey Engr Regt	1980	Barton Stacey	13 Map Production Sqn, 19 Topo Sqn	
	1985		Di	
62 CRE Works	1980	Chilwell	523, 524, 527 STRE(Const)	
63 CRE	1999	Chilwell		
64 CRE (E&M)	1980	Chilwell	516 STRE(BP), 519, 520 STRE(E&M), 521 STRE(Well Dr)	
Queens Gurkha Engrs	1980	Hong Kong	67 GuFS, 68 GuFS, Sp Sqn	
	1981		69 Gu Indep FS Fo	Sqn at Chatham
	1982		Sp Sqn Be 70SS(QGE)	
	1982		69 Gu Indep FS TT 38ER	
	1992		69 Gu Indep FS mov	
	1993		RHQ 68 GuFS and 70SS(QGE) Di	
UNIT	DATE		EVENT	LOCATION
	1994		67 GuFS Be 67 Gu Indep FS, 69 Gu Indep Fd Sqn Be 69 GuFS, Di	69 Sqn mov to Maidstone
	1996		67 Gu Indep FS Di	

Regular Army Independent and Quasi-Independent Squadrons and Specialist Teams

UNIT	DATE	EVENT	LOCATION
1 Fortress STRE	1980		Gibraltar
	1994	Disbanded	
10 Fd Sqn	1980		Laarbruch
	1982		Gütersloh
	1993	Di	
14 Topo Sqn	1980		Ratingen
	1993?	Be 14 Topo Sqn	
21 Army Sp Sqn	1980		Willich
	1982	Be 21 EBW	
33 Indep Fd Sqn	1980		Antrim
	1992	Be 33FS, TT 25ER	
38 (Berlin) Fd Sqn	1980	Berlin	
	1994	Di	
59 Indep Cdo Sqn	1980		Plymouth (Two fd tps & Sp Tp plus Condor Tp in Arbroath in sp 45 Cdo Bde). In N1 June-Oct Condor Tp mov to Plymouth April Mov to Chivenor
	1987		
	1995		
67 Gurkha Indep	1994	FF 67GuFS	Hong Kong
Fd Sqn			
	1996	Di	
73 Indep Fd Sqn	1983	Be 73FS TT 23ER	
	1993	Di	

UNIT	DATE	EVENT	LOCATION
62 Cyprus Sp Sqn	1980		Dhekelia
65 Corps Sp Sqn	1980		Hameln
	1991	Be 65FPS TT 28ER	
512 STRE	1980		Washington, USA

Reserve Army Units

Reserve Army Regiments				REMARKS
UNIT	DATE	LOC OF RHQ	EVENT	
R Mon RE (M)	1980	Monmouth	100FS(R Mon RE) (Newport) 108(Welsh)FS (Swansea) 225(Birmingham)FS	
	1992	Monmouth	101HQS Fo, 108(Welsh)FS Be 108(Welsh)FSS, 100FS mov, 143PIS UC	108FSS Swansea & Gorseinon, 100FS Cwmbran, Bristol & Cardiff, 143 PIS Walsall & Cannock
	1999	Monmouth	101HQS, 100FS, 108(Welsh)FSS, 143PIS TT 75ER, 225(Birmingham)FS Be 225(Birmingham)PIS	Wksp & 100FS Cwmbran/Llandaff, 108FSS Swansea/ Gorseinon, 225PIS Warley
65 CRE(V)	1995	Cove	Fo with RESAT, 504, 506, 508, 525, 526 STsRE (Wks), 507 STRE (Rly), 520 (Water Dev)	Part of MWF(V)
67 CRE(V)	1995	Cove	509, 510, 511, 513, 514, 515, 517, 518, 528 STsRE (Constr)	Part of MWF(V)

UNIT	DATE	LOC OF RHQ	EVENT	REMARKS	
69 CRE(V)	1999	Cove	Di with all STRE	Part of MWF(V)	
	1995		501, 502, 503, 505 STsRE (BP)		
71 (Scottish) Engr Regiment (V)	1980		Di with all STRE	102(Clyde)FS (Paisley)	
			Glasgow		
			104(City of Edinburgh)FS		
			124 (Lowland)FS 117 Fd Pk Sqn (Dundee)		
UNIT	DATE	LOC OF RHQ	EVENT	REMARKS	
72 (Tyne Electrical 118FS West Hartlepool Engineers) Engr Regt	1992	1980	117FSS UC Be 117(Highland)PIS, 80HQS Fo, 102FS Be 102(Clyde)FSS	102FS Paisley	
	1999		117(Highland)PIS Be 117HQ&SS, 72FS(AS) Fo, 102FS Be 102FS(AS), 104(City of Edinburgh)FS and 124 (Lowland)FS Di	117HQ&SS Leuchars, 72FS(AS) Newcastle, 102FS(AS) Paisley	
			Gateshead	103(1st Newcastle)FS 118(Tees)FS	
			1992	233HQS Fo, 105PIS UC Be 105(Tyne Electrical Engineers)FS	105FS South Shields
			1999	103FS, 105FS, 118FS Di	
	73 Engr Regt		1980	Nottingham	129(East Riding)FS, 217(London)FS 575(Sherwood Foresters)FS 873 Mov Lt Sqn
1991			350FS Fo, 129FS Be 129HOS	350FS at Nottingham	

UNIT	DATE	LOC OF RHQ	EVENT	REMARKS
	1992		217FS Be 217FS(EOD) TT 101ER(EOD), 575FS Be 575(Sherwood Foresters)FS(AS), 873 Mov Lt Sqn TT 101ER(EOD), 106FS TF 75ER Be 106(West Riding)FS(AS), 272FSS TF 74ER Be 272(West Riding Artillery)FSS(AS)	106FS(AS) at Sheffield
	1994		Jersey FS TF CVHQ	
	1999		129FS Be 129HQSS, 350FS Be 350FS(AS)	
UNIT	DATE	LOC OF RHQ	EVENT	REMARKS
74 (Antrim Artillery) Engr Regt	1980	Belfast	112(Antrim Fortress)FS, 114(Antrim Artillery)FS 272 Fd Sp Sqn	272FSS Bradford
	1992		272FS TT 73ER	Bradford
	1993		112(Antrim Fortress)FS & 114(Antrim Artillery)FS AF 74(Antrim Artillery) Indep FS	Belfast
	1999		74 Indep FS Di	
75 Engr Regt	1980	Manchester	106(West Riding)FS 107(Lancashire and Cheshire)FS, 202FS	FS at Birkenhead, Manchester
	1992		106FS TT 75ER, 125FSS UC Be 125(Staffordshire)FS, 201HQS Fo, 125FS mov	125FS Longton, 201 HQS Manchester
	1999		125(Staffordshire)FS UC Be	

UNIT	DATE	LOC OF RHQ	EVENT	REMARKS
			125(Staffordshire)FSS, 143PIS TF RMonRE, 202FS Di	
	2000		201HQS, Failsworth; 107(Lancashire and Cheshire)FS, Birkenhead and St Helens 125(Staffordshire)FSS, Longton & St Helens; 143PIS, Walsall and Cannock	
76 Engr Regt	1992	Pitreavie	Regt Fo. 234, 236, 277FS(ADR) UC. 237FS(ADR) Fo	FS at Leeming, Kinloss, Leuchars, Lossiemouth
	1999		Di	
77 Engr Regt	1992	Honington	Regt Fo. 212, 216, 218, 219, 267FS(ADR)	FS at Wattisham, Marham, Honington, Coningsby, Waddington
	1993		212 and 218FS(AS) AF 218FS(AS)	Brize Norton
	1996	Coningsby	219FS(AS) Be 219 HQ&SpS	RHQ mov to Coningsby Nov
	1999		Di	
78 (Fortress) Engr 127FS at Brighton, Regiment	1993	Southamp- ton	Southamp- 560(Hampshire)HQS, 227(Hampshire Yeomanry Carabiniers)AES 127FS TT 101ER, 560HQS, 227AES Di	Regt Fo. 127(Sussex Yeomanry)FS, 227AES at Aldershot
101 (London) Engr Regt (EOD)	1988	Chattenden	579EODS, 583EODS, 590EODS,	Sqns at Dartford, Brighton, 591EODS Fo Chattenden, Rochester
	1989	London (Greenhithe)		

UNIT	DATE	LOC OF RHQ	EVENT	REMARKS
	1992	Catford	217FS TF 73ER Be 217FS(EOD), 873 Mov Lt Sqn TF 73ER	217FS at Holloway
	1993		873 Mov Lt Sqn Be 220(Searchlight)FS	Heston
	1993		590 & 591EODS AF 221FS(EOD), 579 & 583EODS AF 222FS(EOD)	221FS at Rochester, 222FS at Dartford
	1996		223HQ&SS and 579FS(EOD) Fo, 222FS(EOD) Di	579FS(EOD) at Tunbridge Wells and Reigate
	2000		223HQ&SS, 217FS(EOD), 221FS(EOD), 579(EOD)	223HQ&SS Catford, 217FS(EOD) Holloway & Camberwell, 221FS(EOD), Rochester, 579(EOD) Tunbridge Wells & Reigate
111 Engr Regt	1980	Cove	120FS, 130FS, 198FPS	
	1993		120, 130FS AF 4 Air Sp (RESF)	
	1994		Di, MWF (V) Fo	

UNIT DEVELOPMENT

Reserve Army Independent and Quasi-Independent Field Squadrons and Specialist Teams

UNIT TITLE	DATE	EVENT	LOCATION
74 (Antrim Artillery) Indep	1993	FF 74 (Antrim Artillery) Engr Regiment	Belfast
Fd Sqn	1999	Di	
105 (Tyne Elec Engrs) Plant Sqn	1980		
	1992	Be 105FS TT 72ER	
117 Fd Sp Sqn	1980		Dundee
	1992	Be 117PIS TT 71ER	

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UNIT TITLE	DATE	EVENT	LOCATION
105 Plant Sqn	1980		South Shields
125 Fd Sp Sqn	1980		
	1992	Be 125FS TT 75ER	
131 Indep Cdo Sqn	1980		Kingsbury, Birmingham, Hull and Plymouth
135 Fd Svy Sqn	1980		Ewell
	1986	Be 135 Indep Topo Sqn	
143 Plant Sqn	1980		
	1992	TT RMonRE	
198 Engr Park Sqn	1980	Sponsored unit under CVHQ	
	1993	Be 198 Fd Sp Sqn (EOD) (Specialist TA)	
	1995	Be 198 Fd Pk Sqn	
	1999	Di	
234 Fd Sqn (ADR)	1986	Fo	Leeming
	1992	TT 76ER	
236 Fd Sqn (ADR)	1986	Fo	Kinloss
	1992	TT 76ER	
277 Fd Sqn (ADR)	1983	Fo	Leuchars
	1992	TT 76ER	
	1999	Di	
513 Indep Fd Tp	1992	Fo	from RHQ 111ER
590 EOD Sqn	1980	UC 33 (EOD) Regt	Rochester
	1988	TT 101 ER	
591 EOD Sqn	1980	UC 33 (EOD) Regt	Rochester
	1988	TT 101 ER	
Jersey Indep Fd Sqn RE (M)	1997	Jersey Indep Fd Sqn RE (M) Fo	UC CVHQ

Other Reserve Army Units			
UNIT TITLE	DATE	EVENT	LOCATION
Engr and Rly Staff Corps	1980		
	1985	Be Engr and Tpt Staff Corps	
		Be Engr and Logistic Staff Corps	
Engr Specialist Pool	1980	Sponsored unit under CVHQ (Geologists etc)	Cove
	late 1980s	Be RE Specialist Advisory Team (RESAT)	Aldershot

Engineer Brigades and Groups			
DESIGNATION	DATE	UNITS UNDER COMMAND	LOCATION OF HQ/REMARKS
11 Engineer Group	1980	Jnr Ldrs Regt, 1 Trg Regt, 3 Trg Regiment	Cove
12 Engineer Brigade	1982	Mil Wks Force, Engr Resources, 234, 236, 277FS(ADR)	
29 Engineer Brigade	1980	71(Scottish)ER, 72(Tyne Electrical Engineers)ER, 74 (Antrim Artillery)ER, 105(Tyne Electrical Engineers) PIS 117(Highland)FSS	Moved from Newcastle to York Sept 86
	1992	HQ Di	
	1997	Refo as 29 (Corps SP) Engr Bde with R Mon RE, 73ER, 75ER, 125(Staffordshire)FSS, 143PIS	
30 Engineer Brigade	1980	RMonRE(M), 75ER(V), CVHQ (RE)	Stafford
	1995	HQ Di	

DESIGNATION	DATE	UNITS UNDER COMMAND	LOCATION OF HQ/REMARKS
42 Survey Engineer Group	1985	Directorate of Geographic Field Support, 19 STRE, 13 Topo Sqn, 16 Sv Sp Sqn, School of Mil Svy	Hermitage 14 Indep Topo Sqn (Mönchengladbach), 135 Indep Topo Sqn (Ewell) also uc
Military Works Force CVHQ RE	1980	111 ER, 198 EngrPS, 501, 502, 503 STRE (Bulk Petroleum), 504 STRE (Power Station), 505 STRE (Engr Procurement), 506 STRE (Public Utilities), 507 STRE (Railway Construction BAOR), 508, 525, 526 STRE (Wks), ESP	Minley Manor
	1985	504 STRE (Power Station), 506 STRE (Public Utilities), Be 504, 506 STRE (Wks)	
	1997	Jersey Indep Fd Sqn RE (M) Fo	
	1988	ESP Be RESAT	
	1993	505 STRE (Bulk Petroleum) Fo	
	1994	MWF(V) Fo, 111ER Di	Mov to Gibraltar Bks
	1995	520 (Well Drilling) Fo, Jersey Indep Fd Sqn RE (M) TT 73ER 509, 510, 511, 513, 514, 517, 518, 528 STRE (Constr [G7]) Fo, 507 STRE (Railway Construction BAOR) Be 507 STRE (Railways), 520 (Well Drilling) Be 520 (Water Development)	
	1999	198FPS, 501, 502, 503, 505 STRE (Bulk Petroleum), 509, 510, 511,513, 514.517, 518, 528 STRE (Constr), 520 (Water Development) Di, 509 STRE (Constr) Be 509 STRE(Utilities)	

Annex G

Corps Affiliations and Freedoms

With Institutions

INSTITUTION OF	AFFILIATED ORGANISATION
Chartered Surveyors	
Civil Engineers	RSME
Electrical Engineers	RSME
Incorporated Electronic and Electrical Engineers	RSME
Mechanical Engineers	RSME
Plant Engineers	
Production Engineers	
Water and Environmental Engineers	RSME

With Livery Companies

ALL WORSHIPFUL COMPANIES*	YEAR	AFFILIATED UNIT
Blacksmiths	1991	RSME
Curriers	1984	101 (City of London) Engr Regt (EOD) (V)
Engineers	1985	Corps
Fan Makers	1989	217 Fd Sqn (EOD) (V)
Lightmongers	1988	220 Fd Sqn (EOD) (V)

* Except where stated.

ALL WORSHIPFUL COMPANIES*	YEAR	AFFILIATED UNIT
Painter-Stainers	1992	RSME
Paviors	1986	131 Indep Cdo Sqn (V)
Plumbers	1986	RSME
The Carpenters Company	1992	RSME
The Chartered Surveyors Company	1979	135 Topo Sqn (V)
The Company of Watermen and Lightermen	1994	28 Engr Regt
The Masons Company	1989	Corps
Tylers and Bricklayers	2000	Corps
Scientific Instrument Makers	1994	Royal School of Military Survey
Constructors	1998	101 (London) Engr Regt (EOD) (V)
Tallow Chandlers	NK	MWF (V) originally 503 STRE (BP)
Fishmongers	1898	Through The Earl Kitchener of Khartoum and Broome
Plasterers	2000	Construction Engineer School Pattenmakers
		101 (London) Engr Regt (EOD) (V)

* Except where stated.

Freedoms as at 2000

Those granted during the period 1980-2000 are shown in red.

CIVIC AUTHORITY	TYPE	DATE	PRESENT UNIT/HOLDER	ORIGINAL UNIT/HOLDER
Airdrie Borough	Unit	1975	124 Fd Sqn (V)	124 Fd Sqn (V)
Aldershot Borough	Corps	1965	RSME (Minley)	11 Engr Gp
Bailiwick of Jersey	Unit	1995	Jersey Fd Sqn (M)	Jersey Fd Sqn (M)
Barnet Borough	Corps	1982	PCD RLC	PCD RE

CIVIC AUTHORITY	TYPE	DATE	PRESENT UNIT/HOLDER	ORIGINAL UNIT/HOLDER
Beckenham Borough	Unit	1950	211 Fd Sqn (V)	211 Fd Sqn (V)
Berlin Tiergarten	Corps	1979	Corps	38 (Berlin) Fd Sqn
Bethnal Green	Unit	1961	217 Fd Sqn (EOD) (V)	114 Corps Engr Regt (TA)
Birkenhead	Unit	1960	107 Fd Sqn (V)	113 Army Engr Regt (V)
Bradford	Unit	1969	Corps	
Braunton	Unit	2000	59 Cdo Sqn	
Chatham Borough	Corps	1962	RE HQ Mess	Now part of Medway
Chelsea	Unit	1960	101 Engr Regt (EOD) (V)	101 Fd Engr Regt (TA)
Christchurch	Unit	1969	Corps	MEXE Christchurch
Edinburg h City		1968	Corps	
Epsom and Ewell	Unit	1999	135 Indep Geo Sqn (V)	135 Svy Engr Regt
Gibraltar	Corps	1972		1st Fortress STRE
Gillingham Borough	Corps	1953	RE HQ Mess	Now part of Medway
Hameln Stadt	Corps	1977	28 Engr Regt	28 Engr Regt
Harrow Borough	Unit	1983	131 Indep Cdo Sqn RE(V)	Originally 131 Para Sqn
Iserlohn Stadt	Corps	1987	RE HQ Mess	26 Engr Regt
Islington	Unit	1992	217 Fd Sqn (V)	217 Fd Sqn (V)
Kentville Town (NS)	Unit	1990	69 Gurkha Fd Sqn	69 Gurkha Fd Sqn
Lewes	Unit	1993	127 Fd Sqn (V)	127 Fd Sqn (V)
Lion-Sur-Mer-Ville	Corps	1989	32 Engr Regt	32 Armd Engr Regt
Maidstone Borough	Corps	1965	36 Engr Regt	36 Engr Regt
Medway	Corps	1977	HQ RSME	
Monmouth	Unit	1953	R Mon RE (M)	R Mon RE (M)
Newbury	Corps	1999	42 Engr Regt (Geo)	42 Engr Regt (Geo)

CIVIC AUTHORITY	TYPE	DATE	PRESENT UNIT/HOLDER	ORIGINAL UNIT/HOLDER
Nienburg Stadt	Corps	1980	Corps	21 Engr Regt
Oldham	Unit	1999	75 Engr Regt (V)	75 Engr Regt (V)
Osnabruck Stadt	Corps	1959	Corps	38 Corps Engr Regt
Paderborn Stadt	Corps	1969	35 Engr Regt	4 Div Engrs
Ripon City	Corps	1949	21 Engr Regt	38 Engr Regt
Rochester	Unit	1961	221 Fd Sqn (EOD) (V)	590 EOD Sqn (V)
Rochester (Medway)	Unit	1986	69 Gurkha Fd Sqn	69 Gurkha Fd Sqn
Rochester City	Corps	1954	Corps	Now part of Medway
Rowley Regis Borough	Unit	1954	225 (Birmingham) Fd Sqn (M)	215 Plant Sqn (TA)
Rushmoor Borough	Corps	1981	RSME (Minley)	11 Engr Gp
Seaford	Unit	1959	210 Fd Sqn (TA)	210 Fd Sqn (TA)
Sherwood Borough	Unit	1962	575 Fd Sqn (V)	575 Fd Sqn (V)
Smethwick	Unit	1958	225 Fd Sqn (M)	127 Constr Regt
Spandau	Corps	1988	Corps	38 (Berlin) Fd Sqn
St Helens Borough	Unit	1966	107 Fd Sqn (V)	252 Fd Sqn (TA)
Stafford Borough	Unit	1991	Corps	
Stratford upon Avon	Corps	1959	Corps	HQ Engr Sp
Strood RDC Adoption	Corps	1968	RE HQ Mess	12 RSME Regt
Swansea	Unit	1977	108 (Welsh) Fd Sqn (M)	53 Div Engrs (V)
Test Valley Borough	Corps	1982	22 Engr Regt	RE Branch LE(A)
Wallasey Borough	Unit	1960	Corps	624 Crane Op Sqn (TA)
Wallsend	Unit	1969	103 Fd Sqn (V)	506 Fd Sqn (V)
Westminster City	Unit	NK	Corps	324 Fd Sqn (TA)

CIVIC AUTHORITY	TYPE	DATE	PRESENT UNIT/HOLDER	ORIGINAL UNIT/HOLDER
Weymouth and Portland	Corps	1984	Comdt Wyke Regis	MEXE
Willich Stadt	Corps	1973	HQ Engr Resources	40 Army Engr Sp Gp

With Other Organisations

ORGANISATION	AFFILIATED UNIT
7 (SF) Sqn RAF	101 (London) Engr Regt
HMS <i>Chatham</i>	RSME
HMS <i>Chiddingfold</i>	101 (London) Engr Regt (EOD) (V)
HMS <i>Monmouth</i>	R Mon RE (M)
Jamaican Defence Force (1 Engr Regt)	36 Engr Regt
Worshipful Company of Surveyors	135 Indep Topo Sqn (V)

Annex H

Institution Prizes

Awarded and continued
during the period

Institution Gold Medal	A rare honour for some work connected with the advancement of historic, scientific or technical knowledge related to the Corps.
Institution of Royal Engineers Prize and Institution Silver Medal	The best young officer of his batch.
Institution Bronze Medal	Top RE student passing out of the RMA Sandhurst commissioning course.
Gabriel Prize	The RSME instructor who has made the most significant contribution to training during the year.
Best Article Prizes	The best <i>RE Journal</i> articles of the year by a junior officer and warrant officer.
Alan Izat Memorial Prize	The best essay written during the Troop Commanders course.
Arthur ffoliot Garrett Prize	Best article in an Institution publication on technical engineering or survey.
Collinson Prize	Most improved student on the Troop Commanders course.
Durand Medal	Most distinguished Queen's Gurkha officer, warrant officer, NCO or sapper over a three-year period.
Armstrong Prize	The best student on the Clerk of Works (E) Course.
Fowke Medal and Stokes-Roberts Prizes	Fowke Medal: Top of the Clerks of Works (Construction), (Electrical) and (Mechanical) and Military Plant Foremen's courses. Stokes-Roberts Prizes: Top, or most improved students, on these courses less the Electrical, for whom the Armstrong Prize is available.
Haynes Medal	Top of the Junior NCO Instructors Course.
Montgomerie Prize	For the encouragement of articles in the

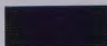
Rainy Anderson

RE Journal by lieutenant colonels and below.

The best end-of-course paper for the Professional Engineering Training courses in civil, electrical or mechanical engineering or the Long Plant Course.

Annex I

Medals for which Members of the Corps Qualified, 1980-1999



General Service Medal 1962
Northern Ireland, Lebanon,
Kuwait



United Nations Medal for
Service in Cyprus
(UNFICYP)



Accumulated
Campaign Service Medal



The Rhodesia Medal
Ceasefire Monitoring
1 Dec 1979 to 20 March 1980



South Atlantic Medal for
service in designated war
zone



South Atlantic Medal for
service in support of
operations outside war zone



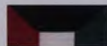
Gulf Medal with clasps
'2 Aug 1990' or
'16 Jan - 28 Feb 1991'



Gulf Medal without clasps
for service in support of
operations



Saudi Arabia Liberation of
Kuwait Medal (keepsake only,
not to be worn)



Kuwait Liberation Medal
(keepsake only, not to be
worn)



United Nations Medal for
the Transitional Advisory
Group, Namibia (UNTAG)



United Nations Medal for the
Advance Mission in Cambodia
(UNAMIC)



United Nations Medal for the
Yugoslavia Protection Force
(UNPROFOR)



United Nations Medal for
the Transitional Authority
Cambodia (UNTAC)



United Nations Medal for
the Rwanda Assistance
Mission (UNAMIR)



United Nations Medal for the
Angola Verification Mission
(UNAVEM)



NATO Medal
Former Yugoslavia



NATO Medal
Kosovo



Western European Union



Multi-National Force and
Observers, Sinai

Annex J

Abbreviations

(C)BFFI	(Commander) British Forces Falkland Islands
1 KORBR	1st Battalion the King's Own Royal Border Regiment
1, (2, 3) Para	1st (2nd, 3rd) Battalion The Parachute Regiment
1/7GR	1st Battalion the Duke of Edinburgh's 7th Gurkha Rifles
2SG	2nd Battalion The Scots Guards
2WG	2nd Battalion The Welsh Guards
ABRO	Army Base Repair Organisation
ABSDA	Army Base Storage and Distribution Agency
ACDS(OR)	Assistant Chief of the Defence Staff (Operational Requirements)
ACE	Allied Command Europe
ADER	Armoured Division Engineer Regiment
ADR	Airfield Damage Repair
AFCENT	Allied Forces Central Europe
AFNORTH	Allied Forces Northern Europe
AFSOUTH	Allied Forces Southern Europe
AFV	Armoured Fighting Vehicle
AHB	Army Historical Branch
AIRNORTH	Allied Air Forces Northern Europe
AMF(L)	ACE Mobile Force (Land)
AOR	Area of Responsibility
APC	Armoured Personnel Carrier or Army Personnel Centre
ARRC	Allied Command Europe Rapid Reaction Corps
ARRC	ACE Rapid Reaction Corps
ASC	Army Survey Course
AVCAT	Aviation Turbine Fuel used by RN
AVLB	Armoured Vehicle Launched Bridge
AVRE	Armoured Vehicle Royal Engineers
BAC	Battle Area Clearance
BAOR	British Army of the Rhine
BATUS	British Army Training Unit, Suffield (Canada)
BHC	Bosnia-Herzegovina Command
BiH	Army of the Republic of Bosnia-Herzegovina

BLB	Base Level Budget holder
BRITENGBAT	British Engineer Battalion
BRIXMIS	British Commanders-in-Chiefs Mission to the Soviet Forces in Germany
CCRE	Commander Corps Royal Engineers
CENTAG	Central Army Group
CEP	Central Engineer Park
CET	Combat Engineer Tractor
CETC	Combat Engineer Training Centre
CIMIC	Civil-Military Cooperation (NATO terminology)
CinC	Commander in Chief
CIS	Communications and Information Systems
CLFFI	Commander Land Forces Falkland Islands
COHA	Cessation of Hostilities Agreement
COMAAFCF	Commander Allied Air Forces Central Europe
CRE	Commander Royal Engineers
CREST	Computer Replacement Study
CSCE	Conference on Security and Cooperation in Europe
DCTA	Defence Clothing and Textiles Agency
DES(A)	Director Engineer Services (Army)
DFAD	Digital Feature Analysis Database
DGDB	Digital Geographic Database
DGIA	Defence Geographic & Imagery Intelligence Agency
DGIWG	Digital Geographic Information Working Group
DGLP (A)	Director General Logistics Planning (Army)
DGPS (A)	Director General Personal Services (Army)
DGT&D (A)	Director General Training and Doctrine (Army)
DIGEST	Digital Exchange Standard
DLMS	Digital Land Mass Simulation
DMZ	Demilitarised Zone
DOE	Defence Operations Executive
DPA	Defence Procurement Agency
DRFD	Demolition Remote Firing Device
DROPS	Demountable Rack Offloading and Pick-up System (self-loadable truck)
DTED	Digital Terrain Elevation Data
DWS	Defence Works Services
E&LSC	Engineer and Logistic Staff Corps
E&M	Electrical and Mechanical
ECOMOG	Economic Community of West African States Monitoring Group
EFHE	Emergency Fuel Handling Equipment
EHC	European Hospital Consultants

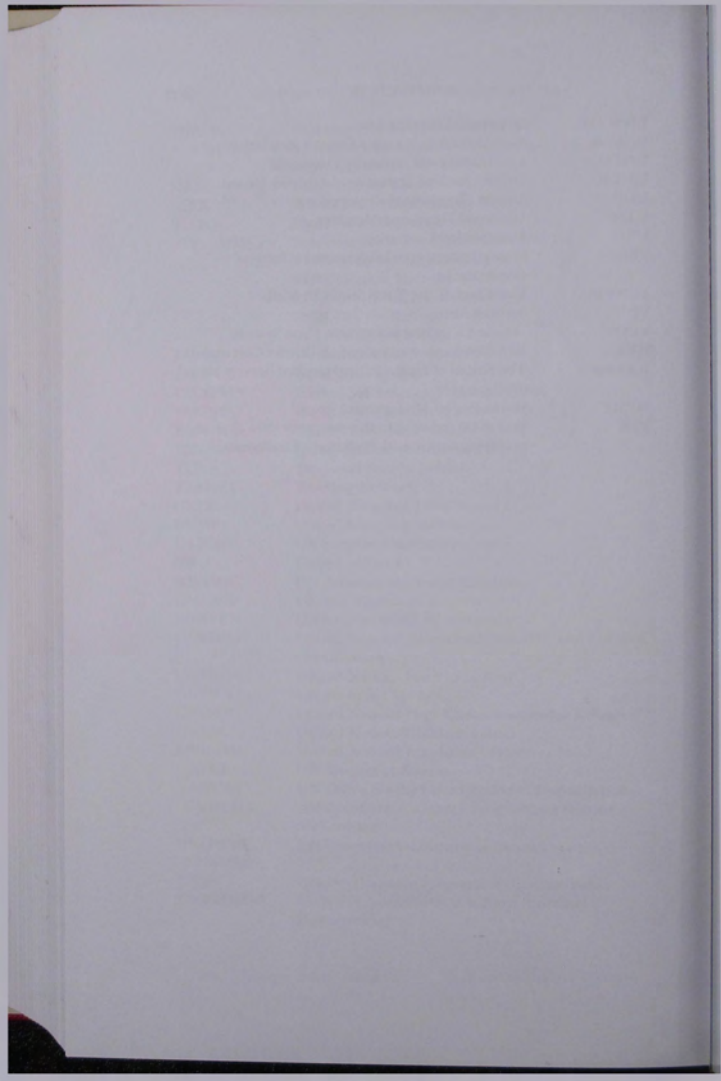
EinC	Engineer in Chief
ENTEC	Euro NATO Engineering Centre
EOD	Explosive Ordnance Disposal
ESD	Engineer Stores Depot
ESP	Engineer Specialist Pool
ESPPA	Equipment Support Provisioning and Procurement Authority
EWBB	Extra Widened Bailey Bridge
FI	Falkland Islands
FIGAS	Falkland Islands Government Air Service
FMA	Force Maintenance Area
FOB	Forward Operating Base
FTX	Field exercise with troops
FWF	Former Warring Factions
G	Army Staff branch for G1 = Manning and Personnel G2 = Intelligence G3 = Operations G4 = Logistics, G5 = Civil Affairs G6 = Communications G8 = Finance See also J1, etc.
GDP	General Deployment Plan
GEE	General Engineer Equipment
GIS	Geographic Information System
GOC	General Officer Commanding
GPS	Global Positioning System
GSG	Geographic Support Group
GSS	Geographic Support System
H(M)(L)WT	Heavy(Medium)(Light) Wheeled Tractor
HLB	High Level Budget/Budget holder
IEBL	Inter Entity Boundary Line
IED (D)	Improvised Explosive Device (Disposal)
IFOR	(United Nations) Implementation Force
IS	Internal Security
ISO	International Standard Organisation
J	Joint Staff branch for J1 = Manning and Personnel J2 = Intelligence J3 = Operations J4 = Logistics, J5 = Plans

	J6 = Communications
	J7 = Training
	J8 = Finance
	J9 = Civil Affairs)
	See also G
JARIC	Joint Air Reconnaissance Intelligence Centre
JRDF	Joint Rapid Deployment Force
JRRF	Joint Rapid Reaction Force
JTFHQ	Joint Task Force Headquarters
KFOR	(NATO) Kosovo Force
KIA	Killed in Action
LCN	Load Classification Number
LSL	Landing Ship Logistic
LWT	Light Wheeled Tractor
MACC	Military Aid to the Civil Community
MAFF	Ministry of Agriculture Fisheries and Food
MAPSP	Map Supply Point
MAT	Mines Awareness Training
MBFR	Mutual and Balanced Force Reduction
MCG	Mobile Civilian Group
MCTU	Mine Clearance Training Unit
MDS	Military Survey Digital Geographic Information Systems
MELC	Museum Executive and Library Committee
MES	Military Engineer Services
MGB	Medium Girder Bridge
MLC	Military Load Classification
MLRS	Multiple Launch Rocket System
MND(SW)	Multinational Division South-West
MOD	Ministry of Defence
MSR	Main Supply Route
MVRDE	Military Vehicles Research and Development Establishment
MWA	Military Works Area
MWF	Military Works Force
NATO	North Atlantic Treaty Organisation
NBC	Nuclear, Biological and Chemical
NGO	Non-Governmental (aid) Organisation
NORTHAG	Northern Army Group
ODA	Overseas Development Agency
OOA	Out Of Area
OOTW	Operations Other Than War
ORBAT	Order of Battle

OSCE	Organisation for Security in Central Europe
PADS	Position and Azimuth Determination System
PANI	Police Authority of Northern Ireland
PC	Personal Computer
PC	Postal and Courier
PETROS	Project name; see Chapter 10
PFI	Private Finance Initiative
Pilot TERAS	Pilot Terrain Analysis System
PJHQ	Permanent Joint Headquarters
PM	Project Manager
PQE	Professionally Qualified Engineer
PSA	Property Services Agency
PUE	Pre-stocked Unit Equipment
QCVS	Queen's Commendation for Valuable Service
QGE	Queen's Gurkha Engineers
QMG	Quartermaster General
R Mon RE (M)	Royal Monmouthshire Royal Engineers (Militia)
RAOC	Royal Army Ordnance Corps
RARDE	Royal Armament Research and Development Establishment
RCZ	Rear Combat (or Communications) Zone
RDD	Rapid Demolition Device
RESAT	Royal Engineers Specialist Advisory Team
RESF	Restoration of Essential Services and Facilities (at RAF bases)
RFA	Royal Fleet Auxiliary
RHAG	Rotary Hydraulic Arrestor Gear
RHKP	Royal Hong Kong Police
RMA	Royal Military Academy, Rear Maintenance Area
RMAS	Royal Military Academy Sandhurst
Roulement	The process of posting units to a programme of short, usually four-month unaccompanied tours.
RPF	Rwanda Popular Front
RSME	Royal School of Military Engineering
RTA	Road Traffic Accident
RUF	Revolutionary United Front (Sierra Leone)
SACEUR	Supreme Allied Commander Europe (Commander of all NATO forces)
SANG	Saudi Arabian National Guard
SCOC	Supply Chain Operations Centre
Scud	Soviet-made free-flight rocket
SDR	Strategic Defence Review
SFOR	(United Nations) Stabilisation Force

SHAPE	Supreme HQ Allied Powers Europe
SOXMIS	Soviet Exercise Mission (Soviet military observers in West Germany)
SSC	Single Supply Chain
SSRB	Service Staff Responsibility Budget
STOL	Short Take Off and Landing
STRE (Wks), etc.	Specialist Team Royal Engineers (Works)
	STRE (WD) = Water Development
	STRE (Mat) = Materiel
	STRE (BP) = Bulk Petroleum
	STRE (Rly) = Railway
	STRE (Util) = Utilities
TA	Territorial Army
TACEVAL	Tactical Evaluation
TACIPRINT	Tactical Information Printing System
TACISYS	Tactical Information System
TACON	Tactical Control
TIO	Topographical Information Overprint
TLB	Top Level Budget holder
TRANET	Tracking Network
UKLF	United Kingdom Land Forces
UKMF	United Kingdom Mobile Force
UKSC(G)	UK Support Command (Germany)
UN	United Nations
UNAMIC	UN Advance Mission in Cambodia
UNAMIR	UN Aid Mission in Rwanda
UNAVEM	UN Angola Verification Mission
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNFICYP	United Nations Force in Cyprus
UNFICYP	UN Force in Cyprus
UNHCR	United Nations High Commissioner for Refugees
UNICEF	United Nations Children's Fund
UNIKOM	United Nations Iraq-Kuwait Observer Mission
UNMIK	UN Mission in Kosovo
UNOCA /	UN Office for the Coordination of Humanitarian
UNOCHA	and Economic Assistance Programmes relating to Afghanistan
UNOMSIL /	UN Observer/Aid Mission in Sierra Leone
UNAMSIL	
UNDP	UN Development Programme (Congo/Zaire)
UNPROFOR	United Nations Protection Force (Bosnia-Herzegovina)

UNSCOM	UN Special Commission
UNSCR	United Nations Security Council Resolution
UNTAC	UN Transitional Authority Cambodia
UNTAG	United Nations Transitional Advisory Group
UOR	Urgent Operational Requirement
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
VBK	Verteidigungsbereichskommando (Fortress Command)
VCNS (AS)	Vice Chief of the Naval Staff (Air Staff)
VJ	Serbian Army
VLSMS	Vehicle Launched Scatterable Mine System
WBK	Wehrbereichskommando (Sub-District Command)
WKhM(G)	The Sultan of Oman's Distinguished Service Medal (Gallantry)
WPMT	Works Project Management Team
Y2K	Year 2000 (relating to the computer date change problems anticipated at change of millennium)



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Back cover illustrations:

Top row: left, RAF Harrier hide; right: 1 Troop 9 Para Squadron going ashore at San Carlos in the Falklands.

Second row, left: the base at Gornji Vakuf in the Balkans, used as the Sector HQ during Operation *Grapple* and by HQ 3 (UK) Division on Operation *Resolute*; centre, Forkill sangar design, Northern Ireland; right: Sugarloaf observation post, South Armagh.

Third row: the Class 40 double double Bailey bridge built over the River Una at Bosanski Nova in the Balkans by 32 Armoured Engineer Regiment in January 1996.

Bottom row: left, oil wells on fire, Kuwait; right, The Falklands Memorial on Sapper Hill, post 1982.

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