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## INSTITUTION OF ROYAL ENGINEERS' STAFF

<i>Secretary:</i>	Colonel M R Cooper	Tel: ATN (9) 4661 (BT 01634 842669/82) 2298.
<i>Assistant Secretary:</i>	Mrs J D Scanlan	Tel: ATN (9) 4661 (BT 01634 842669/82) 2299.
<i>Administrative Officers:</i>	Mrs M Bassett/Mrs J Ellender	Tel: ATN (9) 4661 (BT 01634 82) 2298.
<i>Fax:</i>	ATN (9) 4661 (BT 01634 82) 2397	<i>Email:</i> Secretary@inst-royal-engrs.demon.co.uk.

*All correspondence in connection with editorial matters should be addressed to the Secretary, Institution of Royal Engineers,  
Ravelin Building, Brompton Barracks, Chatham, Kent, ME4 4UG.*

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## Editorial

THE British Army is still widely deployed around the world, though as budgets begin to bite and yet another savings measure is put in place, there is emerging a radical change in the way in which it is able to train and operate. As a result, force readiness cycles, cadreization, contractorization, and rear-basing are some of the new buzz words that have been introduced into military speak. The Corps itself is of course a growth industry with the addition of 1300 posts leading to the introduction of nine new squadrons and two regimental headquarters during the next three years. Nevertheless, this may only ease rather than dramatically reduce the short inter-tour intervals experienced by units and individuals.

This year's joint professional meeting with the Institution of Civil Engineers attracted a large audience with prominent members of the government and the engineering professions in the audience. The topic presented was "Kosovo – An Engineering Partnership – Model For The Future?" No longer is it sensible or practical to talk of single service or joint service operations. The future, at least for operations similar to those in Kosovo, is integrated operations where, in the case of engineering in particular, the full resources and expertise of government, industry and the armed forces needs to be coordinated and focused to achieve a strategic aim rather than a short-term, tactical objective. The need to have the structures in place before a crisis emerges is all too evident when a human tragedy such as that experienced recently in Mozambique occurs.

Several articles in this *Journal* draw upon the lessons learned from the Kosovo experience and point the way to the introduction of new doctrines and procedures to harness the considerable talent and expertise within the Corps. Those at the front end can take heart, from WO1 Abraham's letter in the correspondence section, that those who sit in their ivory towers really do listen to the problems experienced by those at the front end and do all they can to overcome them.

Just about every aspect of the Corps' participation on Operation *Agricola* has now been addressed in this and last December's issues of

the *Journal*. The authors of articles in this issue range from a retired major general and former defence correspondent of *The Daily Telegraph*, a professionally qualified senior engineer, a parachute squadron commander, an explosive ordnance disposal expert and last, but not least, a major from that indispensable and highly respected class of person, the SO2 RE desk officer. I would commend all their articles to you.

If you think there is a surfeit of articles on Kosovo, then I can assure you that there are some tasty morsels in between. For those who might have been reassured that the chances of, say, an accident occurring when arming a mine is 1 in 10<sup>6</sup>, you will find "What's Wrong With The Numbers? A Questioning Look at Probabilistic Risk Assessment" instructive, if not alarming.

Amongst the other articles is an account of the fifth leg of the *Ex Transglobe* yacht race which was skippered by a Sapper. If anyone should think that those who take part in adventurous training activities are on a jolly, they will be reassured, from the comfort of their armchairs, that this was no holiday and whilst the crew did not win, they did remarkably well to survive.

In order to strengthen its ties with the engineering profession, the Council of the Institution sought last year, and has now been accredited with, Professional Affiliate membership of the Engineering Council. Also, a review of the Institution's Honorary Membership scheme has been instigated with a view to extending more widely the Corps' links with key office holders throughout the engineering industry, the professional institutions, the educational establishments, international organizations, government ministries and the armed forces.

Sadly, the Chief Royal Engineer, Lieutenant General Sir Scott Grant KCB, leaves the active list of the Army – though of course remains as the Chief Royal Engineer – in July; the post of Quartermaster General, which so many Sappers before him have filled, is now no more. We are delighted of course that our President, now Lieutenant General Pigott CBE, was promoted last month on taking up his new appointment of Deputy Chief of Defence Staff (Commitments).

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# Just A Back-Room Boy

## Infrastructure Management on Operation Agricola

COLONEL G TAYLOR OBE MA CENG MICE



*Colonel Glyn Taylor commanded 62 Commander Royal Engineers (Works) during Operation Agricola and also fulfilled the role of SO1 J4 Infrastructure. At the height of the operation he commanded 527 Specialist Team Royal Engineers (Works), 521 Specialist Team Royal Engineers (Water Development), reconnaissance parties from 507 Specialist Team Royal Engineers (Railways) (Volunteers) and 516 Specialist Team Royal Engineers (Bulk Petroleum), and individuals from Defence Estates and the Engineer and Logistic Staff Corps. He also had military (but not contractual) command of the works project management team for the temporary field accommodation contract. On his return to the United Kingdom he was horrified to learn that he was to be posted to Project Connaught, the study into a £1billion public private partnership to serve Aldershot Garrison's infrastructure for the next 30 years. He is pictured, not in a dilapidated part of Pristina, but in front of one of 9 Para Squadron's blocks that he expects to replace as part of the project.*

### INTRODUCTION

It is difficult to know where to begin. An operation spread over five countries, 300 infrastructure tasks in six months, a harrowing refugee crisis, the first major use of contractors on a deployed operation, supporting a pan-Balkan power system and running Kosovo's biggest water company. This is the story of infrastructure management on Operation Agricola and the role performed by Military Works Force (MWF) and the other components of Military Engineer Services (MES). There will be some boring bits, with a dash of controversy, and the odd section more at home in an article by "Sticky" Whitchurch. Please stay with it as this is how the Corps is likely to perform infrastructure management on future operations.

### DOCTRINE

IRONICALLY I initiated a doctrine discussion paper titled "Engineer Works on Operations" nearly three years ago. The paper was reviewed by the Engineer in Chief's (EinC) doctrine committee and it was decided that a joint doctrine was required, to be drawn up under Permanent Joint Headquarters (PJHQ). The working group for Joint Warfare Publication (JWP) 4.05 sat for

the first time in October 1998, little knowing that its work would be put into practice within a few months. The JWP 4.05 – "Infrastructure Management on Operations" are as follows:

- Infrastructure management should be led by the senior chartered engineer deployed on the operation. For a medium-scale operation (brigade deployment) this should be the CO of a CRE (Wks).
- The CO should normally be based in the joint force logistic component (JFLogC), or national support element (NSE), and double-hatted as the SO1 J4 Infrastructure. He should also command all the technical assets deployed on the operation.
- The CO should receive appropriate financial delegations to manage the infrastructure with a separate member of his team given contractual powers to let civilian works contracts. The latter to be used to relieve pressure on the squadrons.

In December 1998 CO 64 CRE (Wks) was installed in Bosnia. As soon as the worsening situation in Kosovo materialized I was placed on stand-by to deploy for Operation Agricola.

### DEPLOYMENT – "ENABLERS" FIRST

THE deployment on Operational Agricola recognized that the British force could not be sustained without rapidly expanding the basic infrastructure

occupied by the 600 men already deployed with the Extraction Force on Operation *Upminster*. Hence the enablers went first. Fortunately I had already visited Macedonia in early February where half of 527 STRE (Wks) was already deployed. I almost stayed in theatre as the wheels of expansion were already turning but it was more critical to return for a series of briefings and the International Base Systems Working Group, which was taking place at Chilwell. The latter was attended by all the key players who would be involved in staffing the temporary field accommodation (TFA) contract for British Forces. More of this later, but mounting the contract was to be one of the key components of the infrastructure operation.

62 CRE (Wks)(-) deployed in the first wave of aircraft, including its light vehicles. 527 STRE (Wks) was expanded to a full team and its works contracts powers reinforced. The CRE (Wks) was completed by the JRRF recce officers from 516 STRE (BP) and 521 STRE (WD). All were squeezed into the existing offices at Petrovac airfield and I set up a desk in the NSE at the joint 4 Armd Bde/101 Log Bde HQ in the Panorama Hotel. The desk was collocated with HQRE.

#### COMMAND AND CONTROL – A NEW WAY

MY first task was to explain to all parties about the position of the CO CRE (Wks) double-hatted as SO1 J4 Infrastructure. As a staff officer I worked directly to Comd 101 Log Bde and was responsible for all strategic infrastructure matters. CRE 1 Div maintained OPCON of all Sapper units and could move his assets around as priorities dictated. The CRE (Wks) was placed TACOM of the logistic brigade with the general support regiment (28 Engr Regt). The CRE (Wks) assets remained OPCON to me throughout, and individuals or part teams were placed TACOM to the regiments for specific tasks, in accordance with CRE's mission command directives. This was due to the number of infrastructure tasks that did not involve the regiments, for example, "in" inspections of properties, managing civilian contractors and various infrastructure studies.

#### ACCOMMODATING THE LEAD ELEMENTS – HOTELS AND BROOM CUPBOARDS

It was immediately noticeable how professional PJHQ and the front line commands had become at

mounting an expeditionary operation. Personnel and vehicles poured into theatre. The great unknown was how long we would be staying in Macedonia. The centre of gravity of existing infrastructure was Skopje so the lead elements were to be accommodated there. The existing two hotels were crammed to the four walls so more space was required. There was no expeditionary campaign infrastructure (ECI) in theatre and the 2000-man "winterized" camp was deploying by sea. The only option was to rent more hotels. The ink was not even dry on the contracts as they were filled. The CRE's driver and signaller gained status by securing the most salubrious broom cupboard in the Panorama Hotel! This early spell saw the close relationship with the civil secretariat (Civ Sec) developing. Infrastructure was already being recognized as one of the most important and costliest factors in force projection.

#### ACCOMMODATING THE LEAD ARMoured

##### BATTLE GROUP – THE MACEDONIAN FACTOR

How big is a lead armoured battle group (LABG)? – 1200 men and a lot of vehicles. In addition there was the brigade support group elements and slices of 101 Log Bde units. This was the sea party with the vehicles being married up with drivers at Thessaloniki. The earlier ARRC recce had been promised part-use of three barracks by the Macedonian authorities. BRITFOR selected Prilep on the main line of communication (LofC), but also because it was close to the Krivolak Training Area (KTA), which was already in use by Operation *Upminster* units. The plan was to house the men and bulk of B vehicles at Prilep with the armour based at KTA. Some training could then take place whilst waiting for agreement at Rambouillet. Frantic recces were also taking place to try and secure the best warehouses between this area and Skopje for the logistic units. Agreement to use Prilep had been confirmed at 3-star level in the Macedonian MOD but unfortunately the chief of defence staff had not signed a piece of paper for the camp commandant. The vehicles and men waited at the gates of the camp for nearly 24hrs until it was dispatched. The Macedonian factor emerged early in the operation and had to be taken into account at all stages thereafter.

#### NATO GOES TO WAR – THE MOVE TO OPERATIONAL LOCATIONS

THE LABG trained in appalling weather and there was no pause in the infrastructure operation.

Some of the early locations were rationalized and negotiations began with the Nordic Battalion (NORDBAT) of the UN Preventative Deployment (UNPREDEP) whose mandate was to end on the 31 March. The plan was to occupy NORDBAT's two barracks in the Skopje area and the Macedonian MOD was in full agreement. The collapse of the Rambouillet talks and the start of the bombing campaign changed everything as BRITFOR crashed out to operational locations. Residual hotels in Skopje were abandoned and all locations within artillery range were reviewed. COMBRITFOR also directed that locations vulnerable to civil unrest were also to be abandoned. By and large this met the infrastructure rationalization plan for a move into Kosovo except the troops and vehicles had to stay in Macedonia! Units also had to be poised to face air, land, special forces or terrorist attack. Macedonia lacked the infrastructure and forests to hide all the elements and the deployment was far from the ideal conditions of a war-fighting exercise in Germany in the 80s. Dispersion became more important than camouflage and concealment. Petrovac airfield was crammed full and the LABG deployed to the adjacent training area as the countermove force for a land attack by Serbia. Surrealism entered the "exercise" scenario as Macedonia continued with its normal life whilst heavily armed NATO and Serbian forces faced each other over its borders.

#### LIFE GOES ON –

##### THE USE OF LOCAL CONTRACTORS

IMPROVEMENTS to infrastructure were planned from the beginning of the operation. Clear direction was given by PJHQ that money should only be spent on locations with a long-term use. This would have been fine if the "winterized" camp had provided a modern ECI. It did not, and a few Elsan toilets and ageing mobile bath and laundry units (MBLUs) did not provide much for the 87 per cent of the force now living in tents or hard-lying conditions. Operation *Upminster* had made excellent use of contractors and the system was simply extended into the new operation. Prime tasks were to refurbish showers and toilets in some of the rented accommodation. This type of task could be mounted in days by scheduling the work, walking round the potential bidders, and then giving them 24 hours to bid. The equivalent RE task

would have required drawings, stores lists and the resourcing loop; at least two weeks. The decision to use contractors was taken by me or in consultation with the CRE when there was potential for RE to do the work. Large tasks such as the sewage works, described in the last *RE Journal* by Maj Holland, normally fell to RE with the odd sub-contract included for specialist works. With this system in place the use of contracts was always ready in the background to execute infrastructure tasks if RE manpower was required elsewhere for close support (CS) or other general support (GS) tasks.

Another highly successful use of contractors was suggested by Maj Andy Andrews of 65 Fd Pk Sqn. This was to use a German contractor which provided portaloos and servicing to exercises in Germany to do the same in the southern Balkans! The force ordnance warrant officer (FOWO) initially rejected this idea due to the cost but lack of local facilities and the poorly equipped tented camps left it as the only option. The contract involved purchase or hire of units with one service per day in either Macedonia or Kosovo. It was even extended to Albania for one month and at its height included over 500 portaloos.

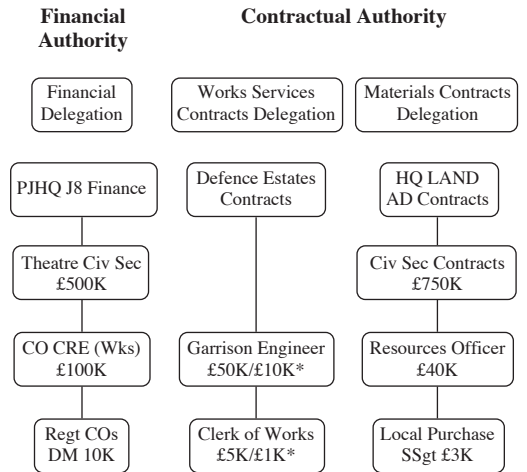
#### THE ROLE OF THE GS REGIMENT

WITH successful use of contractors there was time for the GS regiment (GS Regt) to settle into the infrastructure engineering role. Naturally the GS Regt should train for war but what is war-fighting? With the bombing campaign in progress, NATO (in international law) was at war and its land forces were deployed to find, fix and strike the enemy. Yet, in this situation, the primary tasks of the GS Regt were plant tasks, work on the LofC (staging areas and bridging), and construction tasks. Indeed this role continued throughout the operation and I am certain that this would also have been the primary role in a forced entry into Kosovo. This suggests that the GS Regt's primary role in force projection operations is infrastructure engineering and its secondary role is combat engineering and that it should train accordingly.

#### FINANCIAL AND CONTRACTUAL DELEGATIONS

THE third key component of infrastructure management is appropriate financial and contractual

delegations. The separate chain and recipients are shown in the diagram below:



\*Lower figure for single tender contracts.

At the outset there was limited delegation due to the tight rein that PJHQ wished to keep on finances particularly because it was not known how long was to be spent in Macedonia. Financial authority for each task passed through me to Civ Sec, and local purchase for materials to the resources staff sergeant, who had a limit of £3K. The initial works contract authority was more robust with the garrison engineer holding £20K per task (£5K single tender) and the clerk of works £5K (£1K). However, the time spent in Macedonia provided the opportunity to establish workable procedures based on experience in Bosnia and prove to Civ Sec that all parties understood the business. The delegations above were awarded for the move into Kosovo and retained to the end of my tour. Ironically as I left the CO CRE (Wks) delegation was reduced to £10K per task as this sum was rarely exceeded. £100K is the appropriate sum as it is the investment appraisal limit.

**THE REFUGEE CRISIS – MILOSEVIC’S DEEP BATTLE?**

The refugee crisis exploded in Macedonia over Easter weekend but events began with a summons to the Macedonian MOD one week earlier. The story of constructing the refugee camps rightly belongs to 28 Engr Regt so I will concentrate at the strategic level. DCOS Support HQ KFOR led a team to the meeting with representatives from each NSE. I represented BRITFOR.

In an atmosphere of pure theatre the defence minister, flanked by the minister of infrastructure and the chief of defence staff blamed NATO for the impending refugee crisis. It was not clear in translation whether he was blaming NATO bombs for driving Kosovars from their homes or merely encouraging Serbs to evict them. Whatever, NATO was at fault and it had to solve the problem. What he did not understand was that HQ KFOR had no mandate to force nations to contribute and could only coordinate the effort. The minister thought NATO could do anything if it expended a fortune on bombing Serbia. I had been allowed to offer troops, transport and other logistic support, and also reveal that Dr Kabila, Clare Short’s right hand man at the Department for International Development (DFID), was en route to theatre with an initial spend of £10M. The other nations also added contributions but this did not calm the situation. It was agreed to meet the next day to visit three refugee camps under construction by the Macedonians, which were intended to accommodate 20,000.

The day began amusingly as the minister of infrastructure’s attractive lady assistant arrived catching her hair on a tree. How 20 of NATO’s officers kept a straight face as her wig fell off remains one of the mysteries of the tour. The reconnaissance revealed good intentions but little substance. The camps had been tucked away near Macedonian Albanian villages and progress looked slow. The Germans agreed to assist at one and the British at the other (Bojane). Although at this point there were only several thousand refugees at the border, the whole Macedonian response looked inadequate. British troops began assisting at Bojane the next day but the build up of refugees began in earnest. The Macedonians seemed powerless to offer a solution to the growing crisis.

What were Milosevic’s intentions in precipitating the crisis? Was it spite or part of his deep battle? The latter theory gained credibility as the effect on the Macedonian government became apparent. Macedonia was severely criticized in the media, by UNHCR and by NATO for its response to the crisis. This fledgling nation had been relatively lucky in the break-up of Yugoslavia. It had been immediately protected by UNPREDEP shortly after independence. It had forged a reasonable economy based on import/export, resurrecting its historical role as a trading post at the

crossroads of the southern Balkans. It had kept a lid on its own potential ethnic problems with little trouble between the predominant Macedonians (70 per cent) and the indigenous Albanians (20 per cent). Having allowed NATO to deploy its troops as the spring-board to Kosovo its economy was diving at an alarming rate. One of the first industries to close was the petrochemical plant in Skopje, which relied on products from Serbia. If NATO did not succeed there was an underlying fear that Macedonia would be left with its Albanian population boosted to become a majority. Fear and not hatred was the appropriate word to describe Macedonia's attitude to the refugees. If Milosevic was using the refugee crisis to separate Macedonia from NATO he was achieving a fair measure of success.

COMKFOR's intent was therefore to prop up the government. BRITFOR offered to run a refugee handling centre at the "Eurotrade" staging area north of Skopje originally intended for the move into Kosovo. It divided two crucial pieces of real estate, a private airfield (Brazda), where BRITFOR was already renting a portion of land and Stenkovac Ranges. The former offered an excellent grassy airfield, with a rushing stream on its perimeter, and the latter a good circuit with plenty of grassy enclaves around it. The sites for two camps of 30,000 refugees were obvious and the Macedonian government was persuaded to use them. The task was commanded by 101 Log Bde with the British leading at Brazda and the French at Stenkovac. They became known as Stenkovac 1 and 2. My role was "town planner" and supplying the technical manpower. UNHCR planning guidelines were used and compromised immediately. The limitations and in-fighting of aid agencies were quickly realised. Without sappers, logisticians and medics thousands would have suffered. Many in the services, and even the Corps, tend to have a view that refugee assistance is somewhat beneath the role that we are trained for. This overlooks the fact that we are very good at it, and in the Kosovo campaign it was an essential phase of the operation. If it had gone wrong NATO may not have had a secure base to mount the land operation.

#### **RECEIVING THE 2ND BATTLE GROUP – MORE TENTED CAMPS**

ONE of the little known facts of the operation is that NATO began the bombing campaign with

only four battle groups and a light screen defending Macedonia. The faint hearts were calculating the time to reach Thessaloniki! But Milosevic never came, reinforcing the view that he would rather be kind to Macedonia and force NATO out by more skillful means. All nations began planning fresh deployments and the refugee crisis was a mere interlude before a further 1500 men arrived, representing a second battle group and further logistic support. With a shortage of real estate the only option was to use KTA and construct a camp for 1200 men, squeezing the balance into existing locations. The poor quality of the tented camps was inflicted on more users and this culminated in an urgent operational requirement (UOR) to replace them. The final catalyst for the UOR was the re-programming of the TFA contract and the visit by CinC LAND in early May. He declared the tented camps to be "like an exercise in the 60s" when he had been a subaltern. At this point in the story it is worth exploring the whole approach to ECI in the operation.

#### **EXPEDITIONARY CAMPAIGN INFRASTRUCTURE**

THE planning for the Defence Procurement Agency's (DPA) ECI project was well advanced at the beginning of the operation. A draft specification had already been agreed for this major procurement project, which has an in-service date of 2002. In February 1999 the same project team was switched to the UOR for TFA, the longer-term accommodation for BRITFOR in Kosovo. In May it also picked up the UOR for what became known as improved tented camps (ITC). The deployment strategy behind the main ECI project was as follows:

- Tier 1: Immediately deployable tented camps with limited utilities support.
- Tier 1.5: Limited utilities replaced at 60 days with containerized utilities.
- Tier 2: Tented accommodation replaced with more permanent accommodation at 6 to 7-month point with Tier 1.5 utilities retained.

In February it was agreed to procure TFA, the equivalent of Tier 2, to be supplied, designed, constructed, operated and maintained by a contractor. A so-called "turnkey" contract because all the military had to do was turn the key to enter the room. The original plan was to live in Kosovo's existing infrastructure and the existing tented camps with a contractor constructing the



TFA before the onset of winter. This was ambitious and assumed an early permissive entry into Kosovo. It was also a very complex project and the target of letting the contract in late Spring was unachievable. The destruction of Kosovo's military infrastructure by NATO bombing, or anything which could be used as military infrastructure, also changed the situation. ITC, the equivalent of Tier 1 but with some of the 1.5 utilities, was required to fill the gap.

The effort to mount both projects with the same team at DPA was quite outstanding. It was supported throughout by Sappers embedded in Deputy Directorate Operational Requirements (DDOR), DPA and Defence Clothing and Textiles Agency (DCTA) apart from support provided by HQ MES and MWF in the UK. As I departed theatre in mid-August ITC was beginning to arrive in theatre, almost 2000 men's worth of the TFA hardstandings had been completed by Sapper plant, and advance elements of Hunting Engineering, were setting up to begin its TFA construction programme. Once the TFA is complete 5000 men's worth of ITC will be returned to store for future operations until the main ECI project arrives in service.

#### ALBANIAN ADVENTURE – EVEN MORE TENTED CAMPS

THE second BG had hardly arrived when the next phase of the operation began. CO 28 Engr Regt and I were sent off to Albania on a helicopter recce in lieu of the first day off in the tour. UNHCR had calculated that there could be an influx of 5000 refugees a day to Macedonia with a capacity to process and embark only 3000 to other countries. The influx was expected over 30 days and Macedonia, already creaking, would accept no more. Recognizing his centre of gravity COMKFOR, in liaison with Commander Albanian Force (COMAFOR), mounted a recce to east Albania near Lake Ohrid. This was at the limit of HQ AFOR's communications and it was agreed that if the operation was to be mounted the allied force would be commanded by 101 Log Bde. The recce revealed possibilities in the Korce region, less than two hours over the Macedonian border. This story also belongs to 28 Engr Regt. I deployed for 10 days for the initial ground recces and to initiate MWF recces on winterizing dilapidated buildings, a potential longer-term job for aid agencies. Albania is a

remarkable country, these are just a few of the cameo stories of this adventure:

- At the first meeting, the prefect (mayor) declared Korce to be quiet town. There were four shootings with one death and two seriously injured in the first ten days.
- Korce is 60 per cent Albanian Orthodox, closely aligned to the main Serbian religion. The ethnic and religious divide surprised everyone again.
- 60 per cent of the cars in the region were Mercedes, apparently "acquired" in Germany.

My primary concern was that this new deployment did not jeopardize infrastructure support to the main force. Increased use of contractors filled the gap to some extent but there was also now the prospect of further reinforcements requiring accommodation. With the UNHCR refugee figures not materializing at the border I returned to Macedonia to plan yet another phase of the operation.

#### PLANNING FOR REINFORCEMENTS – SHOWER BAGS AND MORE PORTALOOS

SEVERAL reinforcement scenarios were planned even before Milosevic's collapse. The infrastructure contingency planning included one option to spread the reinforcements over the whole of Macedonia. There were enough tents for the eventual reinforcement by 5 Airborne Brigade but a complete lack of showers and toilets. Macedonia had little more to offer around our LofC and the RLC could not man more than four of the manpower-intensive MBLUs. Toilets were solved by yet another extension of the portaloos contract but the only solution for showers was to purchase 4000 shower bags, a successful idea in the hot summer. The heat also brought the usual demands for air-conditioning. A number of domestic mobile units were locally purchased for headquarters and communication facilities but everyone began to melt in the unrelenting heat. My original UOR for ITC had included full environmental control as per the future ECI project. This was reduced during the staffing process to only heating as the ITC would not be deploying until late summer. It would also have required more power and more expense. A protest to PJHQ produced some bulky environmental control units before ITC was deployed but not in time to help the reinforcing units. Time constraints and the speed of Milosevic's collapse precluded any

acclimatization. 65 Fd Pk Sqn came to the rescue of the worst affected in 5 AB Bde by emptying its sheds at Piper Camp. Judicious use of air-conditioning helps acclimatization and would have prevented the heat exhaustion imposed on many soldiers waiting to move into a potentially dangerous situation.

#### **THE MOVE INTO KOSOVO – A SURREAL EXPERIENCE**

THE move into Kosovo has been well-recorded elsewhere with the vital role played by Capt Walton-Knight. The advance elements of the remaining infrastructure effort moved in on D+2, we were even one day behind Civ Sec! My first priority was to get a feel for the state of Kosovo's infrastructure, particularly the main utilities and their ability to sustain BRITFOR. The military agreement stated that NATO could utilize what it wished in order to meet its mission. This was loosely interpreted as "grab what you can and pay for it when the owner turns up". NATO had bombed every single building in the barracks in Pristina and the Russians had occupied any missed at the airfield. Even large warehouses had been bombed on the grounds that they could be hiding armour. 4 Armd Bde and 5 AB Bde did well to secure real estate at several locations hot on the heels of the Yugoslav Army (VJ) moving out. This was the most surreal aspect of those heady days, heavily armed Yugoslav units mixed up with sometimes very light British forces with only the odd major incident. To give an impression of normality helmets and body armour had been discarded. I will always remember the Irish Guardsman, relaxed but alert, armed with only a SA80 and a floppy hat, as he monitored a column of 50 armoured vehicles leaving Pristina.

I discussed essential services and utilities with CO 21 Engr Regt. He was already switching his attention to this vital area and requiring MWF support. Half of 527 STRE (Wks) and 521 STRE (WD) were immediately moved into Kosovo and placed TACOM to counter the problems he faced.

#### **ESSENTIAL SERVICES AND UTILITIES – CLOSE SUPPORT ENGINEERING?**

THE VJ had gone, many Serbs were fleeing and the Albanians were trickling in from the hills and the borders. Suddenly J5 was the main effort and the Sapper role was to take over the

essential services and utilities. This was firmly part of KFOR's mission. Little planning was possible before entry into Kosovo due to a lack of information. Sappers in the Kosovo verification mission had provided some. We were aware that all management and key technical posts were filled by Serbs. Would they stay?

CRE had been tasked with co-ordinating the RE support to J5 operations and it naturally fell into either 4 Armd Bde's area of operations or the logistic support provided by 101 Log Bde. CO 21 led on the former and I picked up the latter, for example railways and prisons. I also gave technical advice and attached technical manpower to 21 Engr Regt. My role also included "looking up" to coordinate any assistance from the UK. Coordination of power was soon ceded to KFOR as it was a pan-Balkan system. This extraordinary effort was well recorded in Col Heron's article in the last *RE Journal*. MWF provided Maj Cannons and Capt Artis as part of the power team and specialist support was provided by the Engineer & Logistic Staff Corps RE (V) (E&LSC) and the Department of Trade & Industry (DTI) task force. Maj Rainey, the last member of the Corps to run a major power station in Gibraltar, also visited from HQ MES. The fact that Maj Rainey ran a 6.6kV transmission system and this was up to 400kV gives some idea of the technical challenge. Indeed the Corps is neither trained nor qualified to run such systems.

HQ LAND G4 MES staff played a major role in the operation as a higher technical HQ. All requests for additional technical support were staffed through HQ MES by either PJHQ or HQ LAND. It made a major contribution to the TFA and ITC UORs and the other UORs for quarrying and water supply equipment. It acted as the interface with PJHQ on any difficulties with application of the fledgling doctrine. In the deployment of the DTI task force it even became a political lobbyist to square a disagreement between the DTI and DFID over funding! The use of the E&LSC and DTI task force as reinforcements has offered many lessons for future operations and was examined at the annual joint professional meeting at the Institution of Civil Engineers on 21 March 2000. On Operation *Agricola* the restoration of power was essential to the J3 operation, particularly in Pristina, where the opportunity for murder, looting and intimidation would have increased in a blacked out city.

The other areas of particular technical interest were the water supply, railways and the airfield, each served by its own specialist STRE. 521 STRE (WD) had spent two years re-rolling from a simple drilling team to a water development team capable of running anything up to a medium size water treatment system. The Pristina system was perhaps a little larger than envisaged but its success was testament to the training and exercises it had conducted in the re-rolling period. The OC, Maj Crawford, became chairman of the Pristina Water Board, and his "directors" were equal numbers of Serbs and Albanians. Assistance was given by a DFID-recruited team and a visit by Thames Water, which deployed a specialist under the umbrella of the E&LSC. As I left theatre the chairman was mounting take-over bids for some of the peripheral water companies, which existed on local surface or bore hole supplies.

The railways proved to be another vital component of essential services. With the Italians volunteering to lead on railways there appeared to be no initial requirement for 507 STRE (Railways) (V). The main line from Skopje (and ultimately Thessaloniki) to Kosovo Polje, near Pristina, fell mainly in the BRITFOR sector and with a railway squadron in theatre it was naturally opened as soon as possible. A joint recce with EOD and Capt Walton-Knight declared the line clear and structures safe. A risk was taken with the quality of the line until two members of 507 STRE were mobilized. This took two weeks, requiring processing at the new Reserve Training and Mounting Centre at Chilwell and United Nations Training and Advisory Team (UNTAT) training in Germany. In the meantime two emergency repairs were made with the assistance of two Serbs who had not fled.

507 STRE's recce team eventually arrived and provided an invaluable inspection service, later deploying a liaison officer to act as an interface with the Italians. The lesson that requires attention is how we hold key specialist TA personnel on shorter notice to move, preferably at R2 (five days).

The RAF airfield activation team was commanded directly by KFOR. It included the in-role air support squadron (53 Sqn) and 529 STRE (Air Sp), which deployed some individuals from CRE (airfields). The restoration of essential services and the infrastructure was funded by NATO but living and administrative

infrastructure for the RAF was funded by BRITFOR and hence fell under my infrastructure direction. To be involved in its first joint operation was something new for the 12 (Air Sp) Engr Bde elements. It was not helped by having the different funding lines to NATO and BRITFOR. Whilst 529 STRE was not under my command it was under technical control for BRITFOR funded projects, which included one of the first TFA sites to be constructed. What could have been seen as a drawback was soon seen as a plus with OC 53 Fd Sqn (Air Sp) receiving the same financial delegation as the regimental COs. JWP 4.05 will cover all future infrastructure operations, including single service deployments. The contents should not be a surprise to our air support Sappers as much of it is based on the experience gained by them in recent years in Italy, Turkey, Kuwait and Saudi Arabia. The command arrangements for the RAF airfield activation team were somewhat unsatisfactory and posed the question: why did the UK not deploy a proper joint force HQ (JFHQ)?

#### UNDERSTANDING JOINT OPERATIONS

At the start of the operation there were only three formations with 4 Armd Bde, 101 Log Bde and a small Support Helicopter Force (SHF). Commander 4 Armd Bde double hatted as COMBRITFOR. Due to the presence of the SHF, *Agricola* was a joint operation from the beginning and there were also several RAF officers embedded in both HQs. When HQ 3 (UK) Div deployed for the move into Kosovo it had only J1 and J4 command of 4 Armd Bde, 5 AB Bde, the expanded SHF, and the RAF airfield activation team. It had full operational control of 101 Log Bde and the GOC could raise an operational red card if he felt KFOR were misusing BRITFOR assets. In essence four of our formations were under J2/J3/J5 operational control of HQ KFOR. I sensed that none of the senior commanders were happy with the arrangements.

The reasons for the command arrangements were two-fold. Firstly, the British concept of a JFHQ does not sit easily under a NATO deployment involving HQ ARRC. Secondly, COMKFOR was concerned that other nations may wish to install an interim HQ if BRITFOR introduced a 2-star in the chain of command. The bureaucracy of command would increase. COMKFOR's fears were realized shortly after the move into Kosovo when the Russians were allowed to

introduce a 2-star deputy and the French and Germans promptly followed suit.

The situation in Kosovo was ideal for the JFHQ concept. This missed opportunity did not affect my business, which was firmly J4. Indeed the whole of 101 Log Bde managed to play at “jointery” as the JFLogC, even deploying a group captain as the deputy. He became a most useful ally particularly when battling against some of the RAF’s gold-plated infrastructure requirements. In general I do not believe that the Army has fully endorsed the concept of joint operations and the Corps still has some way to go.

#### **TEMPORARY FIELD ACCOMMODATION – THE INFRASTRUCTURE END-GAME?**

ON entering Kosovo the other key element of the infrastructure operation was to crack on with the TFA sites. The first task was to locate them. Much of the infrastructure, which could have been adopted had been bombed by NATO. BRITFOR was also keen to hand back other occupied sites to return Kosovo to normality. The TFA was therefore to be located on green field sites. All parties agreed that a hub and spoke concept fitted the BRITFOR deployment. Large TFA sites would be built as hubs with plenty of facilities, whilst spokes were occupied for operations in either a small TFA site, an ITC (possibly mobile) or local infrastructure. A good example was the Pristina BG, which was to have its TFA site constructed in the open areas of the VJ barracks but with temporary operational locations in buildings in the city.

The TFA contract stipulated that full UK construction design management (CDM) regulations should apply and this involved handing over a health & safety (H&S) file on each site to the contractor. This is the first mention of CDM on the operation. The pace had been such that it was impossible to apply except for the spirit of the legislation and this was limited to the larger projects. A similar situation applied to safe systems of work. When the Inspectorate of Works deployed from MES it refused to look at safe systems of work until later in the operation on the grounds that it would have to close everything down. Sustaining the operation would have ground to a halt. However, 527 STRE (Wks) applied the spirit of the legislation during “in” inspections of local infrastructure isolating any dangerous facilities. It also became very adept at removing “lash-ups”, which were most frequently installed by the REME!

The H&S file had to include an EOD clearance certificate and a land quality assessment (LQA). The latter was conducted by the defence land agent (DLA) from Defence Estates. This was another of the unsung heroes under my command. His principal role had been to record the “in” and “out” inspections. His reports, photographs and videos were invaluable to assist the move out of Macedonia. His records proved that BRITFOR had not caused all the damage, resulting in a bill of only DM150,000 for four months’ occupation of 20 sites. His LQAs also proved invaluable, in one case forcing the Gunners to move the location of their TFA site. It had been used as a sewage dumping ground.

One of the main drivers behind the selection of a “turnkey” contract was to save the labour of two engineer regiments for the construction phase. However, the contract could not be awarded until the end of July, and with a one month mobilization period, two months of site preparation would be lost. It was therefore decided at an early stage in contract planning to construct all hardstandings and bring water to the camp perimeter using Sappers. Plant operators and 521 STRE (WD) would be critical to success. This also removed some risk from the contractor and drove down costs. At the time of tender the sizes and number of sites had been assumed but the locations and proximity of quarries was unknown. The quarries problem was also addressed at an early stage with another UOR but this was not funded until we had proved that Kosovo had no equipment to offer. The negative answer was sent by D+10 but the equipment was not expected in theatre until early August. Two quarries yielded some ground dumped aggregates but the balance had to be brought in by road and rail, a supreme effort by 65 Fd Pk Sqn. In those early days in Kosovo various contractors visited my desk touting for business. Having been given the bad news of the TFA contract they were requested to open a quarry, a concrete plant or an asphalt plant, in that order of priority. Only one achieved marginal success in the first 10 weeks.

As I left theatre in mid-August the works project management team was arriving to manage the TFA contract. Commanded by Lt Col Chris Cockerill, it was the equivalent of a super STRE and it would work directly to DPA on contractual matters. At this point 2000 men’s worth of hardstanding was almost complete, a further

1000 was on its way to contract (eventually completed on time by a Turkish company), and the balance was programmed for the incoming regiment. The water supply for all sites was also well advanced.

#### I THOUGHT IT WAS ALL OVER ...

THE hand-over to my replacement was almost complete when I was disturbed late that night. COMBRITFOR wanted to see me first thing. Fixing me with his steely glare he asked if part of Istok Prison (Kosovo's main detention centre, which had been bombed by NATO) could be brought back on stream within a fortnight. He offered me a business class seat instead of a VC 10 if I needed more time to give him an answer. "Yes", I replied "it is possible", looking sheepishly at my successor. This was the final example of the relentless nature of the infrastructure operation. Fortunately I had time to task the newly arrived 523 STRE (Wks) and 521 STRE (WD) to confirm my answer before I departed.

#### CONCLUSIONS

##### TIME TO WRAP UP THE KEY POINTS

THE command and control of infrastructure is controversial. CRE 1 (UK) Div believes it worked. The question is who should be the staff adviser on infrastructure? The chartered engineer trains and fills posts for this role from senior captain. The advice is given through the commander of the logistic component whatever the level of operation. The senior Sapper may be based elsewhere, in the JFHQ or perhaps the LAND component. Think of it in terms of joint operations and we will arrive at the correct solution for all future deployments.

The ECI project is the most important development in what is now known as "battlefield infrastructure" on the staff courses. It will learn from the ITC and TFA projects in Kosovo. The Corps must decide how we are going to train to support it on operations and how we integrate with the RLC to store and distribute it. Should the engineer logistic squadron hold the technical bits?

The use of local contractors was a major success and will be a cornerstone of future operations. It will also be interesting to see the lessons that develop from the major use of a contractor for the TFA.

The financial and contractual delegations are essential to the smooth running of the infrastructure operation. The support received from Civ Sec was superb throughout but the system proved more responsive for the move into Kosovo.

The Corps has had to run major utilities in all its major operations in the 90s. The STRE (Utilities), to be formed under SDR, will be a major step forward but its training and *modus operandi* must be to call upon E&LSC and DTI support once the technical challenge is beyond it.

Finally, the operation proved beyond doubt the robust nature of our mix of squadrons and specialist units and our importance to force projection. I would welcome comments on the role of the GS Regt. It is also worth pointing out that by mid-tour 42 Fd Sqn had developed the best construction troop I had seen in over three years of Bosnia tours and overseas exercises. It only takes training (in this case on the job) and confidence. During his visit the EinC(A) said he was "awed" by what the Corps had achieved. My prize goes to 26 Armd Engr Sqn for running the power station.

# Close Support to a Light Battle Group – 9 Parachute Squadron and 1 PARA on Operation Agricola

MAJOR C L TICKELL MA



*Major Chris Tickell was commissioned into the Corps in 1983. His first three tours were with 30 Field Squadron, the Junior Leaders Regiment and Independent Field Troop Allied Command Europe Mobile Force (Land). He led a canoeing expedition in the Okavango Delta, Botswana, prior to taking up an appointment as Adjutant 39 Engineer Regiment. 1993 saw him move to 5 Airborne Brigade as a Staff Officer before being selected for Staff College. Two and a half years in Whitehall was followed, in August 1998, by command of 9 Parachute Squadron. Ten days later he took them to Bosnia for a six-month tour. Within two months of returning to the UK the squadron was deployed at short notice to Kosovo as part of 5 Airborne Brigade. By the time he completes his tour the squadron, or significant elements of it, will have spent 18 out of 24 months on operations.*

## FOREWORD

HAVING read with fascination the various articles on Kosovo in December's *Journal*, it seemed appropriate to craft my own thoughts on the operation. 9 Para Sqn's experiences on Operation Agricola were, inevitably, very different from those of the majority of Sapper units deployed at the time and subsequently. Happily we managed to deploy for only six to seven weeks and were undoubtedly involved in the most challenging times of the operation. Many of the lessons learned related more to soldiering and leadership than true "sappery" but as we all know, Sappers are soldiers first ...

## INTRODUCTION

SATURDAY 5 June 1999 started like any normal weekend in the UK. The squadron was stood down. I was about to go to Winchester with Mrs T but was suddenly asked to be in my office for a brief by the CO at 0830 hours. Delighted with this excuse to avoid some shopping I darted into work. "You're going to Kosovo as a light squadron to support the remainder of the brigade", said Lt Col Mike Carter as he arrived,

"Not only that but you will be going within the next 48 hours."

So began an incredibly frenetic period for the squadron. Everyone was recalled from leave and I woke up the 2IC, Capt Frazer Ross, and told him he needed to start some fast planning. By 1030 I was able to give my first squadron O group and by midday we had finalized the ORBAT. All the G1098 was squeezed onto vehicles during the afternoon and I was summoned to a brigade O group. I then discovered that I would be leaving Aldershot at 2300 hours that night, my recce group would be leaving the next day and the bulk of the squadron on Monday, 7 June. Another set of orders from CO 1 PARA was followed by another quick set of orders to the squadron before I managed to get home to pack my kit and explain to Mrs T that shopping in Winchester would have to be delayed.

## DEPLOYMENT

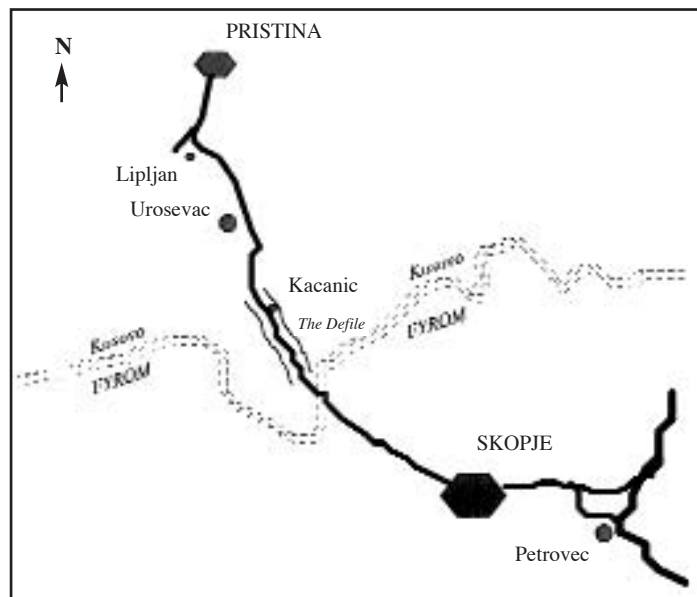
I FLEW out with the brigade recce group and as part of CO 1 PARA's Tactical HQ<sup>1</sup>. The brigade's potential mission was to seize the Kacanik Defile in order to allow the forward passage of lines of

4 Armd Bde. We knew that time would be short and therefore detailed planning started in the back of the RAF VC10. Indeed by the time we landed in Skopje, Macedonia, the “estimate” had been completed and the initial plan thrashed out; 1 Royal Gurkha Rifles (RGR) with 69 Gurkha Fd Sqn would clear the southern half of the defile and 1 PARA with my squadron would clear the northern half. Subsequently we were to be prepared either to continue to hold the defile or fly north to Pristina.

On arrival in Skopje we found ourselves with very little in the way of transport and reliant on the kindness of 4 Armd Bde and 21 Engr Regt. OC 1 Fd Sqn lent me a Landrover which I shared with the Bty Comd from 7 Para Royal Horse Artillery, who was also part of CO 1 PARA’s tactical party. This allowed us to network and try and discover when our relevant sub-units were going to arrive in theatre. Mobile phones became critical assets and were the only method of talking to the UK. Meanwhile the planning frenzy started in earnest and the next 36 hours was a blur, much of it spent in either CO 1 PARA’s basha or the Brigade HQs’ 12x12 tent. The comparison between ourselves and 4 Armd Bde could not have been more apparent and we were certainly on light scales. My recce group had been delayed in the UK and the squadron main body arrived at 2300 on Monday 7 June ahead of them! However the good news was that our vehicles and equipment flew in with them on board an assortment of Antonovs, Galaxies and C130s. Early Tuesday morning saw the squadron fully established within 1 PARA’s harbour area; a sparse wood in the centre of the Petrovec Training Area.

#### TRAINING

DUE to the short notice deployment, no specific training had been done in the UK. It was therefore



Map of area covered by article.

a question of relying on residual experience to ensure we were ready to go when required. The political situation was changing hourly and we were told to be prepared to move from Wednesday morning. I continued to be in a series of never-ending planning meetings at brigade or battalion level which left me little time to be with the squadron. The standard one third and two thirds rule did not apply in even the remotest sense and there was some question as to whether real value was being added by the huge raft of briefings and updates that began at 0600 and ended often in the small hours. In view of the ever-changing plan I decided to adopt a set of standard procedures that could be adapted at short notice. We knew that we would be flying in, the approximate length of road that we would need to clear and that time would be key. The squadron was therefore split into three troop groups of two sections each. The third troop was to be commanded by the QM, Capt Chris Gosling, a veteran of the squadron. Procedures were worked up for clearing the roads, tunnels and bridges that we would face in the defile. At the same time we had to acclimatize to the heat; it was in the high 80s and very different from the UK! Living conditions were austere and washing limited to mess tins. The Brigade Commander had declined the

<sup>1</sup> CO 1 PARA’s tactical party consisted of himself, his Operations Officer, OC 9 Squadron and the Battery Commander of G Battery, 7 Parachute Royal Horse Artillery. We were supported by a number of signallers.



Members of the squadron taking their first rest in five days, having cleared the Kacanic Defile.

offer of more pleasant surroundings in order to prepare and acclimatize us that much quicker; a wise decision in the event. Light G1098s were packed in troop Landrovers and trailers and rigging trials with the support helicopters were conducted. The press descended on the 1 PARA battle group like a plague and a complete day was devoted to entertaining them. They were very much on side but this was indication of the interest generated by the "Paras".

The need for detailed intelligence on the defile was, at this stage, becoming critical. Although some excellent material was available it was still not clear which obstacles the Serb Army had prepared for demolition. On Wednesday night we were warned that we were to move up to the border to Camp Piper, run by 65 Fd Sp Sqn<sup>2</sup>, for final preparations before crossing the border on Friday morning.

#### CAMP PIPER AND THE RUSSIANS

WE flew to Camp Piper on Thursday and settled into an even more austere area; a cornfield awaiting cutting, without the benefit of shade. By this stage the squadron was fully "bombed up (less explosives)" and the weight of our bergens and the heat was certainly focusing the mind. We ran

through the plan for the final time only to be told that we were to be delayed by 24 hours. In retrospect it gave us a welcome breather and allowed the first rest since deployment. Final orders on Friday 11 June were interrupted at 1300 by CO 1 PARA informing us that we had been ordered to seize Pristina, by helicopter assault, ahead of the Russians that afternoon. We were to be ready to move at 1345! An even faster set of orders then followed and our explosives arrived simultaneously; PE4 was thrown at every man in the squadron and bergens became even heavier. We were not clear as to the situation we were about to face other than from the CO's statement

"Gentlemen the threat is ramping up." As a consequence we tabbed to the landing sites with a degree of unease but then watched the afternoon unfold and the tension lessen. Eventually at about 1700 we were stood down and moved back to our harbour area. Recent exposure in the press has revealed a degree of disconnect between senior NATO commanders during this particular afternoon. It was without doubt a difficult few hours and the decision to keep us in Macedonia was, in retrospect, welcomed. The worm's eye view, rightly or wrongly, was that once committed we should be prepared to fight for the airfield; not a particularly happy thought and one that most did not relish. Happily I was too busy to give it much consideration!

#### CROSSING THE BORDER

THE events of Friday afternoon left the whole brigade remarkably tired but we received another set of orders for the crossing of the border the next morning. A final set of checks followed and we were able to rest from soon after midnight before moving to the landing sites at 0330 hours. The support helicopters arrived shortly afterwards, flanked by American attack helicopters as escorts. The squadron was split into the three troop groups and would be the leading elements of the 1 PARA Battle group. We had chosen two landing sites (LS) on the Kacanic Defile and 1 Tp would work south to link up with the Gurkhas who were moving

<sup>2</sup> *The Royal Engineers Journal*, December 1999 – "Operation Agricola Sex Scandal" by Major R K Tomlinson MBE.



north up the road from the border. 3 Troop would land on the same LS and move north to the next LS where the newly formed 4 Troop would already be moving north towards Pristina. After about an hour waiting in the aircraft both on the ground and circling in the air we crossed the border, overflying the huge traffic jam of 4 Armd Bde and the army of press who were all jostling to move first. The RAF produced some outstanding flying to put us down on very difficult landing sites; indeed one Chinook had to hover over a cliff face with its back ramp on the road as troops disembarked.

With 1 PARA providing close protection, the troops started to clear the road. The atmosphere was particularly tense and eerie.

All the villages were empty and cars lay abandoned on the road. The only traffic was a Serb Army staff car travelling south which soon turned around when it met us! Communications were, not surprisingly, very difficult in such a deep defile and our dispatch riders provided the only reliable method to pass critical information on the routes back to Bde HQ. Within 5½ hours the route was open; we had found and dealt with two improvised explosive devices and one anti-tank mine. It is worth noting that the engineer plan had lead and dictated the brigade and BG plans in their entirety.

1 PARA was ordered to go firm in the town of Kacanic which was completely empty. It had been badly looted and dead animals littered the streets.<sup>3</sup> Some members of the KLA (Kosovo Liberation Army) appeared from the hills and were delighted to see us but there were very few members of the community about. We started to establish ourselves in the town but were then informed that we had 15 minutes to be at a LS 2km up the road in order to fly up to Pristina; we ran up the road and met, with 1 PARA, the support helicopters that landed in amongst the armour of 4 Armd Bde. We sat in the aircraft for



The OC trying to calm the Serbs in Lipljan.

an hour, paralysing the move north of 4 Bde, before we were told to debus and move back to Kacanic; the armour rumbled on! 24 hours later we were flown north but to the south of Pristina to a town called Lipljan. 5 Airborne Brigade (5 AB) established itself in the town although at this point 1 PARA was switched to 4 Armd Bde. The first night in the town was disturbed by celebratory gunfire on behalf of the Albanians and a distinct feeling of unease by the Serbs. The next day the squadron was ordered to re-role into an infantry company and take control of Lipljan and its surrounding villages.

#### **POLICING LIPLJAN**

THE town of Lipljan had been predominantly Albanian until the early 1990s when many of them fled the Serb repression leaving the Serbs with an 80 to 90 per cent advantage in 1999. Albanian homes had been occupied by Serbs and many of their businesses looted and burnt. However the Serbs were very fearful for their welfare when we arrived and our key task was reassurance of the Serb community to avoid ethnic cleansing by the Albanians. This was best achieved by a heavy patrol programme, mostly on foot but at times utilizing the few vehicles we had in theatre. Rural patrols sapped our manpower but often these communities were the most vulnerable to Albanian intimidation.

<sup>3</sup> Several days later two large mass graves were also discovered in the town.

We were billeted in an ex-Serb police station; the outgoing inhabitants had left us a full array of weapons and torture instruments and copious quantities of blood on the stairs. Although collocated with The Royal Irish Regiment and Royal Military Police, the majority of the clean-up fell to the squadron. This was done in between patrols and was a further drain on our resources. Included in this was the clean-up of the kitchen which allowed us to move onto fresh rations<sup>4</sup>; a major boost to morale and the envy of HQ 5 AB.

I spent much of my time with Serb leaders, discussing their fears and concerns and trying to ensure that we assuaged them; this included a number of addresses to the people which were somewhat fraught. At the same time the KLA was giving us valuable intelligence on war criminals and weapons caches which we often acted upon. As a result a key war criminal was arrested by the squadron and hundreds of weapons confiscated. Needless to say this ran contrary to the policy of reassuring the Serbs and we were very much caught in the middle of two differing objectives. Impartiality remained vital and we arrested leaders on both sides; however the Serbs became even more frightened and this led to some of them fleeing to Serbia.

The Albanians became more overtly aggressive and on one Monday market day after a morning's drinking they started to wantonly loot the town. We flooded the area with the whole squadron and arrested more people than our cells could deal with before we restored a measure of calm to the situation at the end of the day. Some days later, a squadron multiple patrol was caught in cross-fire between gunmen from both sides; one Serb turned to open fire on the patrol and was shot dead by them. Follow up operations over the next 12 hours netted a large variety of ordnance and weapons<sup>5</sup>. Life continued in this vein for the four weeks that we were responsible for law and order in Lipjan.

Throughout the period we also continued to provide engineer support to the brigade: setting up and running a brigade water point for the four weeks; completing a series of plant tasks; providing

detailed engineer recce data on local materiel; and supporting both the pathfinder platoon and BGs on patrol tasks. Physically and mentally it was highly demanding for all of us; in addition to regular foot patrols we mounted several covert OPs on likely targets<sup>6</sup> and were able to furnish Bde HQ with high quality intelligence.

We were warned that we would recover to the UK in early July and amazingly were duly relieved by a company from 1 Royal Irish at midnight 4 July 1999. We spent two days cleaning equipment before flying home on 7/8 July.

#### LESSONS LEARNT

THE weeks we spent in Kosovo were demanding but highly rewarding. Across the rank structure we learnt much about ourselves, the squadron and others! It is dangerous to draw too many lessons from such a short, albeit intense, deployment but I would emphasize the following four points:

- Close support is not just an armoured occupation. The squadron was in close support to 1 PARA and 69 Sqn to 1st Battalion The Royal Gurkha Regiment. The planning processes are identical and although equipped differently, the demands are similar if not more intense; we were expected to be as professional in our infantry skills as we are as combat engineers, not necessarily the case when the BG is equipped with Warrior and Challenger.
- The speed of deployment both to and within the theatre demonstrated the strategic and tactical utility of light forces. Combining the strengths of 5 AB and 4 Armd Bde made the UK contribution to Operation *Agricola* flexible and potent.
- The insertion using support helicopters and US attack helicopters worked extremely well and was a look ahead to the future of 16 Air Assault Brigade. It is a concept that worked for the US in the Gulf and the UK in Kosovo; 16 Brigade must be properly funded and resourced if UK plc is to reap the full benefits of such a capability.
- The squadron was asked to perform several different tasks at no notice, with little, if any, suitable training. The need for commanders at all levels to be able to operate in an uncertain environment proved to be critical and training for such difficulties must be included at an individual and collective level.

<sup>4</sup> LCpl Forman, Royal Logistic Corps, was awarded a General Officer Commanding's Commendation for this work.

<sup>5</sup> SSgt Tim Barnard was awarded a Mention in Despatches for his work during this and subsequent operations.

<sup>6</sup> For instance, Cpl Balloch and LCpl Winter spent 48 hours with "eyes on" a KLA stronghold. They were no more than 300m from the house which was situated in open country; they extracted without incident. For this and other work Cpl Balloch was awarded a Joint Commander's Commendation.



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# Planning For Expeditionary Operations

MAJOR C M HAINGE BSc(ENG)



*Readers of an article by Major Hainge in the August edition of the Journal probably noticed that after spending a disgraceful amount of time avoiding hard work he was tracked down and posted to Headquarters Royal Engineers 1 (United Kingdom) Armoured Division. He arrived in Herford three weeks before the Commander Royal Engineers and just in time for Christmas. After their well earned leave, both officers deployed to Macedonia and Kosovo on Operation Agricola 1, where they formed the nucleus of a very small Headquarters Royal Engineers. They returned to Herford after six months on operations where Major Hainge has resumed the appointment of SO2 G2/G3 Engineers. The photograph shows the author enjoying the sun in down-town Pristina.*

## INTRODUCTION

READERS of the *Journal* will already have enjoyed the excellent articles that appeared in the August 1999 edition covering the initial phases of deployment, as well as those that took up the story in the December 1999 edition expanding on the advance into Kosovo and subsequent operations. The aim of this modest follow-up is to delve behind the scenes and look at the initial planning and preparation that led to deployment of the first engineer troops on Operation *Agricola 1*; so those who thrive on hard-hitting tales of blood, guts, action, toil and tears can read on assured of a good story.

## KOSOVO'S PROBLEMS

I MAKE no apologies for starting with a short historical overview, because the present-day situation has its roots firmly in the past. In this sense Kosovo, rather like Northern Ireland, is a victim of its own history. The Serbian province of Kosovo is alleged by Albanians to have been inhabited by their ancestors since classical times and Tito recognized this in 1974 when he granted it autonomous status. This infuriated the Serbs, whose feelings for Kosovo date back to 28 June 1389, when the last Serbian medieval ruler lost control of the province to the Turks at the battle of Kosovo Polye. This illustrates the

depth of feeling that Serbs have for their past and perhaps explains the events of 1989 when the Serbian nationalist leader, Milosevic, dissolved the regional government and set in place a police state based on ethnic apartheid. Since then Albanian ethnic unrest made the transition to armed insurrection, the Kosovo Liberation Army took up the struggle and Milosevic embarked on his campaign of ethnic cleansing aimed at clearing the Albanians out of Kosovo.

In 1998 the UN passed a resolution calling for a cease-fire; Milosevic agreed and allowed monitors to enter Kosovo to ensure that the conditions of the cease-fire were observed. The Kosovo Verification Mission (KVM) monitors were headed by a former sapper, Major General Drewienkiewicz CB (known as General DZ) and the Kosovo Verification Coordination Centre was based in the Macedonian town of Kumanovo just south of the border between Macedonia and Kosovo. Since it was subsequently felt that these unarmed monitors could be vulnerable to capture for use as hostages or human shields the decision was taken to create a multinational extraction force in Macedonia, which could enter Kosovo and carry out operations to extract the monitors if necessary.

The UK's contribution to this force was an armoured infantry company group supported in

engineer terms by an initial engineer surge force from 20 Fd Sqn. Integral close engineer support was provided by a field troop from 11 Fd Sqn and an infrastructure engineering capability was provided by elements of 527 STRE (Wks). These elements were deployed in December 1998 and were to play an important part in subsequent events.

Meanwhile efforts to restore peace to Kosovo continued and talks at Rambouillet were programmed to try to reach an interim agreement (IA) between the two sides. Plans were made to deploy NATO forces in Kosovo to implement or if necessary to enforce that IA and the UK made a notable contribution to those forces.

#### CONCEPT OF OPERATIONS

THE BRITFOR outline concept of operations envisaged a deployment through Thessaloniki airport of disembarkation/sea port of disembarkation (APOD/SPOD) in Greece and Petrovac APOD in Macedonia. Deployment was to be phased in four tranches; first to move were the key enablers and recce, followed by further recce and command elements. Next were the lead armoured battle group (LABG) with associated combat support (CS) and combat service support (CSS) and finally the second BG with CS and CSS elements deployed so that a brigade-sized force would be in Macedonia and poised ready to move into Kosovo as part of the NATO implementation force. Passage through Macedonia was to be rapid, with the force implementing the IA immediately. This NATO force was to be commanded by COMARRC, which would deploy as COMKFOR with elements of staff from Rheindahlen providing HQ KFOR.

**Key Enablers.** The key enablers concept was central to a successful deployment. In essence this meant that logistic elements moved into theatre in order to set up the reception, staging and onward integration process for deploying forces, together with the infrastructure needed for those forces to live and operate. Sappers were a critical part of the key enablers force, particularly those from 62 CRE (Wks) and 28 Engr Regt.

**Engineer Surge Elements.** It was recognized that the need for 28 Engr Regt would probably reduce significantly after the initial stages of the operation into Kosovo, so they were designated as surge engineers and earmarked for return without roulement at or before the six-month point. Since the engineer forces remaining in

theatre after the withdrawal of 28 Engr Regt would roughly mirror those in Bosnia, the requirement for a CRE would diminish to the point where the role could be filled by a CO of an engineer regiment.

**Move into Kosovo.** The plan was for KFOR to move north into Kosovo once conditions allowed and an IA had been reached. The force was then to implement and if necessary enforce the IA in Kosovo. Therefore the deployment into Macedonia was to be no more than a transitional stage before the main phase of the operation started, and initial force dispositions reflected this. Planning started immediately upon arrival in theatre for the move north and the focus was firmly on 21 Engr Regt, which was tasked to provide mobility support to 4 Armd Bde during the advance through the 12km-long Kacanik defile along a route restricted by long span bridges and tunnels. These factors dominated engineer plans for that phase of operations and Capt Houlston's article in the December 1999 *Journal*, "Preparing for Operations in Kosovo", gives a fascinating insight from the perspective of one of the key planning staff.

**Subsequent Operations.** Once established in Kosovo the aim was to dominate the area of operations and set conditions for a successful implementation of the IA. It was assessed that there would be a need for EOD support, mobility support and infrastructure engineering to keep UK elements of KFOR poised and operational.

#### PRE DEPLOYMENT PLANNING

PLANNING for the deployment started in HQ 1 (UK) Armd Div in early January 1999 when it became apparent that units from the division might be sent to Kosovo. HQ LAND working closely with PJHQ and the divisional HQ worked up the force element table (FET) and planning started in earnest whilst recce was gearing up to deploy from Germany and the UK. Close co-operation with G3 (Operations and Deployment) at all levels was critical to establishing a balanced and coherent engineer grouping.

**Force Element Table.** The FET was based around the decision to send HQ 4 Armd Bde to command the UK's contribution, including the national support element (NSE). The deploying BGs and artillery regiment were also assigned to 4 Armd Bde, making Operation *Agricola* in effect the first chance to try out the fledgling Joint Rapid Reaction Force (JRRF) concept.

Here lay the first engineer problem; 21 Engr Regt, which had just completed its training year with 4 Armd Bde, had already been warned off to deploy to Bosnia on Operation *Palatine* in March. In order to keep formation integrity it was decided to switch the regiment from Operation *Palatine* to Operation *Agricola* and hand the Bosnia commitment on to 22 Engr Regt.

Having cleared the way for 21 Engr Regt to deploy in its operational grouping, the usual business of untangling peacetime dispositions into an operational posture began and 26 Armd Engr Sqn began preparations to deploy from Hohne to join a RHQ based in Osnabrück. It was decided to deploy a UK-based EOD detachment from 21 Fd Sqn (EOD) and a geographic support group (light) from 14 Topo Sqn with 21 Engr Regt in order to provide these two associated capabilities to the force.

As the force was probably to be deployed at the end of a long line of communication, a significant element of logistic support – the NSE – would be required. CSSG (UK), which was later to adopt the far simpler and more descriptive title of 101 Logistic Bde, was earmarked to fill this role and 28 Engr Regt was warned off for deployment as general support and enabling engineers to provide a surge capability for the UK force. 28 Engr Regt would mainly be operating, initially at least, in support of the NSE. Thus two one-star formations deployed, effectively each with its own engineer support; 4 Armd Bde with 21 Engr Regt and CSSG (UK), with 28 Engr Regt. Once again the peacetime mal-location of engineer units in Germany caused friction; 42 Fd Sqn was to deploy with 28 Engr Regt but although both units were based in Hameln they occupied different barracks and more importantly demanded G1/G4 support up different chains. Similarly, 26 Armd Engr Sqn drew on 7 Armd Bde for logistic support even though it was to deploy with 21 Engr Regt, supported through 4 Armd Bde. Thus the remarkable situation developed where two engineer regiments and their sub-units were working up to deploy on one operational tour yet demanding spares and other resources through four different supply chains – G4 staffs of 4, 7 and 20 Armd Bdes and G1/G4 staff in HQ 1 (UK) Armd Div.

Meanwhile MWF had already placed elements of 527 STRE in theatre to support Operation *Upminster*; these were reinforced and CO 62 CRE (Wks) deployed to take command of

MWF assets and act as SO1 Infrastructure, working primarily to NSE.

As 65 Fd Pk Sqn had been expecting to deploy on Operation *Palatine* with 21 Engr Regt it seemed churlish to leave them out of the ORBAT. Besides, there was a clear role for them to play in Operation *Agricola* and so it was agreed that they too would deploy to Macedonia whilst detaching a small element to provide engineer logistic support to Operation *Palatine* in Bosnia. This eased the planned tour interval for engineer logistic squadrons from six months, which was viewed as unsustainable, to twelve months and was an essential step to take if we were to be able to support both operations simultaneously for any length of time.

Since such a strong engineer force was deploying it was assessed that in order to co-ordinate sapper efforts across theatre it would be necessary for a CRE and some of his staff to deploy. CRE 1 (UK) Armd Div and an SO2, accompanied by the CRE's driver and signaller/operator were added to the FET. As there was no two-star HQ initially, HQRE collocated with HQ CSSG (UK) and CRE deployed forward to join HQ 4 Armd Bde when required to do so.

**Peace Establishment or “Best Effort”?** The initial guidance from HQ LAND was that units should deploy at peacetime establishment. This may have been attainable for infantry and armoured units, but did not represent a realistic aspiration for the Sappers. The demands on manpower made by the black economy, BATUS temporary staff and the usual leave and course loads militated heavily against any such deployment level and therefore Comd Engr LAND decided that Sapper units were to deploy at “best effort” manning levels. This avoided the building-in of long-term problems resulting from back-filling one unit with another's manpower and was a significant factor in keeping individual soldiers' tour intervals at a reasonably sustainable length. Despite this, if we had to man Operation *Agricola* and Operation *Palatine* simultaneously at what were then current levels, and in the worst case long-term, Sapper units in Germany would be faced with twelve-month tour intervals over the next three years.

**Manpower or Capability Lead?** When looking at manning units for deployment we had to ask ourselves the question, “Are we aiming to meet a manpower ceiling or to provide a task capability?” The answer was clear and so planning went

ahead with capability-led force levels based at first on the LABG ORBAT. This was particularly useful as it allowed 21 Engr Regt to overcome the lack of first-line lift by including five DROPS vehicles in its ORBAT. Because movement was to be in four tranches CO 21 Engr Regt wished to deploy 1 Fd Sqn early on, with all three of its field troops as well as one armoured troop from 26 Engr Regt, on the basis that we should get as many field troops as possible into theatre early. This ploy was to enhance the engineer capability in a way that later proved to be useful.

**Standard Fit or Special To Task?** The intention to deploy at LABG ORBAT meant that engineers were not organized in a special to task way, but rather in a way that would give a balanced capability to provide engineer support across a whole range of options. With hindsight it seems that we got it broadly right, but the need to cater for the unexpected must never be overlooked. Who could have predicted the need to construct refugee camps for 30,000 people, for instance? The fact that this was achieved is perhaps more an indicator of the superb professionalism of our Sappers than of our own ability to get the ORBAT right first time.

#### DEPLOYMENT INTO THEATRE

THE deployment started against a background of diplomatic activity to try to secure an interim peace agreement and so all the movement took place as “sensible military contingency planning”. This caveat was to prefix virtually all moves into theatre and reflected the degree of uncertainty that pervaded the operation. It was clear that engineer enablers needed to be moved into theatre early. This had been confirmed by the initial reces, which included engineer commanding officers. At this point a difficulty arose; whilst 21 Engr Regt had a substantial element at relatively high readiness to deploy, 28 Engr Regt was funded for a lower readiness and this meant that it would in theory not be able to deploy for a month. HQ LAND was adamant that there was to be no breaking of readiness – largely to force ministers into making a timely decision – but agreed that the CO’s recce group could deploy early. The remainder of the regiment, including 42 Fd Sqn which had re-rolled from mechanized to wheeled specifically for this deployment, would have to wait out the month in Germany before it could move out to theatre.

Because there would be a shortage of general support engineers early on there was a grave risk that little in the way of enabling engineering works could be accomplished before the main forces deployed. This was where 20 Fd Sqn came into play; having been sent out as enabling engineers for the UK elements of the extraction force on Operation *Upminster* they were placed TACOM to 28 Engr Regt to cover the capability gap until the arrival in theatre of 42 Fd Sqn. The subsequent tasks they covered have been reported separately, but without their efforts at a critical stage, the deployment of Operation *Agricola* forces would not have been as efficiently achieved as it was.

Others have described the initial works that we carried out in theatre whilst waiting for the arrival of 26 Armd Engr Sqn and the remainder of 28 Engr Regt’s vehicles. Suffice it to say, there was enough work to make sure that we had no time to be bored. 42 Fd Sqn came into theatre, allowing 20 Fd Sqn and the troop from 11 Fd Sqn to return to the UK, and the process of fine tuning the engineer FET to be able to cope with likely future tasks in Kosovo began. As a result of the bombing campaign it quickly became apparent that there was likely to be a significant amount of infrastructure damage in Kosovo and so we started to put in requests for additional minor items of equipment to be moved out to the theatre. At the same time we asked for specialist elements to be brought to a reduced notice to move (NTM) so that we would have the capacity to deal with technical reconstruction tasks as well as EOD.

Ministers eventually approved the deployment of the final movement tranche, but its reception in Greece was enlivened by the imposition of road travel restrictions by the Greek authorities and a Greek rail strike.

#### LESSONS IDENTIFIED

ENGINEER recce was proved, once again, to be an essential part of any pre-deployment planning. Comd NSE took CO 28 Engr Regt and OC 65 Fd Pk Sqn on his initial recce to Greece and Macedonia and the value of this recce in helping to shape subsequent engineer planning was enormous. Without it we would have found it very difficult, if not impossible, to construct realistic staff tables. This would have hampered our ability to deliver the required engineer capability in theatre. Other sources of information were relatively scarce; map coverage was provided but there was a

dearth of road and bridge information from Kosovo. The KVM observers under General DZ provided a valuable service in this respect and were able to fill in many of the gaps in our knowledge.

The process of compiling the FET and associated movement staff tables was not easy, as there was no doctrinal template to follow. HQ LAND took a leading role in this activity and showed great flexibility in accommodating requests to modify ORBATs to suit engineer perceptions of the best way to organize the Sapper contribution to Operation *Agricola*. Divisional and brigade headquarters echoed this adaptability and the regiments' requests for additional items of equipment were met, avoiding any deficiencies in critical equipment, even though this often meant that the staffs had to work long hours at a very busy pace.

It was easy to identify the engineer enabler which would also provide engineer surge capability – 28 Engr Regt was the only choice. However, the regiment was at a funded readiness level of R5, or 30 days' NTM. This limited our ability to deploy it to theatre and we only managed to get a reasonably sized footprint on the ground by deploying a large advance party. Had 20 Fd Sqn not been in theatre we would have been extremely badly placed and unable to deliver a meaningful GS engineer capability. The lesson here is that GS engineer regiments must contain an element at the appropriate readiness to be able to deploy in support of similar expeditionary deployments in future.

The limited amount of shipping provided scope for endless bun-fights as each of the units providing elements to Operation *Agricola* fought to get

space for its own vehicles and equipment. Conflicting priorities meant that some of 28 Engr Regt's vehicles and equipment had to be left off the first ships' manifests and were not deployed until the second BG's sea move took place. Engineer commanders should note that for future similar deployments this constraint could mean that not all of their equipment and vehicles may be immediately accessible in theatre. 527 STRE faced a similar problem on a larger scale, as none of their vehicles were put on the first shipping tranche. Once again we were lucky in that 20 Fd Sqn's B-vehicles were available to fill the gap.

#### CONCLUSION

THE unpredictability of events lent its own tone to engineer operations and as a result some unusual demands were made on the flexibility and adaptability of Sappers – and no doubt there will be more to come. The overall impression left in the minds of those who took part in the initial planning and preparation was that once again the unexpected tended to dominate events. The construction and management of a camp for 30,000 refugees is a skill rarely practised in peacetime, and few Sapper officers would expect to be asked to take over and run a 1960s coal-fired power station; yet these are just two of the wide range of tasks that emerged and fell to Sappers to handle. Take into account the fact that the initial operational deployment was planned and mounted in a very short space of time with a large number of unusual constraints and, without blowing our own trumpet too hard, I consider that the Sapper side of the business was executed remarkably successfully.



# Exercise Transglobe

## Leg 5 – Singapore to Cape Town

MAJOR T G VALLINGS DWR

Exercise *Transglobe* is an inter-services round the world yacht race. Crews compete in matched 55-foot yachts, which are crewed by twelve soldiers, sailors or airmen. Three Sappers helped to crew the Army Yacht in Leg V:

Skipper: Lieutenant Colonel Andrew Mills  
Mate: Captain Nigel Hindmarsh  
Crew: Corporal Keith Howes.

The following is an account of their adventures in the yacht *Broadsword*.

THE roar from the wind and sea spray was deafening. Waves as long as our 55-foot yacht crashed down onto the deck in the darkness. We were still some 3000 miles from Cape Town as the cry: “We’re filling up with water!” confirmed our worst fears.

You’d be justified in mistaking this for an extract from an Alistair McLean novel. In fact, it describes one of the many challenges which occurred aboard the yacht *Broadsword*, whilst racing from Singapore to Cape Town. The experience constituted perhaps the most extraordinary six weeks of my life. I use the word “extraordinary” carefully, as the range of emotions experienced on board covered the whole spectrum. You could go from total exhilaration and jubilation to determined survival and self-pity within a couple of hours.

The waves mentioned came with a gale which was one of seven we encountered en route to Cape Town and it was a monster. It was almost impossible to read the wind speed dial due to the volume and speed of the spray crashing over the cockpit. I could just make out a reading of 55 knots when I handed over the helm, at 2300 hours, to our Skipper, Lt Col Andrew Mills. We were charging along at ten knots with three reefs in the mainsail and only a staysail. As the waves enveloped the boat and water poured in, we started to lose steerage. The only way to rid the boat of seawater was to heave-to and level her off to allow us to pump out the bilges. The skipper pushed the helm hard to port and Sgt Scott Rogers and I worked the mainsheet to assist.

The cockpit suddenly filled with water to just above our knees and started to flow down into the cabin. The two starboard bunks were already submerged and the water was now above engine level, sloshing around the cabin floor. Cpl Keith Howes

was trying to bail out the engine locker with a bucket, whilst LCpl “Arthur” Daley was pumping hard on the bilges. The off-watch, unable to sleep after being thrown out of their bunks during the heave-to, also grabbed containers to try to empty the boat. Still the water seeped in quicker than it could be bailed out. The noise of the wind and spray made it difficult from the cockpit to communicate with the rest of the crew who were frantically bailing down below. The skipper handed the wheel back to me and went below to assess the situation.

It was not good. The water was still rising. The skipper directed us to man the fire hose, using it to pump water from the boat into the sea. This proved difficult, as the hoses needed to be connected. Our torches flickered sulkily and one of the hoses leaked. The leak was eventually found and sealed and, after two hours of pumping, most of the seawater had been drained from the boat. We were all exhausted. By 0200 hours, after a very welcome cup of tea, we were able to relax. With the wind still blowing over 50 knots, we were sound asleep in our sodden sleeping bags when the mainsail ripped for the third time and it was all hands on deck to get it down below for repair. Cpl Spence Taylor and Sgt Andy Dorward spent the next 24 hours stitching it up again.

It was clear from the minute we arrived in Singapore that our crew was full of character and that, despite never having sailed together, we were going to bond well. Eleven of us, selected from across the Army, covered ranks from private to lieutenant colonel, whilst our sailing experience ranged from novice to yachtmaster examiner. The four-hour on/four-hour off watch system worked well, with Andy Dorward and myself running each watch and the crew rotated through a day on cooking duties (mother watch). Although it was harder



Cpl Keith Howes grinds in the kicking-strap.

to maintain set drills for the various manoeuvres, changing watches every third day added variety. The skipper and Nigel Hindmarsh rotated watches between themselves. Weighed with overall responsibility for the boat, they concentrated on navigation and sail plan.

The race began ten miles off the historic volcanic island of Krakatoa. *Broadsword* had a good start and led until nightfall when both land and other yachts disappeared for the next six weeks. The first fortnight was quite incredible. We were 200 miles ahead and had experienced some of the most exhilarating sailing possible. Surfing down 20-foot waves, averaging above nine knots and playing the mainsail and spinnaker 24-hours a day was simultaneously exhausting and pretty close to Utopia!

Morale was high, but the humidity and heat were oppressive. Even at night the temperature made sleeping impossible. One way to get some sleep was for the four off-watch crew members to stretch out on the spinnaker bags on the cabin floor, which was the only place that caught any breeze. How unpleasant these bags became after two weeks of sweating bodies lying on top of them! There was no

shower on board so we stripped off at the stern and poured buckets of seawater over ourselves. A bucketful of tepid Indian Ocean was very refreshing, but became fairly bracing when we reached the cold Southern Ocean.

Throughout the race, we ate individual 24-hour ration packs (compo), but no fresh rations. I don't believe anyone has ever eaten individual ration packs for 38 days without a fresh supplement before. In fact, the skipper's decision to take only the ration packs caused much amusement amongst the crews of the RAF and Navy yachts, yet proved to be a possible life-saver, since they required no fresh water for cooking, and when the generator, our primary means of recharging the batteries and running the water-maker, gave up just nine days after setting sail, compo came into its own.

With the generator broken there was only enough diesel to run the engine for two hours a day, sufficient to recharge the batteries provided we didn't use the weather fax, HF radio, or navigation lights. As a result, we were unable to receive any weather forecasts. We were only able to use the water-maker when the engine was running which limited us to five gallons a day. This was not enough in the soaring heat so "mother watch" had to sit at the stern of the boat for up to three hours, often in horrendous weather conditions, using the manual pump to convert seawater into fresh water.

We boiled all our compo in salt water using a pressure cooker, which greatly reduced our water requirements. Cooking in a yacht is awkward at the best of times but virtually impossible in 50 knots of wind, whilst being thrown around by 40-foot waves. Any shortfall in the compo's flavour was made up with lashings of Tabasco. That said, I would now rather starve than have to eat butter-scotch and dumplings with Tabasco again!

Every Friday at 1900 hours we had "Happy Hour" where we were all given a tot of rum, which we savoured, as our weekly 40-word personal family emails were read aloud to us. This ritual always resulted in good banter, especially when crossing the equator when, strangely enough, all our clothes were temporarily lost!

The last three weeks really put the boat and the crew to the test. The boat needed pumping out every 20 minutes during gales – a three-man task – thus sleep and dry clothes were almost non-existent. On average, we got anything from 12 to 24-hour breathers between gales, giving us brief respites before the next battering. During these breaks everyone was cheerful and jokey, but it was hard to

prevent the gloom that soon set in once the next gale arrived. The mainsail ripped a total of four times, keeping two crew members continually below deck repairing it and restricting sleeping room. The remainder of the crew were either involved in keeping the boat dry, hand pumping fresh water or racing the boat.

At one stage, a 45-foot wave broke on top of the boat, ripping out three stanchions on the starboard side and washing away the guard-rail, spinnaker pole mounts, and life raft. Any subsequent activity on the bow now bore the risk of being swept overboard. Pte Nick Shuttleworth and I were sent forward to secure the pole to prevent further damage. Another wave hit us. The bow was totally submerged and we were lifted up 4-foot, to the limit of our harnesses, then came crashing down onto the deck. The impact gashed my knee which required seven stitches. These were administered during the gale by Maj Phil Rosell, fortunately a qualified Army surgeon. The movement of the boat impeded Phil's stitching technique, but a large shot of Captain Morgan's Rum greatly eased the pain! I had the luxury of being ordered to my bunk by the skipper for a whole night of undisturbed sleep. This gave Scott Rogers the ammunition he had long been looking for. He spent the rest of the race telling me how brave officers in the American War of Independence had been, fighting on with severe wounds, such as only one arm, and even then refusing to be casevaced.

We rounded Cape Agulhas (the southern tip of Africa). The end was in sight. We were all dreaming of egg banjos and hot baths when the starboard rear shroud snapped. This was potentially disastrous as it supports the mast; however, Andy Dorward made another excellent repair with a rope tensioned by lashings and a knot that I have never heard of!

Our last day was met with engine failure during routine recharging. This was going to make our entry into Cape Town all the more dramatic. At nine knots, with only the staysail and three reefs in the main and a 40-knot wind on the beam, we sped into Duncan's Dock. It was midnight and we had just enough battery power left to power our navigation lights. Fortunately, the shore team had organized a small motor boat to tow us the last 100 metres to the berth. The doctor was so keen to touch land that he took a massive leap, totally missing the pontoon and landing straight in the water! The rest of us celebrated our landfall with a few quiet beers – mission accomplished. We finished 48 hours behind the RAF and 12 hours behind the Navy.



Cpl Keith Howes and Capt Nigel Hindmarsh point us in the right direction.

However severe the appalling conditions became, individual determination and incredible teamwork enabled us to see the job through. At no time did we consider giving up. Despite the race result, all of us took away a collective victory of having survived and completed the task.

It was without doubt the hardest exercise I have been on. I feel privileged to have been a part of it and humbled by the experience. Our skipper (despite being a Sapper!) was outstanding and deserves much credit for delivering us to Cape Town in one piece. Many critics believe that yachting should not be classified as Adventure Training... I agree – Battlefield Inoculation would be more appropriate!

#### Singapore to Cape Town Statistics

Total distance travelled: 6386 nautical miles.  
 Days at Sea: 38.  
 Max apparent wind strength: 58.2 knots  
 (hurricane = 60 knots).  
 Two gales, three severe gales and two storms.  
 Average duration of gales: 36 hours.  
 Longest duration of gale: 3.5 days.  
 Maximum boat speed through the water: 12.4 knots.

## Autumn in Kosovo – Operation Agricola II

MAJOR GENERAL EDWARD FURSDON CB MBE MLITT DLITT FIMGT



*General Fursdon enlisted as a Sapper in July 1942; attended the RE University Short Course at Birmingham in 1943; and was commissioned in March 1945, serving with West African Engineers in Eastern Bengal, Burma and the Gold Coast. Regimental and staff appointments followed in the UK, Singapore, The Canal Zone, Cyprus, Port Said (Operation Musketeer), East Africa and Kuwait (Operation Vantage): a qualified air despatcher, he flew in the Borneo Campaign. After commanding 25 Engineer Regiment in BAOR, he became AA and QMG and then Chief of Staff and Deputy Commander Land Forces Gulf. BAOR again was followed by a Service Fellowship at Aberdeen University lecturing on strategic studies to post-graduates: the MOD as Director of Defence Policy (NATO and Europe) and then as Director Military Assistance Office (Overseas): Military Adviser to the Governor of Rhodesia and Senior British Officer Rhodesia; and finally Senior British Officer Zimbabwe. Retiring in 1980, until March 1986 he was Defence Correspondent of the Daily Telegraph which included covering the Falkland Islands/South Georgia aftermath, the Contras and being a war correspondent in the*

*Iraq/Iran war. Since then he has been an independent Defence Correspondent, reporting Tri-Service-wise for national and international defence magazines – which has included writing from the Gulf,*

### *Bosnia and Kosovo.*

ALTHOUGH it was still early October, already the first chilling winds of morning were heralding the onset of the vicious Balkan winter. For both Kosovars and the soldiers of KFOR (Kosovo Force) alike, the urgent race against time to provide warm shelter against the ravages of the forthcoming extreme cold was top priority. However, whereas the approach of winter was concentrating minds, this was but one of the myriad of problems besetting Kosovo. At the time of writing there was no indigenous Kosovan Government as such, and thus virtually nothing officially operative in any of the normal areas of a national government administration. As one KFOR officer put it: “Right now Kosovo has a facade of normality, based on no substance: we are holding the ground for the United Nations to get on with its work”.

In the villages and towns, the many houses torched by the Serbs desperately needed reconstruction, starting with re-roofing. As an Albanian told me, “timber is now Kosovo’s

most sought after commodity.” In the capital Pristina, the two power stations desperately needed urgent maintenance, spares, repair, fuel oil and money in order to generate electric power again – similarly its centralized civic heating system. Nevertheless, moving round the country, despite the appalling misery its people had suffered, I was struck by the determination and resilient “Get up and Go” self-help attitude of so many Kosovars to reconstructing themselves and their country.

On 10 June 1999 the UN Security Council passed Resolution 1244 which welcomed the Former Republic of Yugoslavia’s acceptance of the principles of a political solution to the Kosovo crisis; an immediate end to violence; and the rapid withdrawal of its military, police and paramilitary forces. The Resolution also announced the decision to deploy international civil and security presences in Kosovo under UN auspices. The Security Council also authorized member states and relevant international bodies to establish a security presence to deter renewed hostili-

ties; to demilitarize the Kosovo Liberation Army (KLA UCK); and establish a safe environment for the return of refugees and in which the international civil presence could operate. It also authorized the UN Secretary-General to establish this civil presence and appoint a Special Representative to control its implementation. Following the passing of UNSCR 1244, and on orders from NATO's North Atlantic Council, Gen Sir Michael Jackson immediately made plans for deployment of the required security force – Operation *Joint Guardian* – whose leading elements entered Kosovo on 12 June. The build up of KFOR was synchronized with the withdrawal of Serb forces, which was completed by 20 June. Until arrival of the UN civil authority, full responsibility for Kosovo – filling the void left by the departing administration – was that of KFOR.

Bernard Kouchner was the UN special representative with the huge responsibility of leading the UN Interim Administration in Kosovo – more normally called The United Nations Mission in Kosovo (UNMIK) – and organizing, co-ordinating and inspiring the work of four international organizations and agencies in rehabilitation and reform towards achievement of the goal of a peaceful and stable Kosovo. The tenets of UN policy are based on four “pillars”. First, the UN's responsibilities for civil administration which includes the police and the judiciary: and the problem of funding. Second, those of the UNHCR (UN High Commissioner for Refugees) for humanitarian assistance and demining. Third, those of the Organisation for Security and Co-operation in Europe (OSCE) – namely democracy, institution building, elections and human rights. Fourth, the European Union – with infrastructure and economic development. Very important in all this is the Kosovo Transitional Council, a consultative body under UNMIK comprising local political and ethnic groups through which they can assist in decision-making. There are also some 250 NGOs (non-governmental organizations) currently operating in Kosovo, often independently. UNMIK and interested NGOs were aiming to provide every Kosovan family house with one warm room before the winter set in.

The task of implementing the security imperatives of UNSCR 1244, and thus underpinning the work of UNMIK, was now that of the Commander KFOR Gen Klaus Reinhardt, a German, who took over from the UK's Gen Sir Michael Jackson on 8 October 1999. The

General's principal responsibilities were threefold. First secure environment operations which comprised the prevention of any unplanned Serbian Army incursion into Kosovo; maintenance of public order and safety, and the integrity of KFOR; force protection and the security of key sites. Second, compliance operations which included the demilitarization, transformation and reintegration of the KLA UCK. Third, civil/military operations which involved supporting the integrity of UNMIK; emergency humanitarian aid; and assistance with the reconstitution of essential public utilities.

Kosovo is a small country of mountainous borders and central plains – roughly 130km by 130km – which KFOR divided into five areas of responsibility (AOR). Multinational Brigade (MNB) North is French and includes troops from Belgium, Denmark, Russia and the United Arab Emirates: MNB West is Italian and includes troops from Spain and Portugal: MNB South is German and includes troops from Austria, the Netherlands, Turkey and Russia: MNB East is American and includes troops from Greece, Poland, Russia and Ukraine: MNB Centre, based on the capital Pristina, is British and includes troops from Canada, the Czech Republic, Finland, Norway and Sweden – with a Russian presence alongside at Pristina airfield. MNB Centre's mission, derived from UNSCR 1244, was to establish and maintain a secure environment; and assist UNMIK's mission in order to promote peace and stability in Kosovo. Commanded by Brig Peter Pearson (late Royal Gurkha Rifles), it had six battle groups – based on The Queen's Dragoon Guards (QDG) with Challenger tanks at Podujevo in the north: 2nd Battalion The Royal Green Jackets (RGJ) with Warrior armoured vehicles in the capital Pristina: the Norwegian Telemark Battalion in the mid-west: Princess Patricia's Canadian Light Infantry (PPCLI), with armour, in the south-west: a Swedish Battalion (having taken over from the Irish Guards) in the east: and a Finnish Battalion at Lipljan in the south.

Lt Col Patrick Andrews commands the QDG battle group, which had soldiers wearing 29 different cap badges! His AOR had a civilian population of 110,000 of which some 99 per cent were Albanian. Covering 80km of mountainous border with Serbia proper, it included Gates No 2 and 3 which were the only official Serbia/Kosovo crossing places by road in MNB



32 HQ Squadron work at Caravica Quarry – a heavy crawler excavator loads stone into a crusher.

Centre's AOR. Watching this border country were his recce troop in the north and a Czech recce company in the south-east. Responsible for security operations, which would also include dealing with the possibility of any unplanned Serbian incursion, his headquarters included a battle group engineer officer from his affiliated 11 Field Squadron. His own squadrons – plus a Royal Highland Fusiliers Company and two AS90 batteries of 26 Regiment Royal Artillery – were deployed patrolling the AOR and guarding key sites such as secure weapon storage sites and potential ethnic flash points. They also assisted in humanitarian operations – for example, providing 24-hour protection for two elderly Serbian grannies: and underwriting many of the non-government aid organizations working locally. The CO sits on many local councils and committees, and a particular QDG “compliance” responsibility was to keep in close touch with 151 and 152 Brigades of the newly-forming Kosovo Protection Corps (KPC) located in the AOR: “OK so far” was the careful QDG comment. Yes, there were still some shootings, house burnings – I saw one torched only the night before – and grenade attacks were popular; but such incidents were tending to reduce just a little, and some were the result of cross-border feuds. The other five battle groups, such as that of 2 RGJ in Pristina, had similar wide spectrums of varied responsibilities tailored to the special requirements of their individual areas of responsibility.

Never had their motto “Ubique” been more apt

in describing the many diverse and complex tasks of The Royal Engineers in this latest of Balkan crises – started during the Kosovo Verification Mission era; followed by the development of the Force Assembly Area in Macedonia and its feeder routes up from Thessaloniki in Greece; next the traumatic Kosovo refugee phase there and in Albania; then KFOR's dramatic entry into Kosovo itself, together with its very tense immediate operational aftermath: and since then in the country's phase of *ab initio* consolidation and reconstruction. Furthermore, never since World War Two has the Corps had to fulfil not only every one of its tradi-

tional Sapper tasks at the same time, but many strange new ones as well! The diverse professionalism; extraordinary flexibility and adaptability; high morale and cheerful enthusiasm shown by all the Sappers I met “to get the job done”, was truly inspiring.

Col Alisdair Gardiner was the CRE based at HQ MNB Centre, Pristina; and all engineer units in the brigade came under 38 Engineer Regiment Group commanded by Lt Col Tim Grimshaw. These comprised six close support squadrons (Canadian, Finnish, Norwegian, Swedish and two UK); two general support squadrons (UK and Canadian); an EOD squadron (Joint RE and RAF) plus Canadian, Finnish, Norwegian and Swedish EOD elements: a HQ squadron and workshop; an engineer logistics squadron (located in Skopje in Macedonia); a geographic support detachment whose equipment showed me it can rapidly produce any required kind or scale of map or overlay in multicolour or relief as if by magic: and two specialist teams – one for engineer design and one for water development.

38 Engineer Regiment Group's mission was to provide engineer support to MNB Centre in order to create and maintain a secure environment; and to promote UNMIK operations. Executing this remit demanded that the Group be exceptionally well integrated with MNB Centre, fully stretched and thoroughly professional. The ultimate aim was to drive down force levels through rationalization – reducing the dependency culture. Its priorities were supporting the brigade operational

plan to counter any unplanned Serb incursion: ensuring a secure environment: helping to reactivate civil essential services: creating temporary field accommodation (TFA), warm and dry for national contingents to winter in: and contributing to humanitarian aid and the rehabilitation of Kosovo's basic infrastructure.

The Group's main effort was focused on British troops' TFA. This involved completion – by tough target November and December deadlines in the different planned locations – of the necessary enabling works of hardstanding and water supply, thus allowing the civilian contractors to complete the vertical work of erecting the required military living, office, workshop or hospital accommodation, together with its ablution, cookhouse and other associated units. The remainder of such essential requirements as covered storage would come later.

The key to the TFA project lay in stone production – especially from Caravica Quarry 20km south-west of Pristina where I found 32 HQ Squadron's Lt Darren Hoban, and Military Plant Foreman SSgt Carl Clay, operating three benches, producing 2000 cubic metres of crushed rock per day, seven days a week with two shift teams. These men included not only qualified RE plant operators but hastily trained Sapper volunteers from other trades, with Pioneers operating the stone crushers and ex-Infantry TA LCpl Nigel Caton-Sharp drilling the shot holes. They were all working flat out in the hot and very dusty conditions – 6am to 3pm and 3pm to midnight – drilling, charging, blowing, loading the stone crushers by heavy crawler excavator, then loading the crushed stone by medium and heavy wheeled tractors onto a constant stream of civilian contractors' 50-ton and Royal Logistic Corps' 8-ton tippers for delivery to the TFA sites, where squadron bulldozers and graders spread it to the correct depth and finish. Operating Caravica Quarry was the Corps' first major quarrying project since the building of Mount Pleasant airfield in The Falklands.

More crushed stone was being brought up from Macedonia by rail and offloaded at an improvised railhead at Teretna run by LCpl Darren Mills.



Wheeled tractors loading crushed stone.

Very early on, a critical hiatus occurred because the Italian military railway operators did not know how to drive the MOD engine to haul the trucks into the unloading area, thus threatening the project's tight schedule. In desperation and half-joking, 32 Squadron's SSM turned to his driver, 18 year-old Sapper Chris Horner: "Don't suppose you can drive a train" he said, to which came the totally unexpected reply, "Yes, I can." Whereupon Spr Horner, a former North Yorkshire Railway apprentice before enlisting into the RE, immediately found himself driving the engine for four critical days before the Italians could take over! I later visited 523 and 521 Specialist Teams responsible respectively for engineer design and water development: the latter showed me their pipework installation for the new military hospital TFA, their drilling having failed to find water.

Maj Alan Taylor, whose 23 Amphibious Engineer Squadron was away from its bridging role in Germany, took me round the 1300-plus strong TFA site for MNB Centre and a



Spr Horner, whose previously unknown skill as a train driver solved an early stone crisis at the Teretna railhead.



521 STRE water developers WO1 Swinford, Capt Thomason, SSgt Seal and LCpl Chadwick.

British battle group for which he was responsible in the heavily bombed VJ (Serbian Army) barracks just outside Pristina. There, 2000lb Allied bombs had sliced through successive floors of thick reinforced concrete, reducing VJ buildings to huge rubble-filled craters which had to be dug out and filled. The new Kosovo Protection Corps HQ will also be based there. "It's good for my corporals to command field sections here", he said, "as bridge rig commanders they normally only command two rig operators."

Creating a secure environment has many facets. I visited 11 Field Squadron, with 9 Troop of 77 Armoured Engineer Squadron under command, near Podujevo, where its role in support of the QDG Battle Group included ensuring freedom of movement through route maintenance, bridge safety and construction, and snow-and-ice clearance: force protection by building sangars, barriers and creating secure patrol houses and camp bases: plus TFA work. I also saw a secure weapons storage site, guarded by 26 Field Regiment Royal Artillery, containing an astonishing 2000-plus surrendered KLA UCK weapons of every kind in an old barracks which the squadron had made properly secure. Further south at Milosevo, 13km north-west of Pristina, a key road bridge had been totally destroyed in the Allied air campaign and now needed urgent replacement for military freedom of movement as well as civilian traffic; a task given to 69 Gurkha Field Squadron which supports 2 RGJ Battle Group. After creating a nearby traffic diversion

over a temporary assault bridge, the squadron cleared the site and bridge commander Lt Bhisma Gurung built a new 45.7m 15-span Mabey and Johnson bridge over the gap. This was formally opened on 13 October by Commander KFOR General Reinhardt, and named the Evans-Balaram Rai Bridge in memory of the two Gurkha engineers killed earlier in Kosovo whilst clearing unexploded cluster bombs.

The critical secure environment task of EOD and improvised explosive device disposal (IEDD) was that of 21 Field Squadron (EOD), commanded by Major Andy Phillips. By sensibly taking under his wing the four deployed

RAF bomb disposal teams and the two Royal Logistic Corps IEDD teams, he very successfully ran joint teams which greatly benefitted from pooling their different expertise: and perhaps this should be the future way forward. SSgt Tesar's Mamba vehicle led the original KFOR advance into Kosovo up the Kacanik defile on 12 June, and the squadron then worked at fever pitch – proving safe road and rail routes; searching key buildings; and dealing with reports of suspicious potentially explosive items coming in during the early months at the rate of thirty incidents a day. Four response teams were always at 15 minutes' notice to move. Major Phillips' analysis of his squadron's work during this time was 27 per cent search and prove: 2 per cent booby traps: 1 per cent IEDD: 1 per cent hoaxes: 20 per cent false alarms: 35 per cent land service ammunition and 14 per cent (then rising to 20 per cent) NATO UXBs. His analysis of ammunition dealt with was 31 per cent grenades (the favourite): 15 per cent mines: 10 per cent mortars: 6 per cent projectiles: 10 per cent rockets: 28 per cent assorted and improvised items. Missiles dealt with were mainly HARM anti-radar ones and SAM 6s. "It's an EOD adventure playground", he said. The squadron also supported the International Crime Tribunal Yugoslavia (ICTY) by undertaking the morbid task of checking bodies in mass graves for booby traps: and it's mine awareness training was a "must" for all KFOR troops. Later I was out at Goles, a high forest-covered hill overlooking Pristina airfield in which the Serbs had con-



cealed large underground aircraft fuel tanks. Whereas Allied heavy bombs had destroyed many of them, others bombs had not exploded and their entry holes ran so deep as to be beyond the range of normal UXB equipment. SSgt Mick Guest was therefore employing a heavy excavator to scoop out the area surrounding bomb entry points, in order to get down to a second probe's depth in the hope of making contact – alas in vain! Cluster bomb canisters contain 200 sub-munitions of which some 10 to 15 per cent fail to explode on impact and either lie on the ground or part-penetrate it. American ones are yellow with a small white parachute attached – making them dangerously attractive for children to pick up – British ones are black with a coloured band.

The thick forest undergrowth makes “search and find” difficult and very slow. SSgt George Drysdale took me to some he had found and was connecting to a ring main ready for firing: he had already blown up more than 250. We retired and blew the ring with a healthy blast. SSgt Guest had recently blown a ring main of eight sub-munitions under a wood canopy of fir trees; to his surprise, his explosion shook a further eight down from the tree canopy! Sadly, but understandably, despite warnings from EOD teams as to the danger, local Albanians insist on entering the forest to get timber with which to rebuild their houses – and inevitably suffer some casualties. What interested OC 21 Fd Sqn (EOD) was that there were 16 different demining civilian NGOs in Kosovo of varying professional capability and thoroughness of work, with a few of which he had some contact – but over none had he any control.

Assistance with humanitarian aid was very evident as I accompanied Capt Dalbdr Limbu to see his Gurkha sappers at work repairing and securing flats and buildings in Pristina which had been or were at risk of being severely damaged by ethnic reprisal shootings or explosions; at one second floor flat we visited, a delayed charge placed against the front door the previous night had blasted it and much inside, killing most of the occupants: and a family from the other ethnic community had already moved in.

What was very encouraging, in the circumstances, was to see how well Gurkha Sappers were so obviously respected, and their work appreciated, by both the Albanian and Serb communities. The experience of Kosovo – and indeed later of East Timor – has surely put paid to the

view, hitherto held in some UK quarters, that Gurkhas were inappropriate for peacekeeping.

Turning to essential services, WO2 Clerk of Works (Electrical) David Forrest first drove me past the constantly burning, antediluvian open cast mine sites, before taking me to the two nearby power stations which have to function using this low quality coal. Despite all the marvellous initial work done by Sapper specialists to get Kosovo's electricity supply up and running again (a story well told in the December 1999 *RE Journal*), at the time of my visit both power stations were again out of action. Going round Power Station A with WO2 Forrest and Mr Abdyl Bajgora, its local Director, the accumulated result of overuse, poor maintenance, inadequate spares and neglect was obvious. With heavy dirt and dust still overlaying the blackened grey of the huge inactive shafts, pipework and boilers; and a pervasive air of melancholy exuding from the ageing inoperative generators, it seemed like a spooky film set.

At the more modern Station B, its director, Mr Sabri Hashani, took us up 150ft of successive internal metal steps to show how disuse and lack of added heavy oil had hardened the coal in the station's sixteen 400-ton hoppers, so that it could not flow naturally down through them. Up there, separated from us across a wide metal grille, were eight Albanian workers each holding the end of a thick rope which disappeared from view down through the grille. Peering down through it, I was amazed to see eight other Albanian workers – unpaid for three months like all the others – each suspended some 15m down inside the black dust of the hoppers at the other end of the safety ropes held by their colleagues above. The men were all hacking away to dislodge the hard-clinkered coal to get it falling through – such was their commitment and determination to get the station working again: without the ropes, had a large chunk of solid coal mass disintegrated unexpectedly, they could have found themselves falling helplessly to be buried deep in the hopper. I felt I was witnessing a scene from the Middle Ages. But, despite all I saw, I had total faith that the stations' two directors and their ageing technicians, coupled with WO2 Forrest's crucial ability to tap money sources and chaperone vital oil and chemicals across frontiers – would have the capital's own electric power supply flowing again before too long. (In fact the power stations were functional again by early November.)

Capt Mick Berrill, QM 69 Gurkha Field Squadron, had the challenging task of getting Pristina's 57km of 20-year old ducted centralized heating system – long neglected and losing 700 cubic metres of water per day through 27 major leaks – operating again: 120,000 people depend on it. The boilers and machinery had been neglected and suffered from lack of maintenance and spares: and there was currently no stock of the specially imported mazut oil which the system uses. But Germany, Sweden and the UK were helping with money, so the outlook was improving.

As the first Chief Refuse Administrator Pristina (inevitably known within KFOR as Mr Crap), Capt Frank Swales had the very important but frustrating task of getting Pristina's public rubbish disposal system running again – made more difficult because the Serbs took away the previous equipment. Capt Mick Berrill, his temporary successor in post at the time of my visit, told me that as yet he had no UNMIK licence to operate officially for payment – hence no funds with which to pay for labour; and that local "cowboys" were moving in to exploit this potentially lucrative "vacuum" situation. But a Sapper brainwave came to the rescue. Pristina's school children, with the involvement of their teachers and a bit of NGO help, were invited to meet – and accepted – the challenge of clearing up accumulated rubbish in their own school areas on the last two days of the school holidays – and it would be taken away for disposal. Capt Berrill had proposed the name "Clean Start" for the scheme – a very English catch phrase to herald Kosovo's eventual recovery to normality: but in the event the local people

Everyone knows that immediately following KFOR's entry into Kosovo there was some UK-Russian confrontation at Pristina Airfield. But not so many people know about a later, very different sort of UK-Russian confrontation there, described to me by a witness friend. One evening, a well muscled soldier from the Russian parachute contingent was in the canteen, having obviously been relieving his boredom with vodka, loudly issuing challenges for people to arm-wrestle him. But no-one came forward, which only worsened his temper. At last a very tough Sapper – "a type who did pull-ups on a gym beam suspended by only one hand" – got fed up with all this and accepted the challenge. The Russian was delighted: and as the two faced each other, the canteen went quiet. Within two seconds the Sapper had the Russian's arm flat on the table. Furious, the Russian immediately demanded a replay: within two seconds the Russian's arm was flat again: incredulous – he got up and stalked out without another word!

Fitore Ndrecaj, a very bright Albanian former Pristina University undergraduate, told me passionately that "Our war was a war for freedom – our war was a war for peace". In the new peace, all she wants is a normal life – working her way up in a bank, getting married, running her own home and bringing up her own family. But her and Kosovo's future is now dependent not on KFOR – essential though it is for some considerable time to come – but on the future of Serbia's Mr Milosevic and especially on UNMIK's success in fulfilling its mission quickly. Certainly, there is no time to spare.

# What's Wrong With The Numbers? A Questioning Look at Probabilistic Risk Assessment

COLONEL J P K CRAWFORD BSc



*Colonel Jack Crawford was commissioned into the Corps in 1949. He has served, amongst other places, in Korea, Norway, Germany, the Pacific and Australia. He became seriously interested in risk and safety assessment during his appointment as a member of the Ordnance Board from 1978 to 1980. What he learned there led him to reflect on why he had got away with some of the things he did with explosives as a young officer, in contrast to having seen two friends killed, and a third permanently injured, in a mortar firing accident. After the Ordnance Board he became a member of the Australian Ordnance Council during an interesting period of major Royal Australian Navy and Royal Australian Air Force re-equipment programmes.*

*Since leaving the Army he has continued to work in the safety field and is currently working on improvements in the methods used for safety assessment.*

## INTRODUCTION

PROBABILISTIC risk assessment (PRA), or probabilistic safety assessment as they prefer to call it in the nuclear power industry, has been developed over the last 30 years as a discipline heavily influenced by the mathematical theory of probability. Its mathematical methods are endlessly extended and refined in the literature. But how confident can we be that the output numbers mean what they claim to mean, ie probabilities of future events? I believe that the time has come for a pause to think about that basic issue.

This paper explains what led me to initiate a study of the foundations of PRA, defines key questions which need to be asked about its credibility, and arrives at some provisional answers.

## WHY SHOULD A STUDY BE NEEDED?

THE factors which triggered the study follow:

- The incredible magnitude of many of the probability numbers.
- The sometimes over-optimistic assumption that an assessment encompasses all credible failures.
- Observation of some gross discrepancies between predictions and outcomes.
- Difficulty in finding examples of accidents caused by genuinely random component failures.

- PRA seems to be too narrowly focused on measurable events, especially failure rates. It too easily ignores accidents which are not caused by failures.

I will give some examples to illustrate those points. During 15 years' involvement in risk and safety assessment in the weapon systems field, here and in Australia, I have been bombarded with numerical probabilities. Many of them have seemed incredible, or at best to venture into the unknowable. Some of the powers of ten ascend into the high teens and even the twenties. The record in my experience was a probability of premature functioning of a mine fuzing system predicted to be 1 in  $10^{44}$ .

In another example, the design authority (DA) for a weapon system decided to include in it an electro-mechanical device which had an excellent record in another application. After pages of calculations to assess the effects of stresses in its new application, they predicted that its probability of mechanical failure would be 9.116 in  $10^9$  operating hours. The operating cycle time of the device was only 40 seconds at a likely rate of fewer than 10 cycles per battlefield day, so the predicted failure rate should have seen us through many times more use than the system would ever get in service. But in a system

test, which included four of the devices, we had two mechanical failures before they had accumulated one hour of operation. The failures happened in two different modes, neither of which had been considered in the analysis. This example illustrates three of the trigger factors mentioned above:

- The magnitude and precision of the number, by which the DA claimed to be able to predict so accurately the number of failures in a billion operating hours.
- The gross discrepancy between the prediction and the outcome.
- When something went wrong, it happened for reasons which had not been quantified in the analysis.

On the relatively few occasions when we get a chance to compare safety predictions and outcomes, those are quite common features in my experience.

On the other hand, I have found it difficult to come by examples of accidents caused by what the textbooks and safety standards describe as “random” failures. Two years ago a dozen of us attended a meeting in the MOD at which the contribution of random hardware failures to accidents was questioned. Between us we could think of only one example of an accident caused by a combination of genuinely random events. Five years ago the Health & Safety Executive (HSE) published a booklet called “Out of Control”<sup>1</sup> containing 34 examples of control system failures. In the summary of causes at the end of the booklet not one system failure is attributed to random hardware failure. If that kind of failure were indeed a major cause of accidents, we would surely expect it to turn up somewhere in 34 examples.

Readers will remember the disastrous first flight of the Ariane 5 rocket in June 1996, when it broke up and exploded 40 seconds after launch. According to *Aviation Week*<sup>2</sup> the pre-launch estimate of the probability of completing the mission was 98.5 per cent. The reality, as the report of the Board of Inquiry<sup>3</sup> showed, was that the design ensured that the rocket would crash after 40 seconds. The real probability of success was zero. To compare that with the trigger factors:

- It illustrates a gross discrepancy between prediction and outcome.
- There was nothing random about any of the causes.
- The accident was not caused by component failures. No component of the rocket system failed to behave as it was designed to behave throughout the short flight.
- The real causes of the accident, which in this case were errors of management, were not considered in the analysis.

#### INITIATION OF THE STUDY

AFTER observing those and other examples, it seemed reasonable to look into the methodology of PRA. In the course of a few quick checks, my pocket calculator failed to find anything wrong with the mathematics of any of the assessments that were readily to hand, so the next step had to be to investigate the basis on which the mathematical structures were built.

For several years I have been searching for a test of the theory that we can draw probabilistic data on failure rates from past experience, and then synthesize a selection of the data in order to predict the failure rate of a new system. The safety and reliability literature does not help much because it generally goes no deeper than the mathematics that are built on the theory.

My search has included talking to people in the Civil Aviation Authority (CAA), the HSE, and several leading engineering companies and academic and engineering institutions. The only people to come up with anything that attempted to test the theory were AEA Technology plc. They kindly provided me with a study<sup>4</sup> which compared predicted and observed reliability figures for equipment used in nuclear power plants. It concluded that the correlation was reasonably good. That was useful as far as it went, but the study seemed to me to have two shortcomings. One was that it looked at failure rates at the reliability level, rather than at the safety level which (in the military field at least) are much harder to predict. The other was that it had been done as an afterthought, so it was not the properly designed and controlled experiment I had been looking for.

<sup>1</sup> Health & Safety Executive. “Out of Control”. HSE Books, Sudbury, 1995.

<sup>2</sup> *Aviation Week & Space Technology*, 29 July 1996, (p33).

<sup>3</sup> *Ariane 5 Flight 501 Failure*. Report by the Inquiry Board. Paris, 19 July 1996.

<sup>4</sup> E R Snaith. “The Correlation between the Predicted and the Observed Reliabilities of Components, Equipment and Systems.” United Kingdom Atomic Energy Authority National Centre of Systems Reliability, Culcheth, 1981.

By now I find myself being driven towards a conclusion that the scientific method may never have been applied to this particular theory. I still hope to be shown that I am wrong, but meanwhile the apparent lack of science in this field threatens to become the most disappointing finding of the study.

### THE MAIN QUESTIONS

HAVING observed that PRA might be questionable, it became necessary to decide what the questions should be. It seemed to me that there are four key questions, one practical, one theoretical, one philosophical and one contingency question which depends on the answers to the other three. This section lists the questions and provides some answers.

Question 1: To what extent does PRA encompass the main causes of accidents?

This is the key practical question. First, it seems inevitable that any unforeseen causes, modes and effects of failure will escape the attention of PRA. We can and should do more thinking to reduce the number of missed tricks. But, when we have done our best, we still have no way of knowing whether we have thought of everything, as the example of the electro-mechanical device illustrated.

Second, PRA tends to lead us into a mind-set which assumes that systems fail only if their critical components fail. It does not lead us to think enough about that class of accidents in which everything functions as designed. Here are some examples:

- Turner<sup>5</sup> describes a collision on an unmanned railway level crossing. The drivers of the train and the road vehicle did nothing wrong, and there was no equipment failure.
- Kletz, quoted by Leveson<sup>6</sup>, describes an accidental release from a computer-controlled chemical reactor. No human operator was involved. The automatic control system, in triggering the release, functioned as designed.
- From my own experience, an anti-tank mine design was proposed which in certain conditions would have killed soldiers laying the mines according to the correct drill.

A third gap in the coverage of PRA is caused by invalid, or invalidated, assumptions. The assumptions made in a safety assessment are not always made explicit and may later be forgotten. When an important assumption is invalidated by changed circumstances, and nobody any longer knows that it was made or that anything depended on it, an accident will be waiting to happen as soon as certain conditions prevail. One of the findings of the subsequent inquiry is likely to be that in those conditions the probability of the accident was 1.

Of all the sources of risk which PRA overlooks, management must be the most prolific. Many apparently technical failures have their roots in management weaknesses. Leveson<sup>7</sup> points out that “unmeasurable factors (such as ... management errors) are ignored even though they may have greater influence on safety than those that are measurable”. As she was writing those words, the European Space Agency was committing the management errors which led to the Ariane Flight 501 debacle, while using measurable data to predict the high probability of success.

An important aspect of risk management is the quality of the culture in an organization. For example, the *Piper Alpha* inquiry found that “Senior management ... adopted a superficial response when issues of safety were raised”, and the judge in the *Herald of Free Enterprise* case criticized the “disease of sloppiness” which had spread down from the top of the company. In each case the company’s safety culture had contributed much to the disaster.

All of those sources of risk are “soft” or unmeasurable factors. They affect the frequency and scale of accidents, but PRA does not encompass them. It focuses, rather, on the measurable causes, modes and effects of failure. With so limited a view of the scene PRA must be expected to deliver optimistic results, contrary to what we normally aim to do in risk assessments. In terms of the “As Low As Reasonably Practicable (ALARP)” principle, the consequence is that PRA can neither demonstrate that a risk is as low as reasonably practicable, nor that it is tolerable.

Question 2: Can statistical inference take us forward from the past to the future?

<sup>5</sup> Barry A Turner. “Man-Made Disasters”. Wykeham Publications, London, 1978.

<sup>6</sup> Nancy G Leveson. “Safeware”. Addison-Wesley Publishing Company, Reading, Massachusetts, 1995 (p165).

<sup>7</sup> Ibid p59.

This question addresses the theoretical basis of PRA, for which the apparent absence of any proper justification or test was noted above. The clearest argument I have found is one developed by Deming<sup>8</sup> in which he explores the limits of statistical inference.

He argues that the historical results which provide input data for predictions depend on the sets of conditions in which they were produced, and that those exact conditions are unrepeatable. Furthermore, as Feynman<sup>9</sup> reminds us, we cannot assume that all of the conditions which contributed to a result have been recorded or even noticed. Deming concludes that there is no mathematical method by which to extrapolate past results to future conditions, and consequently no objective way of assigning a numerical probability that a prediction will be right or wrong. Prediction therefore means applying judgement and knowledge of the subject to the available data, rather than just manipulating numbers.

A further problem is that most statistical methods assume that component failures will be independent. In reality, dependent failures contribute to many accidents. The “fudge factors” sometimes introduced to allow for dependencies, such as cut-offs and beta factors, do at least move the numbers in the right direction. On the other hand they are arbitrary and are no substitute for an understanding of the dependencies within a system and their potential consequences.

As an aid to predicting the behaviour of systems, Deming<sup>10</sup> advocates the concept of stability developed by Shewhart. “Stability” means that the functions of the system display a stable range of variation. He argues that stability is a prerequisite for predictable behaviour, and that in a man-made system it is not a natural state – it has to be achieved and maintained. Systems are constantly threatened by destabilizing influences, so their stability must be monitored and, whenever necessary, restored. Hence a system will remain stable and predictable only by virtue of people’s vigilance, knowledge and effort. It is not a question of probability.

Without stability there is no basis for prediction, but I have yet to find a safety or reliability database which assures us that its estimates of component failure rates were derived from stable systems by stable methods of measurement. Some may have been so derived but even then, when we take those types of components and build them into a new system, we leave the stability behind because we have now changed the operating environment. A new state of stability will have to be achieved and maintained, and new rates established.

Collectively, those arguments seem to me to falsify the theory that we can rely on historical probability data to take us across the boundary between the past and the future.

Question 3: How much force does the mathematical theory of probability add to a probability statement?

This is the key philosophical question. In looking for the answer, I have used ideas put forward by Stephen Toulmin<sup>11</sup>. When we make a prediction, especially a safety prediction, we want as much precision as we can manage. Toulmin distinguishes between precision in the sense of definiteness and precision in the sense of exactness. So for example if we say that an event is extremely unlikely to happen, we are relying on definiteness. But if we estimate a probability that the event will happen twice in a thousand general support bridge launches, we are relying on exactness. This leads to further questions such as how much do we gain when we are able to add exactness to definiteness? And what should we do if we find that we have one but not the other? Those sorts of questions may seem ethereal to some people, but the study is telling me that they actually matter when it comes to taking decisions such as whether a system is safe enough to be accepted for service.

PRA uses mathematical probability in an attempt to deliver precise predictions. But from a logician’s standpoint, Toulmin argues that “Little is altered by the introduction of mathematics into the discussion of the probability of

<sup>8</sup> W Edwards Deming. “On Probability as a Basis for Action”. *The American Statistician*, Vol 29 No 4, 1975 (pp146 to 152).

<sup>9</sup> Richard P Feynman. “The Meaning of it All”. Penguin Books, 1998.

<sup>10</sup> W Edwards Deming. “The New Economics for Industry, Government, Education”. Massachusetts Institute of Technology, 1993.

<sup>11</sup> S E Toulmin. “The Uses of Argument”. Paperback edition, Cambridge University Press, 1993. (Ch 2.)

future events” and that “The development of the mathematical theory of probability accordingly leaves the *force* of our probability-statements unchanged; its value is that it greatly refines the *standards* to be appealed to”.

If we accept the arguments of Deming and Shewhart, the refinement is spurious in the context of PRA. (Deming<sup>8</sup> points to areas in which numerical probability does provide a valid guide to action, but they do not relate to PRA.) The spurious refinement of the numbers is starkly illustrated by the two examples given earlier in which, when the definiteness of the prediction proved to be a delusion, its exactness was exposed as ridiculous.

A relevant, if irreverent, statement of philosophy comes from Feynman<sup>12</sup>, who preferred engineering judgement to what he regarded as meaningless numerical probabilities: “If a guy tells me the probability of failure is 1 in 10<sup>5</sup>, I know he’s full of crap”.

Question 4: If the numbers generated by PRA do not represent probabilities of future events, are they still useful? If so, for what?

Question 4 is the contingency question and it clearly needs to be answered. My view is that the numbers are still useful. For one thing, factors that are measurable do contribute to risk and PRA has been successful in helping us to see how to reduce risks from those causes (it may even have contributed to the scarcity of accidents from “random” causes). For another, its inherent optimism tells us, when it indicates a risk which is too high, that improvements are definitely needed. Thirdly I have found, when working as a regulator in the weapon systems field, that I can learn much from the numbers by digging for answers to the questions they raise.

### CONCLUSIONS

THE study remains incomplete, partly because of the difficulty of finding a convincing justification for PRA. If anyone can find or construct one, it would be very welcome. Meanwhile the

provisional conclusions to be drawn seem to me to be as follows:

- The numbers delivered by PRA do not represent the probabilities of future events because:
  - The PRA methodology, by focusing on measurable factors, ignores some of the most significant sources of risk.
  - The theory that it is justifiable to extrapolate historical data, in order to assign a numerical probability to a future event, is false.
- If PRA is used on its own to support an ALARP or any other safety case, it is likely to be misleading. To be complete and credible, the case should provide:
  - Qualitative data and argument on the issues not covered by PRA.
  - A reasoned account of the liability to error of each quantified prediction.
- Quantitative probability statements have no more force than qualitative probability statements. At best they may be more refined, but only if the numbers can be shown to be credible.
- Our quest for more reliable predictions would be better served by paying more attention to the stability of the systems from which we draw data, and to the stability of those whose behaviour we need to predict.

So should PRA be scrapped? My answer is “no”, for the reasons given in the answer to Question 4. PRA remains an invaluable tool for focusing our minds on issues related to measurable factors. We do not need to believe that the numbers are probabilities in order to use them for purposes such as comparison of design options, sensitivity checks and the improvement of designs.

By now it is clear that there is a Question 5 to be answered: “What would be a better way and what place should PRA have in it?” The investigation continues.

### ACKNOWLEDGEMENTS

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<sup>12</sup> Richard P Feynman. “What do *You* Care What Other People Think?” Paperback edition, HarperCollins, London, 1993 (p216).

## The Last Surviving Balloonist in the Corps

LIEUTENANT COLONEL J P FITZGERALD-SMITH BENG MICE PTSC



*Lieutenant Colonel Jim FitzGerald-Smith was commissioned into the Royal Engineers during the 1939-45 war. He served as a platoon commander in 78 Division Royal Engineers in Italy. He became a regular officer after the war managing to always be present at critical times in the dissolution of the Empire: India (1947); Egypt (1954); Cyprus (1954); Malaya (1962); I wonder, was there a connection?*

I CAN see the mathematicians amongst us doing their sums and saying “He can’t be” or “He must be” over 100 years old. The answers to those two statements are: I am, and I am not, over 100 years old. This article will explain how I came to be ballooning for the Corps in the last century.

The year was 1956. I was a young major with a typical rugby forward build, instructing at the School of Military Engineering in Chatham. In the same year the Royal Artillery (RA) was organizing a searchlight tattoo at Woolwich as they wanted to put on a tableau of Gordon receiving his Mandarin’s Button. Chinese Gordon was trained at the “Shop” in Woolwich, and the Gunners felt they had some claim to him. It was to be a very colourful display with a 100ft-long dragon with the head mounted on a jeep, and two blazing headlights for eyes. The body of the dragon was made of a scaly fabric supported by hoops with a Gunner inside each hoop programmed to jump kick and shimmy on some DNA-cycle peculiar to dragons which, when viewed from the outside, gave a very good simulation of a dragon.

The Gunners, having hijacked Gordon, thought they should have some Sapper input into the tattoo. We were allotted three slots, a troop of

Airborne Sappers would land in the arena, a troop of assault engineers would demolish a bridge in a flash, and a troop from the regiment at Maidstone would put on a display (using a gas-filled balloon as an observation balloon) of a Sapper balloon section in the uniform worn by the Corps at the turn of the century. The uniform was similar to the one worn by the Royal Canadian Mounted Police, with the exception of a pillbox instead of the mounties’ boy scout hat, and, of course, a red stripe on the breeches instead of yellow. The balloon was filled with hydrogen gas, and when deflated was carried on a general service wagon drawn by four horses. The officer was mounted, but the crew marched behind the wagon.

The Chief Engineer, who was Nap Binny at the time, knew that I was not heavily committed in the summer term, so I was detailed to co-ordinate the three troops – and to see that we upheld the good name of the Corps while taking part in the Gunner show.

You will recall the year was 1956. When the Suez Crisis blew up, the parachute troop and the assault engineers were spirited away on more urgent duties, leaving just the balloon section. This period was also towards the end of national



service. The national service officer, who was shortly to be demobbed, when he heard he had to ride a horse, politely declined as he could not ride! The Chief Engineer came down to see me, I had hoped to relieve me of my command. No such luck! He said, "I know you can ride, you can take the place of the balloon officer".

"The Manual of Ballooning 1891" was a beautiful Moroccan leather-bound volume. I realize now that we had come a long way since it was written, but one thing was certain, whoever wrote it did not know how to write instruction manuals. I read the book from cover to cover and at the end was no wiser about how to fly a balloon.

Some 24 men formed the section: four winch men, four brake men, twelve guy men, and four pole men. With a little reading between the lines I could see how most of these men could be deployed; but the four pole men had me baffled.

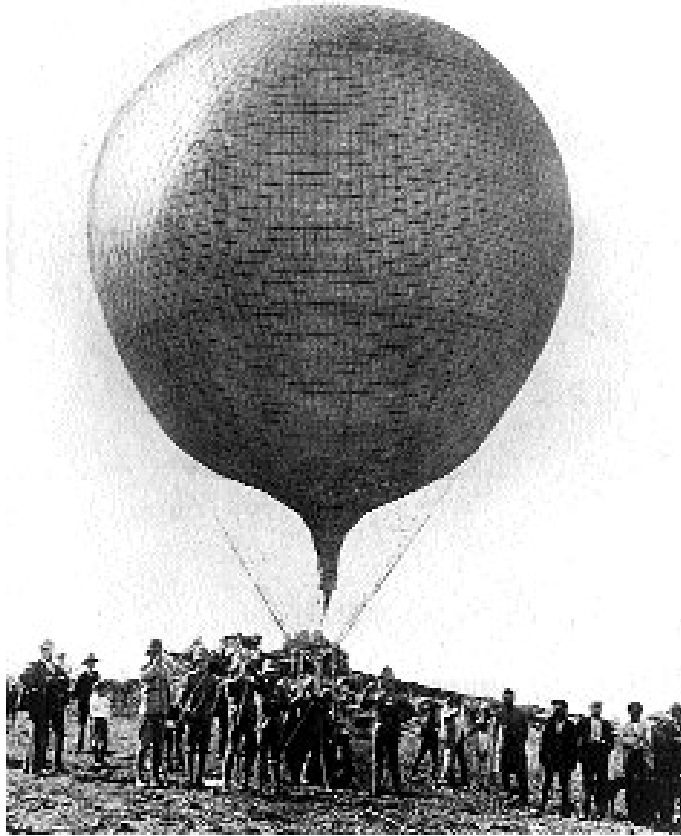
Worse was to follow. The RAF had a Montgolfier balloon which they used for recreation. But they would not lend it for the tattoo unless they trained the personnel who were to fly it. The whole of my balloon section was ordered down to Cardington, in Bedfordshire, where we would receive our training. A RAF flight sergeant would train and give us technical assistance. I remember his puzzled expression when I asked him for advice on how the 24 men would be deployed. He showed me this miracle of modern engineering, the balloon winch, which one man could operate and apply the brakes. As far as he was aware the others were surplus to establishment. I knew this would not go down too well, so I set to work and knocked up a dummy wooden winch, with a big wooden drum and enormous handles, big enough to accommodate four men. The brake I improvised with giant levers and friction blocks which used up another four men. The guy men were easy enough to distribute about the balloon like the hours of a clock. But the pole men were still a mystery. They obviously played an important part; for on the command "Let up" they disappeared from the instruction book – only to reappear on the command "Let down". I decided by this time that I would abandon trying to do the drill by the book – I would invent my own drill! As long as it looked smart with lots of punching arms in the air and parading by numbers, I would get away with it. I, of course, took the troop into my confidence – you may fool the people above you, you may fool the people on your own level, but you



Balloon School, Aldershot.

will never fool the people below you. By imagining myself in an operational situation when an enemy gun might be ranging on the balloon, it would be necessary to come down quicker than the clumsy winch without gears could manage. So I put a snatch block on the middle of a pole and then reeved the balloon cable through the snatch block. If the four pole men were to run away from the balloon they would convert vertical cable to horizontal cable at the speed they could run. This would account for their sudden disappearance and appearance at critical moments of the launch and recovery. We practised my phoney drill until it looked quite convincing. The RAF flight sergeant rather looked down his nose at our antics but did not mind as his purpose-designed modern winch was concealed within the dummy winch (operated by himself).

I was instructed in the art of ballooning. As a tethered balloon, I could only control going up and down. I was the sole crew member with about a dozen bags of sand hanging about the basket. If I wanted to ascend, I threw out a handful of sand. One pound of sand thrown out would give me one pound force propulsion



Number 1 Balloon Section, Ladysmith about 1899.

upwards. If I pulled a plug I allowed gas to escape which allowed me to descend. The flight sergeant's big worry was that if by accident my cable broke, the balloon would be blown into the spectators stand where numerous people would be smoking and, as it was a hydrogen-filled balloon, this would be very dangerous. The immediate reaction in such an emergency, I was instructed, was for the balloonist to throw one whole bag of ballast overboard. This would shoot him out of the arena like a rocket! There was only one snag! A preliminary preparation that has to be made before the officer is prepared to ascend is to remove sufficient ballast, when the balloon is fully inflated, so that the basket is in neutral equilibrium. By the time this balancing exercise had been completed for my weight only one bag of ballast was left in the basket. Too late to go on a crash diet. Once James had been shot out into outer space, there was only

had served with the balloons in the South African war, was going to visit me at Cardington to give advice on the training. I needed the venerable brigadier like a hole in the head, knowing what diabolical liberties I had taken with the drill, added to the fact that this was the last day of training.

After some moments of panic I started to rationalize the whole thing. If the brigadier had been about 30 in his active ballooning days, circa 1897, and this was 1956, he must be about 90 years old. The old boy was coming out for a day's nostalgic memories. He would probably be in a wheelchair and unable to see across the room.

When the message came that the brigadier's car was at the gate, I left the old R100 airship shed, where we were training, to pick him up at the guardroom. I got the shock of my life. The car door flew open, and he jumped out of the car like the demon king in the pantomime. He had a

one option left. Pull the plug and come down. Bear in mind I am completely at the mercy of wind direction, so having decided to return to earth, should I find myself drifting towards a high tension cable there was no longer the facility of reversing the descent to get above it. I also had the nasty feeling that if I floated into any of the busy airways I would be shot down as a danger to aircraft.

It was near the end of the training period. I learnt several interesting things about ballooning. For example, even such whispered phrases like "Shall we cut the B... loose" can be clearly heard in the balloon several hundred feet up, as the ground acts like a giant sound reflector. I, on the other hand, could yell my head off and no one could hear – at least, that is what they said. Another interesting fact learnt from the manual was that an essential item to carry on you was a signed rail warrant with the destination left blank!

Just when I was congratulating myself on translating the manual, I received a nasty shock – a phone message from Eastern Command that a Brigadier Broke-Smith, who

ballet dancer's build, and was as fit as a flea. Two piercing blue eyes looked me up and down. He said, "How heavy are you?". I owned up to 12 stone – to which he remarked, "We could get two for your weight!". He then gazed into the distance and said "Is that the balloon?".

As he was looking somewhere in the direction of where I had left the balloon a mile or so back I said "Yes".

"It's the wrong colour," he said. With some trepidation I asked if he would like to see us letting the balloon up? "Yes, yes, of course." Now had come the moment of truth, when my phoney drill would be revealed as a sham. The crew put up a wonderful show with bags of swank, while I squirmed inside the balloon. I peered over the edge expecting to see the brigadier alongside me in a pillar of flame. But no! He was very quiet, and asked quietly, "How long did that take?". I consulted my watch and said, five minutes. He shook his head and just said, "We could never do better than thirty minutes!"

We now had to return to Woolwich for dress rehearsals. By this time we had our "Mountie" uniforms and we would parade with horses. It was only when I was mounted on the horse with the wagon and men strung behind me that I realized that I had never commanded a mounted section before, and the command "By the left quick march" didn't seem to meet the bill. I had an inspiration. I remembered a John Wayne film where he was in a similar situation with a troop of 7th Cavalry, so I raised my hand in the air, like my hero, and said "Forward Ho". To which a very embarrassed battery sergeant major, in a stage whisper said, the order is "Forward March!"

There was about a week of rehearsals, during which we learnt that the BBC was going to televise half an hour of the tattoo, and because no one had seen a balloon section in action, this was to be one of the highlights televised, to be followed by King's Troop – galloping the guns in the famous "crossover".

On the night of the televised show I was deluged with advice from the Chief Engineer down. The Corps was in full view before a vast television audience; see that they marched smartly in! The flight sergeant belatedly told me he had powers to withdraw the balloon if the wind was gusting more than 10 knots. The sales organizer reminded me that the expensive tickets were in the covered shelter, and that I should not go too high, or they would not be able to see the balloon.

In the manner of all tattoos, each act is marshalled a half hour before going into the arena. I was to follow the dragon. The time coincided with a NAAFI break and large sections of the dragon were laying unmanned while the occupants were drinking tea. The marshalls, with commendable enthusiasm, pressed unwilling gunners into service – with large rumblings of dissent coming from the dragon. The horses in my section, drafted in from the RA hunt, were not used to a talking dragon and were beginning to play up. I was glad when the dragon waddled off into the night accompanied by a barrage of fireworks.

The time had come for our entrance. The flight sergeant was bleating that he shouldn't let us go on as the wind was gusting at 10 knots. I, ashamedly using rank, said "The show must go on". Richard Dimbleby, the present announcer's father, gave the introduction. We trooped into the arena, with the inflated balloon held down by the marching Sappers behind the mounted officer and the general service wagon. Dimbleby's words: "The ingenious Sappers had conquered the air, here seen as a balloon observation section at the time of the Boer War," was accompanied by music playing the Victorian ballad, "Up in a balloon boys". The searchlight came on just in front of me on the horse. The horse was not used to what appeared to be a white hole opening up in front of him, and started prancing around the white spot of the searchlight. More by good luck than good management I got the section in front of the "royal box" where we then would launch the balloon. I don't think the Chief Engineer was too pleased with the marching, as it is very difficult to march properly two feet above ground, trying to stop the balloon taking off.

I remember the announcer making great play of the pantomime as the officer removed his spurs (in case they struck a spark!). Whilst I was in the balloon my horse was held by a Sapper. It is a fact of life that in every troop there is one member who is not stupid but can be guaranteed to foul up whatever he is given to do. The task this worthy member of the troop had finally gravitated down to was horse holder. I didn't find out until too late that he was afraid of horses. When given the reins to hold, he thought this was too near those nasty big white teeth. He very prudently transferred his hold to a less dangerous part, the stirrup leather. He didn't realize it was a safety stirrup leather

which frees itself from the saddle if it is pulled to the rear, thus saving a rider from being pulled along the ground should he for any reason fall off. Poor lad thought he had broken the strap and was sure he would be blamed, so quickly dropped it. When the time came to remount I spent a fruitless couple of minutes looking for my offside stirrup. In the end I had to ride off with both feet out of the stirrups.

Once I had remounted I had to lead the section off. The lights would move away, I was to lie quietly up against the entrance, then, when King's Troop had made their entrance, I was to slip out. In the event, what really happened was this: two trumpeters charged through the gate, struck up a dramatic stance, and sounded "The advance to action", followed by six 6-horse gun teams. My horses were stabled with the King's Troop horses and got very excited as they charged past their noses in the dark, and before I could do very much about it they wanted to join the stampede. This would not have pleased King's Troop, who had never done their evolution with a balloon bobbing along behind. My

Western mentor came to my aid again. When his cattle were about to stampede he prevented the disaster by the order, "Keep them milling". This is what I did; I kept them milling around in the dark until I could slip through the gate, luckily before the Guns, having unlimbered and fired their rounds, came thundering back.

The finale of the tattoo was with all the troops who had taken part assembled in colourful array for the national anthem. There was only one place for the balloon: in the centre. The balloon was allowed to ascend 10 feet slowly with the band playing, and the lonely officer in the balloon at the salute. Then, the heavens opened and the whole sea of colour turned black, all except me with the balloon sheltering me. I don't know whether the spectators could see the smug smile on my face which very rapidly was wiped away. All the rain that had fallen on the balloon collected and ran down the filling sleeve just above my head. A jet of water three inches in diameter nearly drove me through the basket.

I survived, and hence my claim to be the last serving balloonist in the Corps.

# Prime Contracting in Construction

LIEUTENANT COLONEL J A R STRONG MA CENG MCIBSE



*After commanding 52 Field Squadron (Construction) at Royal Air Force Bruggen, Alastair Strong did a staff job in London and a technical job in Cyprus before becoming SO1 G4 Estate Plans in Headquarters Land Command. In late 1997 he took over as Commanding Officer 64 Commander Royal Engineers (Works), from where he has been seconded part time as the Land Command representative on the Defence Estates Prime Contracting Team.*

THE Ministry of Defence is setting the pace in a government initiative which will have fundamental and far reaching consequences for the construction industry. The changes will also impact on the Corps, particularly on the way we carry out construction on operations. We must keep abreast of developments so that we can take advantage of opportunities which will arise along the way.

During the 1990s the generally adverse economic conditions in the UK forced prices down in the construction industry. Profit margins were pared to the bone in the desperate struggle by firms to secure what work was available, which tended to be in the public sector. This exacerbated the traditionally adversarial nature of the relationship between contractor and client. Clients often specified their requirements poorly and had to amend them after the award of the contract. The contractor's best chance to make money lay in making substantial claims to increase the price, usually as a result of these changes. Clients tended to hold back payment as a means of enforcing performance jeopardized by low prices. This withholding of cash was cascaded down to subcontractors and suppliers who could easily be forced out of business as a result.

The situation was widely recognized but was first seriously examined in the Latham Report,

which looked at the way the offshore oil and gas industry had reformed itself, to determine what parallels could be drawn. The report made a number of recommendations designed to produce a more cooperative environment where clients could achieve value for money and contractors could flourish. Central to these was the concept that the number of bespoke construction contracts should be reduced. Ideally a standard contract, written in simple understandable English, should be adopted defining relationships on a set of principles rather than in minute legalistic detail. This would be complemented by a system of tendering where quality would be accorded as much importance as price and by enhancing the role of project managers. It was accepted that disputes would still arise but it was proposed that these should be resolved primarily by adjudication to avoid costly and slow litigation. The report also recommended a Code of Practice to ensure fair treatment of subcontractors and suppliers.

In 1998 the Egan Report, commissioned by the Labour Deputy Prime Minister, was published which developed the Latham recommendations to the next stage by identifying specific actions to improve the efficiency of the industry. A detailed comparison was made with the car manufacturing industry and a series of measures was described to optimize the construction process

and focus it on the product. Some of the terminology, such as “quality driven agenda”, smacks of instant cliché but the report makes a series of coordinated pragmatic recommendations. These are centred on the idea of the client, the contractor and the supply chain in a partnership. The whole process would be integrated so that, for example, the expertise and experience of suppliers would contribute to the design. The report advocated long-term non-adversarial relationships where discrete contracts would be replaced by a commitment to performance measurement, bench-marking and continuous improvement. Dr Martin Barnes noted, further, in a 1999 lecture to the Institution of Civil Engineers, that sharing of information is fundamental to this way of working and that it is vital to make the best use of information technology.

The recommendations have already been implemented in some areas of the private sector. For example the British Airport Authority has formed a partnership with AMEC plc and others for aircraft pavements at seven airports in the UK. The relationship between them is cordial but not cosy and there is clear evidence of long-term improvement trends in cost and time. This business is ideally suited to this type of working as the core output is the construction of new aircraft stands, a repetitive task which lends itself to production line techniques. The success of ventures such as this has helped to overcome the inherent conservatism of the industry and the major players are now examining how to restructure and adapt their businesses. The main effect is likely to be the formation of long-term alliances with subcontractors and suppliers to replace the current system of separate arrangements for each job.

Ministers are convinced that the big players in the construction industry should move in this direction and they are determined that the public sector, as a major client, should lead the way. Within the MOD this is known as the prime contracting initiative and a series of pilot projects are currently underway. So far these all involve discrete major projects but work is in hand to extend the scope of the initiative to property management, which accounts for over twice the expenditure on new projects. The intention is that over the course of the next five years large prime contracts will be let to cover geographical areas, such as regional brigade areas. These will pick up all routine works for a three to five-year

period. Major works will be placed with the prime contractors without competition providing their performance remains on target. Savings generated by ideas from the contractors would be shared with the MOD. These latter two measures are designed to encourage cooperation by aligning the interests of the contractor with those of the MOD; to improve performance and drive costs down. It is becoming accepted that it will be necessary to provide a more assured level of funding for the initiative to be successful. However there is optimism at the highest levels that prime contracting will provide an opportunity to make better use of scarce cash resources and reverse the dilapidation of the estate.

There will be a major impact on the structure, working practices and culture of estate management within the MOD. The prime contracting initiative complements the smart procurement initiative in the Defence Procurement Agency and will similarly involve the formation of integrated project teams. These will comprise representatives of the contractors, the appropriate budget holders and Defence Estates who will all need to be suitable to work in new ways, managing businesses of perhaps £50M per year, and will need to be trained in new skills. A number of tasks will transfer from formation estate staffs to the integrated project teams and some tasks currently carried out by the public sector will transfer to the contractors. Defence Estates will become more directly involved in day to day business. This is one of a number of changes to estate management in the Army which is being examined in a study by Land Command at the moment. In the RAF the long-term structure of CRE(Airfields) will be considered when the practicalities of the geographical prime contracts become clearer.

The effects on the Corps will not be immediate but will be far reaching. Now is the time for consideration and debate so that the Corps can influence events and ensure that the new system properly encompasses the needs of infrastructure management on operations. The use of contractors on operations avoids tying down hard pressed RE units on construction and maintenance tasks. It is important, however, to engage the contractors on a basis compatible with that on the peacetime estate, to facilitate the transition to peacetime procedures and the reduction of Military Engineer Services personnel at the earliest opportunity. I believe that the Corps should seek to maintain a number of RE posts on

integrated project teams, at all levels, to provide an adequate pool of personnel experienced in up to date estate management practice. At any time a proportion of this pool would be employed in the Military Works Force, available for immediate operational deployment. I also believe that the Corps should seek to have dormant operational responsibilities included in those UK geographical prime contracts with RE members on the integrated project teams. This would enable deployment of contractors early in an operation without the need for a time consuming contract competition and would also enable them to deploy with the RE members of their normal management team. These measures would clearly have a financial impact and would not be without opposition, but I believe they would provide a real operational enhancement with a faster response time than the current temporary field accommodation contract in Kosovo.

I suggest the Corps might also examine its own in-house construction business in the light of the

prime contracting principles. In particular I believe we could improve in the areas of project management and supply chain management. The loss of Long Marston has fragmented the supply chain for construction materiel and necessitated a more proactive style of management in partnership with the Defence Clothing and Textile Agency. Within regiments the management of construction needs to be merged with the management of the whole supply chain, rather than these being thought of as two complementary activities. Perhaps this should be a formal task for the HQ of the HQ squadron.

The MOD is in the vanguard of the government's initiative to reform and modernize the construction industry. A real opportunity exists for the Corps to influence the outcome to enhance its operational capability. I would encourage debate of this issue to widen understanding of infrastructure management and develop ideas on how the Corps should discharge its responsibilities in this area.

## Close Support Training for Young Officers – A Coherent Approach

LIEUTENANT L F NGWENYA MENG



*Lieutenant Lindi Ngwenya was educated at Westminster School and St John's College, Cambridge, where she gained a MEng in chemical engineering. Her service life began in earnest when she was commissioned into the Royal Engineers in August 1997 and completed 119 Royal Engineers Troop Commanders' Course. She joined 8 Armoured Engineer Squadron as an armoured troop commander after completing the Royal Engineers Close Support Course, and is now serving with the 58 Field Squadron (Explosive Ordnance Disposal). Her operational experience to date is on Operation Palatine.*

### COURSED OUT

FORTY-FOUR weeks at Sandhurst was not an adequate preparation for the dubious pleasures of the Royal Engineers Troop Commanders' Course (RETCC). The cloud of ennui that rapidly descended upon me as I sat in the classroom of Command (Remand) Wing remained stubbornly in place until the very last day when I was then welcomed with open arms by 22 Engineer Regiment – at least that is what I would like to believe. In spite of my self-confessed lethargy on 119 RETCC, I always felt a pang of conscience which told me to listen carefully because everything that I was being taught would prove to be invaluable in the long run and marginally prevailed over my body's wish to close down for large periods of time.

When the course finished, I joined 8 Armoured Engineer Squadron, arguably the finest purveyors of close support (CS) engineering, and to my dismay/surprise was informed by the OC that I would be attending the six-week Close Support Troop Commanders' Course (RECSC) as soon as possible. An involuntary flicker of panic must have crossed my eyes as I was thinking to myself, "hadn't I just completed that test of mental

endurance known as the RETCC? Oh no, maybe this is punishment for all those times that I didn't pay attention in class." My fears were allayed when the OC explained that the RECSC covers areas not dealt with by the RETCC, namely CS engineering of any description. I berated myself for being so paranoid as to think such a large chunk of RETCC could pass me by, but the next thought that sprung to mind was "couldn't something like CS engineering have been squeezed into the streamlined five months of the RETCC?"

So off to Bovington I went on the RECSC but not before having a taster of things to come by participating in a brigade field training exercise (FTX.) The RECSC did indeed cover much material that had not been touched upon on the RETCC and my private disquiet grew as my experiences on the FTX had made me realize how much of this really should have been old ground. Some would say that it is possible to overstate the case for the importance of including CS engineering in a course as wide-ranging in scope as the RETCC. However post-Strategic Defence Review, with the eventual establishment of six engineer CS regiments, surely the case for including CS training for all young officers cannot be emphasized enough.



### ON THE SPOT

HAVING come to what I believed was the reasonably isolated but enlightened view that there should be much more CS engineering training for all young officers, I joined the massed ranks of passionate but not particularly vociferous RETCC detractors. Unfortunately for me, this cosy world of scepticism at a distance was jolted when the recently arrived CO paid the squadron a visit. It became clear that he considered the need for a six-week RECSC to be rather questionable especially after a young officer had completed a course of such length as the Troop Commanders. “Surely a fair amount of CS engineering could be covered on the RETCC and this would reduce or possibly negate the requirement for the RECSC?” he said. As already stated a greater CS engineering content in the RETCC is something that I agreed with in principle and when I concurred with the CO’s ruminations I was given the task of putting my thoughts and recommendations on paper.

The first port of call in my research was inevitably personal experience. I cast my mind back to 119 RETCC and with the benefit of hindsight considered what I thought to be errors of omission with regards to CS engineering. The CS engineering of 119 RETCC could really be narrowed down to one weekend at Bovington where course members gained their CVR(T) commander’s licence and a fleeting glimpse of armoured engineer equipment on the final exercise of the course (*Exercise Phantom Sapper*) when the course configured into a field troop orbat. Although battle group (BG) tactics were covered during the command and tactics phase in the context of the three operations of war, delaying, defensive and offensive, much of this was from the perspective of a BG planning staff. With the exception of reserve demolitions not enough time was spent looking at the specifics of engineer support to the BG during the various operations. In short, a lot was learnt about the squadron or company commander’s considerations but perversely engineer squadron and troop commander’s issues were relegated to secondary importance.

### OPTIONS FOR CHANGE

HAVING drawn on personal experience, the question of whether or not to integrate CS training into the RETCC and the possibility of shortening the RECSC as a result was considered. Four options were examined:

**Keep CS training separate from the RETCC and look at means of reducing the duration of one or both courses.** This is an option that seduces one with the expectation of reduced training time. After all, “The Troop Commanders’ Course is too long” is one of the most frequently heard mantras to emanate from most sections of the Corps. However, whilst the RETCC detractors bemoan the length of the course an even more anguished groan can be heard from any directing staff involved with RE officer training in recent years. Calling for the RETCC course to be reduced is like calling for waiting lists in hospitals to be reduced. It’s a good call on paper but when anyone tries to implement it practically it proves to be an irritatingly intractable problem to solve.

The conundrum that anyone tasked with streamlining the RETCC faces is cutting volume without compromising quality and content. Although a pared down RETCC or RECSC has its attractions in terms of quicker output of officers to regiments and may indeed lead to an improvement in CS engineering training, it would almost inevitably be to the detriment of another aspect of young officer training. One could say “so what if this happens, it is just a matter of prioritizing.” However, in a time-constrained course (which is definitely the case with the Troop Commanders’ course) then such prioritizing merely leads to omissions that have to be rectified somewhere else in the system.

Even more persuasive a counter-argument is that keeping CS training discreet from the RETCC fails to address the underlying issue of more extensive integration of it into mainstream young officer training. Surely the point is about providing balanced training which may include CS engineering in as time efficient a manner as possible and not merely making time reductions for their own sake.

**Integrate some CS training into the RETCC and reduce the duration of the RECSC accordingly.**

This option provides the benefit of producing officers who all have a basic grounding in the fundamentals of CS engineering. The challenge then would be to incorporate the CS content into the RETCC without causing a significant increase in duration of this already bloated creature. On closer examination, the challenge is not as tricky as it would first seem. As stated earlier, much of the emphasis of the command and tactics phase was on BG tactics from the perspective of the teeth arms. A change of emphasis in teaching more towards the engineer perspective would provide the ideal platform for teaching CS engineering in detail.

The final exercise of the RETCC could be used as an opportunity to witness and practise CS engineering and thus significantly reduce the teaching requirements of the RECSC. More importantly, since most officers who remain in the Corps for any length of time are likely to work in a CS regiment, it

would mean that all of them had a basic understanding and some experience of CS engineering.

Such a format for the RETCC would allow the RECSC to be reduced to covering the gunnery phase and practical training in the form of a teaching exercise followed by a comprehensive debrief and a confirmatory exercise. This would approximately halve the RECSC to three weeks.

**Integrate the RECSC completely into the RETCC.** This is an option that appeals to those who feel that the RETCC should comprehensively cover as much engineering as possible. A new troop commander with an understanding of close support and general support engineering considerations is clearly a well rounded individual requiring little formal continuation training with the exception of those going into specializations such as military survey. However, the downside as the time police would be very quick to point out would be either an increase in duration of the RETCC or the omission of another part of the course to accommodate this load.

Clearly a balanced approach is required and including CS engineering in its entirety on the RETCC is swinging the balance a little too far towards that side. The argument that CS engineering is not relevant to all Sapper officers and should not be taught in great detail becomes a persuasive one in this particular instance.

Ultimately, there needs to be an assessment of all subjects covered on the RETCC and their importance and then the CS engineering content required could be put into context.

**Keep the RETCC as it is and scrap the RECSC altogether so that young officers learn about CS engineering on the job.** This is the “sink or swim” method of introducing troop commanders to the realities of CS engineering. The learning curve would undoubtedly be steep and some officers could fall by the wayside, but some would argue that at least those who survived this baptism would be of the requisite quality and robustness. Other advantages to this approach would be quicker output of young officers to the field Army and a reduction in workload on the RE wing at Bovington.

However the downside is also quite compelling. Those who are not firmly ensconced in the “no pain no gain” camp as regards to training would question the wisdom of sending young officers out into the field Army who are ill prepared for the job that they will be expected to perform. What is the point they would ask of subjecting officers to such trauma when a relatively short specialist course could equip them with the necessary knowledge? An approach that would reduce the training burden on the Bovington staff would merely shift it to the already busy regimental staff and so in the end would not actually alleviate the burden at all.

Also, in these days of operational tours interspersed with short intervals between, some officers have found themselves doing little or no practical CS training on things such as FTXs. Therefore, the lack of a formal course may leave them worryingly lacking in experience in CS engineering even after a two-year appointment. The RECSC was instigated because a need for officers to have a working knowledge and understanding of CS engineering was identified. So, any abolition of the RECSC without full integration of CS engineering into the RETCC would be a retrograde step.

### RECOMMENDATIONS

AFTER examination of the four postulated options, the twin Gods of Common Sense and Experience made me decide that the most logical choice would be a greater integration of CS engineering into the RETCC which should enable a commensurate reduction in duration of the RECSC. Such an option presents the best balance in terms of minimizing training time and providing the necessary in-depth practical and theoretical knowledge. The emphasis of the RETCC command and tactics phase and final exercise would be shifted towards an engineer perspective with a weighting towards CS engineering. This would leave the RECSC as a vehicle for practising the theory to a greater proficiency and depth.

### OVER TO COMMAND WING...

BUOYED up by the conclusions that I had come to pretty much from my own ruminations, I decided to give Command Wing at Chatham a ring in order to get a reply from them on my recommendations and hopefully give them a bit of a hand-bagging about the course’s lack of CS engineering, lack of relevance to reality in general etc, etc. After a few minutes delicate negotiations with an American officer, I was put through to the Senior Instructor, Major Ainslie. When I informed him of the content of my report and my desire to discover if anything had changed in the world of young officer training, I was surprised, nay gob-smacked, to be told that drastic surgery had finally been conducted on the RETCC. Major Ainslie was more than happy to spend fifty minutes of his time on the phone explaining to me the content of the new course and by the end of our conversation it became pleasantly clear that other people had independently come to much the same conclusion as me as to the CS engineering content of the RETCC

and practically all my recommendations had been addressed.

#### EVOLUTION

So what, I asked, had brought about this wholesale change in the RETCC? Well, it all began about three years back when the then EinC made it clear that the RETCC was far too bloated at 28 weeks and needed to be reduced to a less portly sixteen weeks. Efforts were made to carry out a merciful cull of chunks of the course but deciding which parts of the course to omit was rather tricky. The Chief Instructor, Lt Col A Harris, then decided to change tack and looked at what prospective troop commanders needed to learn prior to being inflicted on regiments. The RE Training and Development Team (RETDT) was called in to conduct a study to come up with answers. Team members looked at what was taught at RMAS and at the course content of JCSC (Joint Command Staff Course) in order to try to identify training requirements. They also looked at the young officer training of other Corps such as the Royal Signals. Most importantly, however, they went round engineer field units in the UK and Germany garnering the opinions of those directly affected by young officers (such as squadron commanders) as to what they considered to be important for young officers to be taught.

The report from the RETDT highlighted a number of areas of failure one of which was that the young officers' understanding of combined arms operations and Sapper integration into them was minimal. The RETCC was restructured to take on board the report's various recommendations and consequently the all-new 26-week RETCC package (16 weeks was not viable) was produced with a more than significant element of CS engineering included within the combined arms context.

#### EXECUTION

So what is the CS engineering content of the new course? The command and tactics phase at Chatham has been adjusted so that within each of the BG operations, the Sapper's role in the operation is scrutinized. Consequently TEWTs (tactical exercise/s without troops) that hadn't changed fundamentally for the best part of seventeen years were rewritten and students are required to produce engineer troop commander sets of orders for most of these scenarios.

Exercise *Open Eye* is a three-day command post exercise (CPX) that covers the three phases of war (delay, defence and offence) and command appointments include as many engineer posts as possible. I still remember without fondness participating in a similar CPX with various command appointments from company commander to BG commander's radio operator but few or no engineer appointments. Little surprise then that the exercise culminated in a bunfight on the map over who had killed who and thus how many pieces each protagonist was allowed to remove.

Exercise *Phantom Sapper* has probably undergone the greatest surgery of all and the final phase of the exercise results in the troop commanders' course reconfiguring with the Combined Arms Training Centre engineer troop into two CS troops. Course students act as engineer troop commanders and recce sergeants during the BG advance-to-contact and subsequent obstacle breaching. Even the weekend that my course spent at Bovington has been extended to a week and students see quick examples of armoured recce and a CS task as well as experiencing the fun of thrashing a Spartan about on the cross-country area.

So, the RETCC course has changed fundamentally and on the face of it for the better. The first products of the new course are now arriving at their regiments and ultimately the effectiveness of the new course will be judged by the young officer's understanding of CS engineering and his/her subsequent performance.

The RECSC has not as yet changed to address the new training requirements but this is not surprising as troop commanders trained on the revamped course are only just starting to appear. The RECSC can be a more rapidly changing course by dint of its much shorter length and thus flexibility. The training requirements of the course are, therefore, constantly under review. So perhaps a shorter RECSC will be the eventual outcome in the near future and all my dreams will have come true(!).

#### RETRIBUTION

ALTHOUGH I have been thwarted in my initial intention to highlight all that is inherently evil with the RETCC, it is heartening to think that future generations of Sapper officers will be in a position to appreciate the course in hindsight because, to be honest, it's a rare individual who does so whilst on the course.

# Engineer Logistics in the Army Supply Chain “ ... And Assorted Opinions”

MAJOR A M MOORE



*Tony Moore joined the Corps in 1982. He was commissioned in 1985 from the rank of Lance Corporal. His tours as troop commander were with 7 Field Squadron, and the Junior Leaders Regiment, followed by one as training adjutant. After Junior Division Staff College he was posted to 73 Engineer Regiment (V) as adjutant during the re-rolling of the regiment to support the RAF Harrier Force. During his appointment as operations officer 32 Engineer Regiment, he deployed to Bosnia as part of the French-lead multinational brigade, which comprised the Devon and Dorset Battle Group and the French Foreign Legion! The primary engineer task was construction of winterized camps on the vital ground of Mount Igman with an engineer group from six nations with varied languages including Malay. For the past three years Tony has been the SO2 Engineer Logistic Operations with HQ LAND Engineer Division. A period marked by substantial development in the area of engineer logistics. He will soon be moving to command 15 Field Support Squadron.*

## FOREWORD

*THE style of this article takes the form of a narrative which leads the reader through a recently drafted Tactical Doctrine Note (TD Note). The subject is engineer logistics. It will undoubtedly be some time before the note attains formal status and, in the light of several recent Journal articles on the subject, I thought it might be useful to expose the detail to a wider audience sooner rather than later.*

*Having contributed to the development of the TD Note I feel compelled to embellish that which will become doctrine and expand upon the underlying logic and motives. It is hoped that this article will be of use not only as a reference document to those members of the expanding engineer logistic club, but also to the wider community of engineer officers and warrant officers who have missed the significant changes that in the last three years or so have resulted in the development of an improved capability.*

*The narrative is displayed in italic text to distinguish it from the original words of the TD Note.*

## INTRODUCTION

On training and operations, Royal Engineers can only work effectively if they are supported and sustained in a timely manner, with engineer resources\* and engineer workshop support. The scope of engineer tasks that may be required in support of an operation are difficult to predict, as is the wide range of engineer materiel<sup>ii</sup>, which may be required to complete these tasks. There

are no scales or consumption rates for engineer materiel and it is impractical for every engineer unit to hold all that might be required for every contingency. Therefore engineer materiel is:

- Held in “pools” by engineer logistic units in the Deployable Supply Chain (DSC)<sup>iii</sup> and, in the Logistic Support Base Area (LSBA)<sup>iv</sup>, by the Defence Storage and Distribution Agency<sup>v</sup>.
- Passed back and forth along the Army Supply Chain (ASC)<sup>vi</sup> to be refurbished, stored and reissued as necessary.

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\* See attached glossary for definition

- Procured by Engineer Resources Specialists as far forward as possible.
- Manufactured, adapted or repaired by Engineer Workshops as far forward as possible.
- Configured<sup>vii</sup> as far back as possible.

### AIM

The aim of this TD Note is to describe Engineer Logistics and its place in the Army Supply Chain in order to explain how it contributes to engineer capability.

### SCOPE

This TD Note describes the following:

- Engineer Lines of Support.
- Engineer Logistic Support to the Joint Rapid Reaction Force (JRRF).
- Engineer Logistic Force Packaging.
- Principles of Engineer Logistics.
- Core Functions of Engineer Logistics.
- Financial and Contractual Delegations.
- Command and Control of Engineer Logistics.

It focuses on engineer logistics in the Field Army and does not consider, in depth, the 4<sup>th</sup> Line, Base area, support provided by the Defence Logistics Organisation (DLO)<sup>viii</sup>.

It does not consider the engineer logistic challenges associated with the specialist areas of Air Support, Air Assault, Amphibious or Armoured operations, which are covered by specific TD notes on these areas. Nor does it consider support for specific theatres eg Cyprus and the Falkland Islands. Nevertheless, the principles of engineer logistic support for such operations all broadly apply.

#### **DEFINITION AND SEMANTICS**

*THE Concise Oxford English Dictionary definition of logistics is given as:*

- “The organization of moving, lodging and supplying of troops and equipment.
- The detailed organization and implementation of a plan or operation.”

*The plethora of commercial enterprises now incorporating the word logistics in their title has elevated the term into everyday use. The extension of the term to include engineer logistics is a perfectly logical one that conjures up a suitable image of the tasks involved. The semantic debate*



In-theatre logistic bridging; critical to the Army supply chain.

*has touched the otherwise uncomplicated lives of the staff in LAND Engr Division. The resources policy committee has been renamed and has directed that, where sensible, the word resources be replaced by logistics. This change in terminology will be written into the next edition of “Engineer Support Regulations”, but cannot yet be fought through to its logical conclusion. If we wish to change the job title of our military engineer resources specialists there are numerous publications that will require amendment, which may yet prove to be a step too far.*

### ENGINEER LINES OF SUPPORT

In general, engineer logistic support is required by the Field Army at 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Line<sup>ix</sup>. Engineer lines of support can be described as:

**1<sup>st</sup> Line.** 1<sup>st</sup> Line engineer logistic support is integral to CS and GS engineer regiments and is usually provided by the HQ squadron. It consists of immediate

stocks of engineer materiel usually configured for a particular task, together with a small stock of general engineer materiel eg reserve bridging. In addition to their engineer logistic function, HQ squadrons provide Combat Service Support (CSS)<sup>x</sup> to the regiment. However, they have no artisan workshop component and only limited plant and transport capability.

2<sup>nd</sup> Line. 2<sup>nd</sup> Line engineer logistic support is provided to engineers within a formation. There is normally one 2<sup>nd</sup> Line engineer logistic squadron in each division or independent brigade and, when deployed, they are located within the formation Supply Area. They supply engineer materiel forward to HQ squadrons and other engineer task squadrons, as required. 2<sup>nd</sup> Line engineer logistic units hold quantities of engineer materiel as working stock<sup>xi</sup> both for specific tasks, and as a general-purpose reserve, while retaining a level of mobility commensurate with the formation being supported. 2<sup>nd</sup> Line engineer logistic units require deployable artisan workshop facilities to provide adaptation, fabrication and Level 2<sup>xii</sup> repair capability with a limited capacity for manufacture and Level 3 repairs.

3<sup>rd</sup> Line. 3<sup>rd</sup> Line engineer logistic support is normally provided as an integral part of a Logistic Brigade. Alternatively, 3<sup>rd</sup> Line engineer logistic support could deploy independently of the Logistic Brigade, or as part of a task-organized formation. If a Logistic Brigade is deployed, it would normally have an engineer logistic unit OPCON, to provide 3<sup>rd</sup> Line engineer logistic support, in addition to a GS engineer regiment providing general engineer support. They may have call on the Engr Sp Sqn, RLC, which holds a tipper fleet and forms part of the Logistic Brigade orbit. 3<sup>rd</sup> Line engineer logistic units usually require well-found buildings and hard standings on which to store significant quantities of engineer materiel, generally ground-dumped. These facilities should be close to or within the Point of Disembarkation (POD). Large quantities of locally procured materiel may also be obtained. 3<sup>rd</sup> Line engineer logistic units must be capable of providing in-depth repair and extensive manufacturing and adaptation capabilities. They will require deployable workshop facilities and access to sources of appropriate raw materiel.

#### **WORKSHOP POLICY**

*WORKSHOP policy is in the process of being republished as endorsed by the EinC(A) and Comd Engr LAND. The new policy will be disseminated soon and incorporated into the rewrite of "Engineer Support Regulations". Essentially it provides for the five engineer logistic squadrons and 60 HQ & Sp Sqn to be equipped with a deployable workshop capability. This will in due course replace the static facilities which currently provide an*

*opportunity to train in barracks. Should our workshops be given a geographic dependency as was the case in the past, or is there another way to provide a controlled load for the workshop when it is not deployed? HQRE 3 (UK) Div are studying this requirement based on the assumption that the new logistic squadron location in Woodbridge will not be furnished with a static workshop. Early conclusions indicate that a temporal roster will be the preferred solution for deployable units with non-deployable units such as UOTCs being supported from the base. The statement of user requirement for a deployable engineer workshop has been written and accepted by LAND G3 Operational Requirements. It is not yet in the funded equipment programme and is likely to take several years to procure.*

#### **ENGINEER LOGISTIC SUPPORT TO THE JRRF**

Each echelon of the JRRF has corresponding engineer logistic support.

First Echelon. Within the Joint Rapid Reaction Force (JRRF), an engineer logistic squadron (-) will form part of the Joint Force Logistic Component (JFLogC)<sup>xiii</sup>, First Echelon.

Second Echelon. During a Medium Scale operation an engineer logistic squadron will form part of the JFLogC, Second Echelon. It would be expected to form a Main Rendezvous (MRV), usually as part of the (Air, Sea or Rail) POD and to establish a Forward Rendezvous (FRV). The generic<sup>xiv</sup> logistic squadron has this capability built in, with a Resources Troop comprising of a Main Det (0+8) and a Forward Det (0+9) at Unit Establishment (UE) [(1+21) and (0+21) at W]. Plant Troop, or elements, will usually be detached forward to support Field Squadron tasks. Thus, it is possible for the squadron to fulfil both 2<sup>nd</sup> and 3<sup>rd</sup> Line functions, albeit, in a limited capacity. It is unlikely that a Workshop Forward Det would be required.

Third Echelon. Within a Large-Scale operation, two engineer logistic squadrons are deployed. One would provide 2<sup>nd</sup> Line engineer logistic support to the deployed Division and would be based in the divisional support group. The second<sup>A</sup> engineer logistic squadron would

<sup>A</sup>In the case of an extended LofC, two engineer logistic squadrons would deploy at 3<sup>rd</sup> Line, one at each end of the LofC.

provide 3<sup>rd</sup> Line engineer logistic support and would form part of the Logistic Brigade within the JFLogC, Third Echelon. Although each unit is identical and could provide 2<sup>nd</sup> or 3<sup>rd</sup> Line support as required, it would also be possible for the CRE to task organize these two units to suit the particular requirements at 2<sup>nd</sup> and 3<sup>rd</sup> Line. For example:

**Resources Troop.** The Resources Troop at 3<sup>rd</sup> Line may require reinforcement to undertake the receipt into theatre of large volumes of stock and to establish the theatre Engineer Park or MRV. Conversely, the 2<sup>nd</sup> Line Resources Troop may be required to be more mobile, operating as a large FRV. In this case task organization, between the two squadrons, could be necessary.

**Workshop Troop.** It is almost certain that the static, well found, facilities necessary to establish an effective engineer workshop, are likely to be found in the rear area and near to the POD. To this end, it is likely that the 3<sup>rd</sup> line engineer workshop will need to be augmented by assets from the 2<sup>nd</sup> Line engineer workshop, which will need a less capable facility, undertaking field repair.

**Plant Troop.** Plant assets can be tasked organized wherever the greatest demand lies, either forward with the 2<sup>nd</sup> Line, or back to the 3<sup>rd</sup> Line. Assets can be switched from 2<sup>nd</sup> Line to 3<sup>rd</sup> Line, or vice-versa as the situation demands.

**Support Troop.** Bridging assets within Support Troop are more likely to be required forward and therefore assets from the 3<sup>rd</sup> Line engineer logistic squadron would need to be detached to the 2<sup>nd</sup> Line. Military transport assets are less likely to require task organization and both 2<sup>nd</sup> and 3<sup>rd</sup> Line engineer logistic squadrons may require reinforcement from elsewhere.

#### **WAR RESERVES**

*A SPECIAL Purpose War Reserve (SPWR) equipment schedule is in draft for engineer equipment in support of the various components of the JRRF. The SPWR will provide the additional equipment not held on unit equipment tables. Equipment will be held to a structured readiness state using three principles of logistics: foresight, economy, co-operation. The base will be expected to keep the high readiness equipment fit and ready for deployment within the stated readiness preparation time (RPT) – foresight. Conversely, the equipment earmarked at longer readiness may not need to be held, but could be purchased within the RPT. This will permit expensive stock levels to be reduced – economy. This process is being instigated in HQ LAND*

*Engr Div, but cannot progress further without the involvement of those within the smart procurement system and ultimately the agency which will hold this equipment – co-operation. It is anticipated that the other two principles of logistics: simplicity and flexibility, will be achieved as the system develops and more people understand how to maximize its benefits.*

#### **ENGINEER LOGISTIC FORCE PACKAGING**

Deep, close and rear operations may make the distinction between 2<sup>nd</sup> and 3<sup>rd</sup> Line less clear. An extended Line of Communication (LofC) may demand a clear split between 2<sup>nd</sup> and 3<sup>rd</sup> Line activities, whereas a shorter LofC may result in a bespoke organization. Similarly, operational and geographic factors may also influence the structure of 2<sup>nd</sup> and 3<sup>rd</sup> Line support. It may be possible to combine 2<sup>nd</sup> and 3<sup>rd</sup> Line functions and carry them out within a single engineer logistic unit. This has been done successfully, for example, in Bosnia. Such ad hoc groupings are likely to remain a requirement for operations other than war (OOTW). Greater sustainability and flexibility of engineer logistic support during protracted operations should be achieved with the generic engineer logistic unit establishment. At unit establishment (UE) these orbats permit interoperability between the 2<sup>nd</sup> and 3<sup>rd</sup> Line support.

The factors that need to be taken into account when the engineer commander produces his logistic support plan, include:

- Troops available to task.
- Operational situation.
- Geographic situation.
- Formation G3 and CSS plan.
- Materiel being handled.
- Amount of available Host Nation Support (HNS).

**Pairing.** Pairing is the mechanism by which a unit is brought from UE (Unit Establishment) to WFE (War-fighting Establishment) by reinforcing it from another unit elsewhere within the FRC (formation readiness cycle). At UE, certain elements of the generic engineer logistic squadron are cadreised in excess of 50 per cent and therefore even when two units are ‘paired’ they will fail to make a single WFE engineer logistic squadron. The solution lies with G3 (O&D) when force packaging for WFE deployments.

**MANPOWER ESTABLISHMENT REVIEW (MER)**

*As a result of the SDR an additional engineer logistic squadron is forming. This permits the commensurate engineer logistic support to two lines of communication in support of the JRRF whilst maintaining a 24-month tour interval. The squadron will form up this year as 70 Gurkha Field Support Squadron and will deploy on Operation Agricola in August 2000. The MER has taken the opportunity to make all the establishments of the logistic squadrons the same. This makes them interchangeable for OOTW and avoids the undesirable differences in capability experienced in recent years. The decision has also been taken to rationalize the names of these squadrons, which from the 1 April 2000 will all become known as field support squadrons. The pairing mechanism is assisted by this modular approach.*

**THE PRINCIPLES OF ENGINEER LOGISTICS**

**General Principles.** Engineer logistics share the over-arching principles of the Army logistic system, which are Foresight, Economy, Flexibility, Simplicity and Co-operation. In addition, the following general principles are recognized:

- There should be a single, integrated supply chain from 4<sup>th</sup> Line (Base) through 3<sup>rd</sup> and 2<sup>nd</sup>, to 1<sup>st</sup> line.
- The ASC should operate the same in peace as on operations.

**Specific Principles.** The specific principles of engineer logistics are:

**Expertise.** Engineer expertise must be embedded at key points in the supply chain, including the headquarters of the Logistic Brigades, within the Supply Chain Operations Centre (SCOC)<sup>xv</sup> and within CDL's Agencies<sup>xvi</sup>.

**Deployability.** 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> Line engineer logistic units must be deployable.

**Command.** Engineer logistic support should be commanded at the highest practical level.

**Separation of Tasks.** 2<sup>nd</sup> and 3<sup>rd</sup> Line (Deployable) engineer logistic units in Land Command should not undertake 4<sup>th</sup> Line (Base) logistic tasks, such as storage of War Reserves or Level 4 Repair. Similarly, 2<sup>nd</sup> and 3<sup>rd</sup> Line Field Army tasks should not be carried out in the Base area. 4<sup>th</sup> Line engineer logistic tasks should be carried out, as a core function, by the DLO Agencies.

**Employability.** To allow sustainability on protracted operations, 2<sup>nd</sup> and 3<sup>rd</sup> Line engineer logistic units should have the same establishments, which can be task organized to suit particular situations.

**Resourcing.** Repair and procurement should be conducted as far forward as possible and the appropriate Financial and Contractual Delegations must be issued at the onset of an operation, to allow procurement to take place.

**DESIGNING TO YOUR RESOURCES**

*DESIGNING with available resources has not always worked as successfully as it might. Often for the lack of an adjustment to either the design or the resources demand, a task has been delayed. The convergence of the designing and resourcing disciplines will help to improve this situation and avoid some unnecessary delay. The emerging challenge is to engage the civilian contractors, who support an increasing number of our tasks, with the same process. Our chartered engineers are more familiar with civilian practice than the majority of our military resources specialists. As the operational commitments appear to be waning, now is the time to expand the scope and style of the training provided for our resources specialists in barracks.*

**Configuration.** Configuration should be conducted as far back as possible.

**CORE FUNCTIONS OF ENGINEER LOGISTIC UNITS**

The core functions of engineer logistic units are:

**Engineer Materiel Handling.** Engineer logistic units process demands; account for receipt and issue of stores; hold, control, service, inspect (inclusive of quality control), package, reconstitute and configure stores and engineer equipment; let contracts and conduct local purchase. Stores are held at a level of readiness commensurate with the line of support. In order to fulfil this function it is essential that engineer logistic units have the appropriate materiel handling equipment (e.g. Container Stuffers, Materiel Handling Equipment and Rough Terrain Container Handlers(RTCH)).

*The Army Materiel Liability Committee has accepted the new establishments of the engineer logistic squadrons which includes container stuffers and RTCH. We would seek to have container*



stuffers on the unit establishment (formerly peace establishment) of all the squadrons because of their utility in barracks as well as on operations. However, the RTCH are almost solely required on operations and would be an equipment care liability in barracks. We may yet benefit from the application of whole fleet management to these heavy equipments thus reducing the maintenance burden in barracks whilst retaining the opportunity to train and ultimately achieving the required operational capability. Whatever the eventual solution, at least we are now established for RTCH, removing the need to borrow from the RLC for operations having discovered that these specialist vehicles were not readily available for hire.



Part of the urgent operational requirement for quarry equipment on Operation Agricola.

Note: Engineer logistic units hold additional plant, primarily for use by CS and GS engineers as required and in accordance with the engineer commander's priorities. It is possible for engineer logistic units to supervise and carry out some engineer plant tasks but this may be to the detriment of their other core functions.

Engineer Workshop Support. Engineer Workshop Support consists of manufacture, modification, inspection, maintenance and repair of engineer materiel and equipment at Levels 2 and 3. In order for this function to be undertaken on operations it is essential that engineer logistic squadrons are equipped with a deployable engineer workshop capable of supporting the full range of engineer artisan trades.

*The recently endorsed, and soon to be published, Engineer Workshop Policy reinforces the requirement for a deployable workshop capability. It is clear that once such a capability is in service, the static facilities will no longer be supported. Indeed, we may be able to mortgage some of the existing facilities to help finance the deployable workshop. This will require even more imaginative solutions to provide adequate training for our artisans whilst in barracks. The development of artisan training standards is being considered to reduce skill fade and increase deployable capability.*

#### FINANCIAL AND CONTRACTUAL DELEGATIONS TO PURCHASE MATERIEL

In order that engineer logistic squadrons can provide materiel (stores and equipment) for tasks, it is important that they are given the appropriate financial<sup>xvii</sup> and contractual<sup>xviii</sup> delegations. A close liaison must be established with the appropriate Civil Secretariat and Contracting Authority. Suitable systems must be in place to ensure the correct financial and requirement scrutiny<sup>1</sup> and maintain relevant individual qualifications. These delegations must not be vested in the same individual and, where possible, should be kept separate from those responsible for technical specification.

#### *DELEGATIONS*

*AN initiative currently underway in LAND Engr Div as a result of post operational reports, is to achieve the right balance of financial and contractual delegations for deployed engineers. This has not been a straightforward task as there is some resistance from the financiers. There is also the issue of propriety to ensure that commanding officers have the necessary financial safeguards.*

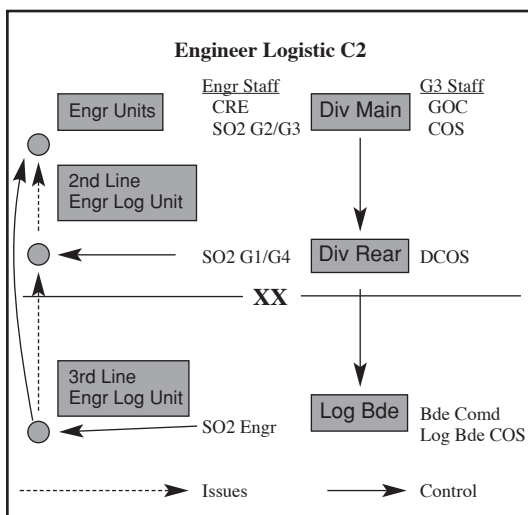
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<sup>1</sup> Regulations contained within *Joint Warfare Publication 4.05*.

### COMMAND AND CONTROL OF ENGINEER LOGISTIC UNITS

HQ Squadrons are integral to their parent CS or GS regiment and are commanded by the CO of that unit. Engineer logistic squadrons will normally be integral to the formation and OPCOM the appropriate engineer commander, for example the CRE in a division. The exact command arrangements within a formation are the responsibility of the engineer commander, who may command the 2<sup>nd</sup> Line engineer unit directly or may place it under command of a GS engineer regiment. Whatever the command arrangements, it is essential that the engineer commander, at the highest level, determines the priorities for the allocation of engineer materiel and integrates logistic and operational planning.

On operations, the 3<sup>rd</sup> Line engineer logistic unit would normally deploy OPCON of the Logistic Brigade, receiving priorities from the formation engineer commander. In peace, however, 3<sup>rd</sup> Line engineer logistic units remain within the engineer command chain in order to prepare them fully for war, to provide peacetime 3<sup>rd</sup> Line support and to manage their employment on operations where a Logistic Brigade is not deployed.



#### **COMMAND & CONTROL**

*OPERATIONAL* experience continues to demonstrate the benefits of affiliations. This has been particularly evident with the CS regiment link to the brigade HQ. If team members have exercised

*together and know one another well they will be stronger than an ad hoc group. Fairly obvious perhaps, but greater efforts have been made recently to preserve these affiliations. The post SDR RE organization strengthens these links further especially in Germany where a major reorganization is under way to place CS regiments with their affiliated brigades in barracks. Logistic squadrons would also benefit from such affiliations with their formation or logistic brigade, but being outside of the formation readiness cycle requires a bespoke solution, which is being developed now. The best option will favour the strengthening of affiliations, but each logistic squadron will almost certainly have two affiliations. Not perfect, but in the absence of any more logistic squadrons, a better solution than the alternatives.*

One of the major benefits of the ASC is the increased visibility and prioritization of the significant transport requirements necessary to support engineers. It is important to note that engineer logistic units do not possess the transport lift necessary to move engineer stores throughout the formation area and rely heavily on GS transport assets. These will be required on a regular basis subject to operational priorities.

*The volume of freight moved by land, sea and air in support of engineer operations is substantial. Formation assets are prioritized accordingly, but arguably the major difficulty is further back in the supply chain. The ASC has overcome this by successfully prioritizing 3<sup>rd</sup> and 4<sup>th</sup> Line transport assets.*

*Here are some statistics, but remember ...*

*"Torture statistics long enough and they will confess to anything!"*

*30347 m<sup>3</sup> of Engineer equipment and materiel has so far been outloaded to Operation Agricola compared to 38770 m<sup>3</sup> dispatched during the four years of Operation Grapple. The value of the Operation Agricola inventory (only counting items over £1500) after just 12 months exceeds £27M with a gross tonnage of 5315 tonnes. This represents 32 per cent of all such operational expenditure since 1992.*

*... but it gives an indication of the scale of support for this brigade deployment.*

The introduction of common logistic Information Systems (IS) such as GLOBAL<sup>xix</sup> and VITAL<sup>xx</sup> will support these functions. It is important that a GLOBAL account (termed a “Secondary Depot” account and identified by means of a CA UIN) is set up immediately on deployment of a logistic unit in order that materiel may be accounted for correctly from the outset. Commanders should note the requirement for suitable communications when siting engineer logistic units’ IS.



Constant improvement increases the capability of the supply chain to meet demand.

#### **LOGISTIC IT**

*GLOBAL was not designed to fulfil engineer requirements. Unlike the majority of commodities in the supply chain which are “fire and forget”, the bulk of engineer equipment (if not resources) will require to make its way back again. The accounting for this activity is more involved and together with local purchasing, is not fully supported by GLOBAL. However, the fact that engineer logistic squadrons now have GLOBAL means that we are able to influence future developments and programmes. Indeed £4M has just been released to improve GLOBAL. We are a part of the system and will benefit from these developments, which if successful in computerizing our engineer accounts will permit e-commerce to be embraced and will release our resources specialists from some of the monotony associated with manual accounts. Digitization is just over the near horizon, which may revolutionize our business, but is happily outside the scope of my article!*

#### **SUMMARY**

Engineer logistics are essential for the success of any engineer work in support of operations and are fully integrated into the ASC. The flexibility of engineer logistic unit establishments allows generic units to operate at either 2<sup>nd</sup> or 3<sup>rd</sup> Line through correct task organization. Engineer logistic support can be provided within the framework of the JRRF in warfighting, or OOTW, to priorities specified by the engineer commander.

#### **CLOSING REMARKS**

*THE interruptions above read a little bit like a development agenda (new management speak) which is not surprising considering the staff*

*changes that have taken place in the last ten months. In addition to the embedding of RE expertise at strategic points in the ASC, LAND Engr Div now has a colonel engineer logistics and an SO1 engineer logistic operations in addition to the original staff. This extra horsepower has created the conditions to develop engineer logistics as described above, major developments which I hope I have managed to place in context with a rewritten doctrine.*

*On an evangelical note, my lasting impression of this period of change is what good logisticians RE officers make. We entered the ASC late having emerged from our own self contained, mystical system. Initial concerns about how long we would take to be integrated were soon dispelled. The fact is that RE officers, from troop commander onwards, know (from bitter experience) the importance of getting the right kit to the right place in the right configuration and at the right time. This is, and always has been, the most appropriate definition of engineer logistics. There are some interesting opportunities evolving for engineer logisticians, both within our Corps (the engineer logistic club that I have already mentioned) and in the wider logistic community.*

#### **GLOSSARY**

Definitions used in this TD Note (in order of appearance).

<sup>1</sup> Engineer Resources. The generic term used to describe that materiel of which RE is the exclusive

- or principal user and those facilities which enable RE to function in its engineering role – ESRs.
- ii Engineer Materiel. Engineer materiel comprises of:
- All equipment with the DMC prefixes NA – NZ and SA – SZ, spares for engineer materiel and construction materiel.
  - Other DMC materiel, such as Armd Vehs RE and earthmoving and construction C Vehs, of which the RE is the primary user.
- iii Deployable Supply Chain (DSC). The DSC is defined as those deployable logistics units that provide Combat Service Support (CSS) to deployable units. On operations, the DSC geographical area is from the Port of Dis-embarkation (POD) forward to the Forward Line of Own Troops (FLOT).
- iv Logistic Support Base Area (LSBA). The LSBA (Base or Base Area) is defined as that area within which non-deployable logistic support base organizations are located and from where they provide logistic support to the DSC and non-deployable units. Geographically, the LSBA covers the whole of the United Kingdom and Germany.
- v Defence Storage and Distribution Agency (DSDA). A Tri-service agency, responsible for base storage and distribution of materiel.
- vi Army Supply Chain (ASC). The term “Army Supply Chain” is used in its broadest sense, including all aspects of provision, procurement, inventory control, storage, maintenance, distribution, regeneration and disposal. It covers the point of manufacture of materiel, the entry of materiel and other resources into the supply chain through to the point of consumption. This is in partnership with suppliers, internal and external executive agencies, logistic units, both within the DSC and the LSBA, and those units supported by them.
- vii Configuration. Configuration is the process of bringing stores together, often from different suppliers and occasionally from different countries, in order to create packages which are of the greatest utility to the end user. This process may include the breaking down of trade packing as well as the running up and testing of machinery.
- viii Defence Logistics Organization (DLO). Defence Organization, headed by a 4-Star appointment, with Tri-service responsibilities for the provision of logistic support.
- ix Lines of Support.
- 1<sup>st</sup> Line – Logistic support organic to a unit.
  - 2<sup>nd</sup> Line – Logistic support organic to a formation.
  - 3<sup>rd</sup> Line – Logistic support behind the divisional rear boundary and forward of the POE.
  - 4<sup>th</sup> Line – see LSBA.
- x Combat Service Support (CSS). The support provided to combat forces in the fields of administration and logistics (AAP-6).
- xi Working Stocks. Working stocks provide immediate support to tasking, allow proactive reaction to changes in circumstances and reduce the “lag” effect of supply chain inertia.
- xii Levels of Repair.
- Level 1 – User level maintenance.
  - Level 2 – Field maintenance carried out by replacement or minor repair. Normally designated in Army Equipment Support Publications (AESPs).
  - Level 3 – Field maintenance in greater depth, requiring special skills or facilities short of complete re-build. Normally designated in AESPs.
  - Level 4 – Base repair requiring full recondition or major conversion.
- xiii JFLogC. The JFLogC is situated in the operational theatre, and comprises the Air/Rail/Sea POD, the Forward Logistic Site, Logistic Brigade, Air Logistic Support Group and Rear Support Group. A JFLogC is established where scope exists for providing more efficient, responsive and cost effective logistic support. The JFLogC will assume TACOM of joint logistic units and 3<sup>rd</sup> line assets in order to achieve this economy of effort. Further details are available in JWP 0-10 Chapter 8.
- xiv Generic Logistic Squadron. The term “generic logistic squadron” is used to describe the similar establishments for all engineer logistic units created during the Strategic Defence Review (SDR) 1998. There are 5 Engr Logs Sqns (15, 45, 61, 65 and 70 Fd Sp Sqns).
- xv Supply Chain Operations Centre (SCOC). The Supply Chain Operations Centre (SCOC) executes the day to day management of the Army Supply Chain, including war reserves. SCOC includes the Engineer Resources Management Cell, to manage engineer materiel in the Army Supply Chain.
- xvi CDL Agencies. The CDL Agencies have the following missions:
- Defence Storage and Distribution Agency (DSDA) – To operate Base storage and distribution cost effectively world wide to agreed standards whilst sustaining the Forces’ technical skills in these functions for crisis and war.
  - Equipment Spares Provisioning and Procurement Agency (ESPPA) – To meet all customer needs by supplying vehicle and technical spares and equipment at the right place, to the right quality and at the best possible price.
  - Defence Clothing and Textile Agency (DCTA) – To provide an agreed range of clothing and textile products and services and general stores to meet the operational requirements of the UK Armed Forces, NOC agencies and other customers, within agreed standards and in the most cost effective manner.
  - Defence Transport and Movements Agency (DTMA) – To provide an agreed transport and movement service for the world-wide support of HM Armed Forces, the MOD, Other Government Departments and sponsored organizations, in order to meet the required operational logistic support in peace, crisis, transition to war and war within agreed standards and in the most cost effective and efficient manner.

- Army Technical Support Agency (ATSA) To enhance the Army’s operational capability by providing an effective and efficient technical support service.

<sup>xvii</sup> Financial Delegations. Financial Delegations will be passed down to named individuals through the J8 (Budgets) and Civ Sec chain in the appropriate theatre of operations. When not held centrally by Civ Sec in theatre these must be provided, early in an operation, to the delegated RE Commanders. It would not be unusual to have Financial delegations for the CRE, CO of the Engineer Regiment, SO1 J4 Infra (but it must not clash with his technical responsibility) or the OC of the Engineer Logistic Squadron. Levels of delegation will vary depending on rank and the operational situation. It will be required for contingencies (working stock) as well as specified tasks.

<sup>xviii</sup> Contractual Delegations. Contractual delegations will be authorised to named individuals by the

appropriate mentor in either HQ LAND or the Defence Procurement agency (DPA). Individuals must have attended the appropriate training. They are restricted in what they can buy (no weapons, fuel, rations etc) and must get value for money. The amount of delegation will depend on the rank and experience, modified by operational circumstances, the size of the project and the cost of stores.

<sup>xix</sup> GLOBAL. GLOBAL is the DSC’s standard inventory control IS. It is used for processing demands and accounting for stock, including loan pools and locally procured materiel, at 2<sup>nd</sup> and 3<sup>rd</sup> Line. It also provides a means of interrogating the LSBA’s stores database to determine the availability of codified spares.

<sup>xx</sup> VITAL. VITAL is the standard IS for tracking consignments through the DSC between the LSBA and 2<sup>nd</sup> Line, including through the RAF supply chain.

## Digital Photographs

### If you are considering using a digital camera to produce illustrations for an article, please read the following :

Many photographs taken by digital cameras are being received by the editor for publication in the Corps’ *Sapper* magazine and *The RE Journal*, but unfortunately **not one** received so far has been of suitable quality to be used for publication.

Unless a digital camera is available to take photos (during operations/exercises/adventurous training and so on) at a resolution of 800 dpi (dots per square inch), then **please** make sure that a normal camera is taken to produce photographs to illustrate articles to be considered for publication.

If a suitable digital camera is available (set at 800 dpi), then also required will be a piece of equipment capable of filing the results to send to this department: either a CD reader/writer so that you can send a CD, or a zip disk driver with zip disks of 100 or 250 Mb. CDs or zip disks will be returned to the sender after use. If you have access to an integrated services digital network (ISDN) line, then our number is: 01634 403501 and any number of photographic files can safely be sent by this method. Further, it is important that the photographic file arrives here in an “unexpurgated” state, ie not touched up in any way, lightened, sharpened or resized.

If you do not know what dpi your camera is set at (the majority are 72 dpi) then you have only to look at the size of the file produced. One average-size (say 15 x 10cm) black and white photograph suitable for publication **will not fit** onto a floppy disk (even if the file is compressed) as it will usually be somewhere between 2 to 6 Mb in size. A coloured photograph is infinitely greater in size.

If low quality digital photographs are the only ones you have available to illustrate an article you

# Explosive Ordnance Disposal Operations in Kosovo

MAJOR A W PHILLIPS MA



*Major Andy Phillips was commissioned in 1985. He served as a troop commander in 39 Engineer Regiment and was Adjutant of 25 Engineer Regiment in Osnabrück. He spent two years as an instructor at the Canadian School of Military Engineering in British Columbia but paid his penance in 1995 when he was sent to Ploce Dockyard Camp, Croatia, for three months whilst serving on the staff of 24 Airmobile Brigade. He attended the first Joint Service Command and Staff Course at Bracknell and assumed command of 21 Field Squadron (Explosive Ordnance Disposal) in August 1998. Having never previously served in EOD, he feels extremely privileged to have had the opportunity to command the squadron on such a unique and challenging operation.*

## INTRODUCTION

BETWEEN March and December 1999, 21 Fd Sqn (EOD) was responsible for providing EOD support to all British forces deployed on Operation *Agricola*. The squadron, which had four Royal Air Force teams and three Royal Logistic Corps teams under command at the peak of the operation, was approximately 100 strong and represented the largest single deployment of EOD assets since the Gulf War. It was also the first time that Army and RAF bomb disposal personnel had worked together in joint teams in an operational environment.

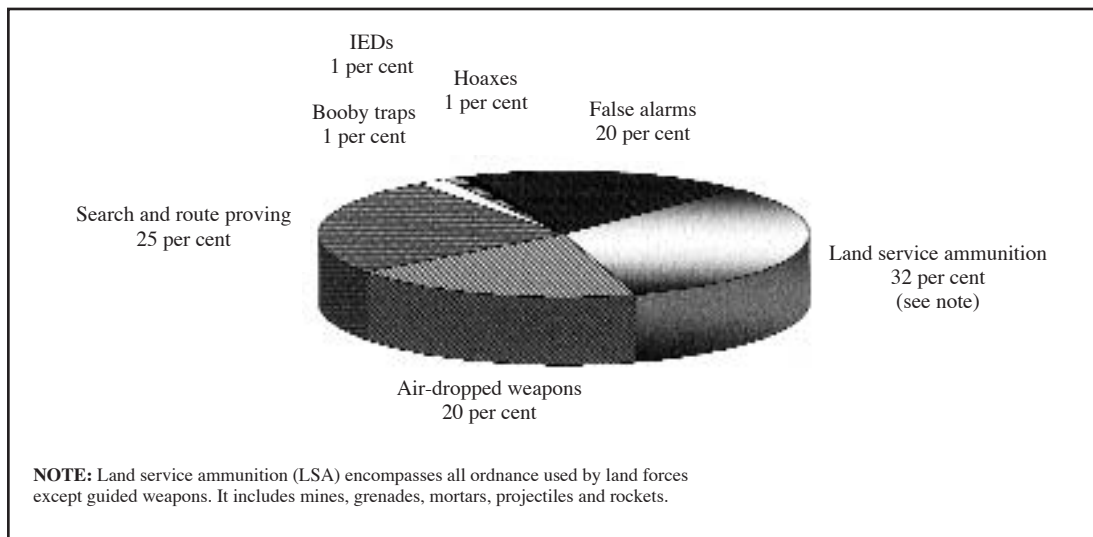
Unexploded ordnance (UXO) was a major threat and bomb disposal officers (BDOs) were much in demand throughout the entire force. During the first week in Kosovo over 100 separate EOD tasks were completed, a figure which had risen to over 400 by the end of the third week and to almost 1000 by the two-month point. By the time final elements of the squadron handed over to a detachment from 49 Fd Sqn (EOD) in December 1999, over 1600 EOD tasks had been completed and hundreds of thousands of items of unexploded ordnance had been successfully rendered safe.

This article provides an overview of EOD operations in Kosovo and highlights some of the key issues and lessons learned.

## DEPLOYMENT TO THEATRE AND ENTRY INTO KOSOVO

THE events in Kosovo between February and June 1999 meant that the deployment of the squadron to theatre was spread out over a period of three months. A troop deployed to the Former Yugoslav Republic of Macedonia (FYROM) with 21 Engr Regt on 7 March 1999 whilst the squadron's main body, which included four hastily assembled teams from 5131 (Bomb Disposal) Squadron RAF, deployed during the first week of June. Three improvised explosive device disposal (IEDD) teams from 11 EOD Regt RLC were subsequently flown out and came under command once the squadron had become established in Pristina. This fragmented deployment was driven by events and was unavoidable; however, it meant that the squadron was not fully operational by 12 June and could only field seven RE BDO teams to support both 4 Armd Bde and 5 AB Bde during the crucial entry phase into Kosovo.

**Team Configuration.** The decision to deploy joint EOD assets was made by the Permanent Joint HQ only two weeks prior to the deployment of the squadron's main body and this allowed very little time for pre-deployment training. It



Breakdown of EOD tasks by type.

was therefore decided to create mixed RE/RAF teams in order to spread the available expertise and to enhance unit cohesion. It was also decided to replicate the Bosnia model and mount the four-man teams in two vehicles, thereby allowing them to operate as robust, self-contained units which could establish a limited cordon without external support. For larger tasks the teams were augmented by one of the two EOD sections which were held and tasked centrally. Equipment constraints dictated that only three of the teams were equipped with Mamba mine protected vehicles (MPVs) and the remainder were mounted in a combination of Land Rovers and RAF Spartan tracked reconnaissance vehicles.

**Grouping.** The squadron was task-organized throughout and the grouping evolved as the operation progressed. For the initial seizure of the Kacanik defile, three dismounted teams landed with the lead elements of 5 AB Bde to clear the route whilst another team, mounted in an MPV, led the Brigade Commander and his HQ up the defile. The remaining two teams mounted in MPVs provided integral EOD support to the lead battle groups of 4 Armd Bde whilst a light BDO team remained with the field hospital in FYROM to form a heliborne immediate response team (IRT). Because of the scarcity of EOD teams, the dismounted BDOs who supported the heliborne operation had to remain in the defile once it had been secured and then marry up with their vehicles as

the 4 Bde convoy passed through. Once the squadron had become fully operational in Kosovo, five teams were placed in close support of the 4 Armd Bde manoeuvre units and five teams were held centrally for general support tasking. By early July the situation had stabilized to such an extent that all the BDO teams were placed under centralized control and this allowed EOD assets to be more effectively prioritized across the Area of Operations (AO). The eleventh BDO team provided an IRT on 15 minutes notice to move within Kosovo and the three IEDD teams rotated between Pristina and Skopje to provide a dedicated IEDD capability in both Kosovo and FYROM.

#### THE UXO THREAT

THE UXO threat was both widespread and diverse. The pie chart above shows the breakdown of EOD tasks by major ordnance type and the different components of the threat will now be examined in more detail.

**Mines and Booby Traps.** The initial assessment was that NATO troops could be facing a significant mine and booby trap threat from the withdrawing Yugoslav Army (VJ) and police force (MUP). All routes therefore had to be EOD proved and the fact that it was a Mamba which led the first column of vehicles across the border was a clear indication of the priority which was given to EOD by all arms commanders. All areas and buildings had to be searched prior to

occupation by units and the squadron was very heavily committed to these time-consuming and manpower-intensive tasks during the early days of the operation; indeed, there were very few tasks during the first month for which EOD was not on the critical path. Being in the midst of the VJ as they were pulling out was a strange experience which was both unnerving and reassuring; unnerving because we fully expected them to target us with booby traps as they departed, and reassuring because we knew that the routes down which they were withdrawing would not be mined. As it turned out, the VJ and MUP did not target KFOR troops but concentrated instead on the returning refugees. All the Albanian houses which they had occupied were razed to the ground<sup>1</sup> and there were reports of widespread civilian injuries from booby traps. BDOs were inundated with requests to clear refugees' houses but this task was not only outside the Squadron's remit but would have overwhelmed our limited assets. Inevitably, however, BDOs did get involved in some booby trap clearance, particularly in Pristina where CO 1 PARA saw the swift return of refugees to their homes as critical to achieving his mission of restoring the city to normality. As far as mines were concerned, the VJ largely complied with the terms of the agreement and either lifted the mines which they had laid or handed over their minefield records. As it transpired, the majority of tactical minefields had been sited in the border regions in the south of the country and were therefore outside the Multinational Brigade (Centre) (MNB(C)) AO. The greatest threat came from unrecorded nuisance minefields laid by the Kosovo Liberation Army (KLA) on remote tracks; these caused a significant number of civilian casualties but from an EOD perspective there was little that could be done to reduce the threat.

**NATO Air-Delivered Weapons.** During the air campaign over 8500 air-delivered weapons of various natures were dropped on Kosovo as a whole, of which over 25 per cent lay within the MNB(C) AO. Although a large number of spent anti-radiation missiles were recovered, it was the cluster munitions and large high explosive (HE) bombs which posed the greatest threat.

**Cluster Munitions.** Cluster submunitions represented the most widespread and hazardous of the unexploded NATO ordnance. The air-dropped weapons database compiled at NATO HQ in Vicenza indicated that approximately 170 cluster bomb units (CBUs) had been dropped across the AO, approximately two thirds of which were American BLU-97s. The remaining third were British BL-755s.<sup>2</sup> Based on a worst-case planning failure-rate of 10 per cent it was assessed that there could be as many as 4000 unexploded bomblets to clear.<sup>3</sup> The threat posed by these munitions was clearly demonstrated by the tragic accident involving two members of 69 Gurkha Fd Sqn on 21 June and was continually reinforced by the regular flow of civilian casualties which resulted from bomblet strikes. Initially the BDOs undertook only those clearance tasks deemed essential to the KFOR mission; however, media pressure in the UK prompted a reappraisal of policy and in mid-August the squadron began a systematic operation to locate, mark and, wherever possible, clear CBU strike areas in order to assist the humanitarian effort. The squadron worked closely with those civilian de-mining agencies which were also carrying out cluster munition clearance and by early December over 3000 submunitions had been destroyed within the MNB(C) AO. The risk to the local population was thereby significantly reduced before the onset of winter although, given the extent of the contamination, it is inevitable that submunitions

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<sup>1</sup> Ironically this situation was reversed within a few weeks as Albanians began to systematically burn former Serb houses.

<sup>2</sup> Interestingly, several of the BL-755 CBUs which were located turned out to have been dropped by the Yugoslav Air Force prior to the NATO bombing campaign. The UK sold the weapon to Yugoslavia in the late 1970s.

<sup>3</sup> The American CBU holds approximately 200 BLU-97s whilst the British version contains approximately 150 BL-755s. The failure rate is very dependent upon the nature of the ground at the point of impact and in Kosovo ranged from 0 per cent on concrete to 30 per cent on very soft ground and in heavily wooded areas. In some cases the unexploded submunitions were actually buried beneath the surface and could only be located with a mine detector. Overall, the average failure rate for submunitions within the MNB(C) AO proved to be slightly over 10 per cent.



will continue to be found for some time to come.

**HE Bombs.** During the tour the squadron dealt with over 20 unexploded HE bombs. The largest was a 2000lb Mark 84 which had skipped off a hill and landed in a garden half a mile away; the majority, however, were 500lb Mark 82s, most of which had failed to function because of the poor quality of the explosive fill. All the bombs which had been dropped were fitted with impact fuses and thus the risks associated with disposing of them were significantly reduced. Whenever the situation allowed the bombs were blown *in situ* using a Baldrick shaped charge but where the risk of collateral damage was too great, a water suppression system was

constructed around the bomb in order to mitigate the effects of the detonation.<sup>4</sup> Because of their size, the height at which they were dropped and the nature of the ground, many of the bombs had penetrated to depths of over 20 metres. The lightweight shafting equipment can only be sunk to a depth of 6 metres and open-cast excavation could only achieve about 12 metres. Thus, whilst the bomb entry holes could still be seen within the pit, the bombs could not be reached and as a result not one of the five recovery tasks attempted during the tour was successful.

**Land Service Ammunition.** The squadron dealt with vast quantities of LSA from a wide range of sources. During the first few weeks of the operation large quantities of mortars, projectiles, grenades and small arms ammunition were found in the abandoned MUP police stations. There was a steady flow of grenade attacks targeted against Serbs remaining in Kosovo, a high percentage of which failed to function, and a large amount of ordnance was also handed in by the local population. However, the largest concentration of LSA was found at the four VJ ammunition compounds sited around Pristina. These compounds had been bombed during the air campaign and were heavily contaminated by



Water suppression equipment constructed around an unexploded Mk 84 2000lb bomb.

damaged LSA. The imperative to clear them was driven by the need to prevent civilian casualties and also to deny the KLA the means by which to rearm. Large quantities of damaged ordnance had to be destroyed *in situ* whilst those items still in tact were removed and disposed of at a temporary demolition range.

**Improvised Explosive Devices.** During the tour there was only a handful of genuine IEDs in theatre and only one – a device placed in the wheel arch of a military vehicle at HQ KFOR (Rear) in FYROM – which was targeted against NATO. The remainder, which all occurred in Pristina, were primarily aimed at causing damage to symbolic Serb buildings and monuments. One device was initiated remotely but the majority were relatively unsophisticated time-activated devices. All of the IEDs encountered had already functioned prior to EOD being called out and only one resulted in any civilian casualties.

#### KEY ISSUES AND LESSONS LEARNED

**Jointery.** The formation of joint teams with two RE and two RAF personnel per team had a synergistic effect and was very successful. The wide range of EOD knowledge and experience within each team represented a significant increase in

<sup>4</sup> The water suppression system consists of a polystyrene “igloo” draped in water bags. It was originally procured for bomb disposal operations in the UK but proved to be extremely successful in Kosovo.



A rolled Mamba MPV finds a fortuitous resting place against a haystack.

operational capability and despite the inevitable cultural difficulties, the advantages of taking the joint approach to such a low level far outweighed the disadvantages. Nevertheless, if such an arrangement is to become the norm it must be formalized through peacetime training and procurement so that the last-minute, ad hoc approach which characterized the Kosovo deployment can be avoided in future.

**Command and Control (C<sup>2</sup>).** The C<sup>2</sup> structure for British forces during the entry into Kosovo was complicated by the late deployment of 5 AB Bde and meant that the planning which had been undertaken by 4 Armd Bde during their three months in FYROM was largely superseded. The final plan required 5 AB Bde to secure the defile and 4 Armd Bde to conduct a passage of lines once they had reached their limit of exploitation. However, the lack of a controlling divisional HQ meant that the squadron's Tactical HQ had to split itself between two brigade HQs and coordinate the EOD effort whilst on the move. The potential for things to go wrong was immense but the plan actually worked as envisaged, even adapting to the rapid regrouping which occurred once 5 AB Bde reached its limit of exploitation and then continued onto Pristina. Once units had become established in their AOs and the BDOs had been centralized, the squadron command

vehicle (CV), which was embedded in HQ 4 Armd Bde, was controlling up to 13 teams at a time and this "flat" command structure placed a great strain on the small command team. The lack of an established squadron operations officer<sup>5</sup>, in particular, was clearly felt and meant that the second-in-command had to work exceptionally long hours in order to keep the CV running effectively.

**Close Support EOD.** BDOs were placed in close support of the manoeuvre units in order to allow battle groups to have both an integral EOD advisor and a responsive EOD capability during the initial, fluid phase of the operation. The tempo of operations during the first two weeks was high and, given the C<sup>2</sup> structure previously described,

could not have been maintained without BDOs operating in close support. However, once units had become established in their AOs and a steady state had been achieved, the requirement to prioritize EOD work across the entire AO became paramount and this could only be achieved by tasking BDOs directly from the CV in Brigade HQ.

**Unity of Command.** Because of the nature of EOD operations and the serious consequences arising from uncoordinated EOD activity, operational command of all EOD assets, including the RAF and RLC teams, was vested in the CRE and delegated to OC 21 Fd Sqn (EOD) as the Joint Service EOD Commander. The requirement for a single tasking authority was seen as paramount and the operation highlighted the importance of maintaining unity of command of EOD assets, regardless of service or capbadge interests.

**Multinationality.** For the first three months of the operation, MNB(C) comprised almost entirely of British troops. However, the roulement of 4 Armd Bde and 19 Mech Bde coincided with an influx of multinational EOD troops into the brigade. Thus, although the UK EOD effort had begun to draw down within three months of crossing the border, the brigade's EOD capability actually increased as teams from Finland, Sweden, Canada and Norway assumed responsibility for

<sup>5</sup> This establishment shortfall was identified prior to *Op Agricola* and has now been rectified.

EOD within the different multinational battle group areas. Given that the multinational EOD teams were under command of their parent battle groups and not the squadron, the tasking and monitoring procedures were less rigid than they had previously been and this resulted in the brigade HQ having reduced visibility of the EOD activity within the AO. However, the squadron quickly established good working relationships with the various multinational EOD detachments and this ensured that the overall EOD operation continued to be closely coordinated.

**IEDD.** Whilst the RLC lead on IEDD in peacetime, it is the Sappers who lead on all EOD matters, including IEDD, in operations other than war (OOTW). The demands placed upon operators in the two environments differ considerably and the nature and tempo of operations in Kosovo required BDOs to adopt a more flexible approach towards IEDD than would have been deemed acceptable under peacetime regulations. This brought the difference in ethos between Sappers and the RLC sharply into focus and the fact that current Army EOD policy does not clearly define an appropriate *modus operandi* for IEDD in OOTW led to a certain amount of friction. It is hoped that the ongoing joint services EOD study can resolve this issue.

**Training.** Because of the rapid flash-to-bang time for the RAF element of the squadron, there was little opportunity to carry out joint pre-deployment training. However, the collective training which the squadron had carried out during the preceding year had more than adequately prepared Sapper BDOs for the task and they quickly adapted their training to the unique situation in which they found themselves. The RAF BDOs understandably took a little more time to adjust to the environment. The training which they had undertaken – both at the Defence EOD School and within their unit – had provided them with an excellent technical grounding but their lack of tactical awareness put them at a distinct disadvantage during the early days of the operation.

**Equipment.** The squadron deployed with its normal scaling of vehicles and equipment but



The Bison RCV.

also received several major items procured under an urgent operational requirement.

- **Mamba MPV.** The Mamba MPV is an Alvis-modified version of a South African route-proving vehicle which was originally procured for Bosnia in 1996. The concept is that the “V” shaped hull of the vehicle deflects the blast of the mine outwards whilst the hardened central crew compartment remains intact. The performance of the Mambas in Bosnia had been dogged by reliability problems, exacerbated by the addition of a ceramic belly-plate which was designed to prevent the penetration of the shaped charge from a TMRP-6 anti-tank mine but which also raised the all-up weight of the vehicle to almost 8 tonnes. The squadron had three first-generation Mambas which had been refurbished for the operation and which were very heavily tasked during the first six weeks. Their reliability was better than anticipated but the lack of spares support meant that once a vehicle became unserviceable, it could only be put back on the road by cannibalization. The problem worsened when one of the Mambas was written off whilst proving a narrow dirt track which gave way under the weight of the vehicle. Thus, by the time a batch of five more Mambas arrived in mid-November, the squadron was down to one serviceable MPV. Fortunately, the reduction in the number of route proving tasks coupled with the arrival of Swedish and Canadian MPVs ensured that this did not result in a capability shortfall within the brigade.
- **Groundhog and Bison.** Groundhog and Bison are a pair of wheeled remote controlled vehicles (RCVs) which were developed by the Defence Evaluation and Research Agency (DERA) and procured to provide BDOs in Bosnia with a remote reconnaissance and disposal capability. The squadron deployed with one

of each but the complexity and fragility of the equipment meant that they struggled to cope with the intensity of in-theatre training which the BDOs were required to carry out and as a result were often unserviceable. Fortunately the RLC teams deployed with the more robust Wheelbarrow RCVs which provided a well-proven and more effective remote IEDD capability. The Wheelbarrows were deployed on a number of occasions although all the incidents proved to be false alarms and they never dealt with any genuine devices.

- **Remote Controlled Excavator (RCE).** The RCE is an Atlas excavator fitted with a suite of camera equipment which allows it to be operated from within a remote command vehicle. It was developed for Operation *Crabstick*, the clearance of buried pipe mines from beneath the UK's Second World War airfields, and offered the capability to dig for deep-buried bombs without placing the operator at risk. In theory this represented an attractive enhancement to the squadron's capability although in practice the complex remote camera equipment proved to be very unreliable and the "black box" had to be returned to the UK for repair on several occasions. This resulted in the excavator only being able to function in manual mode for much of the tour, but as it turned out the lack of success at reaching deep-buried bombs meant that the vehicle's remote capability was never needed for this task. Nevertheless, the RCE did provide an extremely effective area clearance capability and was successfully used to clear large areas of UXO-contaminated rubble from the bombed-out VJ barracks in Pristina.

#### NON-GOVERNMENTAL ORGANIZATIONS (NGOs)

DURING the first two months of the operation the humanitarian clearance effort was, by necessity, limited and piecemeal. By early September, however, there were seventeen different civilian clearance organizations operating in Kosovo fielding upwards of 40 teams. Whereas previous

demining operations had been directly funded and controlled by the UN, in Kosovo the decision was made to "out-source" the operation and to coordinate and monitor activity by means of a small mines action coordination centre. Whilst this had obvious financial advantages for the UN, it left the demining organizations largely free to pursue their own agendas and as a result the operation was not as efficient or well-structured as it could have been. The problem was compounded by the marked difference in quality between some of the organizations and it took some time before the mines action coordination centre was able to impose some degree of accountability and quality control. That said, a great deal was achieved in a short period of time and the squadron enjoyed good working relationships with those organizations which worked in the MNB(C) AO.

#### SUMMARY

FROM an EOD perspective, Operation *Agricola* provided the most diverse and concentrated EOD environment since the Second World War. During the early days the squadron was completing upwards of thirty tasks a day and the rapid reduction in the UXO threat made a major contribution to the success of both the military and humanitarian elements of the operation during the first six months in Kosovo. The rapid and ad hoc nature of the squadron's deployment posed many challenges, most notably in the areas of jointery, C<sup>2</sup>, close support EOD and specialized equipment, and whilst one must hesitate before drawing universal lessons from what was a unique operation, it is hoped that the experiences of 21 Fd Sqn (EOD) in Kosovo will play an important role in informing the current debate on the future of EOD across the three Services.

## Memoirs

**MAJOR GENERAL A G C JONES CB MC**

*Born 20 May 1923, died 11 July 1999, aged 76.*



MAJOR General Tony Jones' exploit in preventing the Germans from blowing up the vital Nijmegen road bridge over the river Waal during Operation *Market Garden* in September 1944, which won him the Military Cross, came to popular attention in the film "A Bridge Too Far" based on Cornelius Ryan's book. It was one incident in a hectic period of life "at the sharp end" in the last year of the Second World War. In another he told of having rapidly followed his driver and wireless operator out of his scout car after it had been hit by a bazooka. Tony Jones later related that, when his driver, new to the game, expressed his antipathy to this kind of war, "it took some time before good order and military discipline were restored."

Anthony George Clifford Jones, the son of an Army colonel, was educated at St Paul's School. He was commissioned into the Corps in 1942 and became a troop leader in 14 Field Squadron,

the unit in which he was serving, supporting the Guards Armoured Division, at the time of the Nijmegen bridge incident. After the war he took his degree at Trinity Hall, Cambridge, and then had a spell with the Indian Sappers and Miners. Returning home he became a company instructor in Victory College at the Royal Military Academy Sandhurst and, after Staff College, went to Malaya as Brigade Major 63 Gurkha Infantry Brigade, following that with a works services tour as DCRE Penang in 1958.

He then commanded 25 Field Squadron in Minden where one of his troop commanders remembers his leadership as "... positive and final. We had clear briefings, debriefings, praise and reprimands ... We were all welcomed into the midst of his family who were all intensely interested in the doings of the squadron and very much part of its life. Social events were always fun, the rooms echoing with laughter."

Despite his effervescent personality Tony Jones was a modest and generous man. On his next posting, as DAAG in AG7, a junior colleague records how he could never be persuaded to speak of his past achievements. When the time came for his own next posting there were two vacancies from which to choose. He gave first choice to a contemporary, and accepted the second choice himself as Chief Instructor at the Training Regiment at Cove, which he took up in 1962.

In 1965 Tony Jones was appointed to the command of 25 Engineer Regiment at Osnabrück. He "had a powerful presence as commanding officer and in all ranks there seemed to be an instinctive recognition of the fact that he was probably the best soldier in the regiment. He really did lead by example and was an inspiring trainer and motivator." Again, his ebullient personality is a recurring theme: "The arrival of the Jones family at a function was an event one could not be unaware of."

Professionally, he also devised the idea of the partnership of an engineer regiment with a brigade with a squadron affiliated to each infantry battalion. Command in Brigadier Douglas Withers' 6 Infantry Brigade was exercised through a tactical HQ team of the commander and the Gunner and Sapper COs. Thirty-five years later this innovation is now standard.

Tony Jones then returned to the MOD in Whitehall for another spell on the staff before commanding the RE Training Brigade. In 1972 he was back in Germany as BGS (Ops) in Northern Army Group, and then in 1974 at Aldershot again as Deputy Commander and Chief of Staff in South East District.

His final appointment was President of the Regular Commissions Board, from 1975 to 1978. On retirement he was appointed CB.

After retiring from the Army, Tony Jones joined Saga Holidays, of which he became a Director in 1982, as he was of the Apple Booking Company. He was very active in support of the Corps and ex-Servicemen's organizations. He was President of the Dover branch of the REA and served as Chairman of the British Legion Housing Committee; and from 1978 to 1986 he was Honorary Colonel of the RE

Volunteers (Sponsored Units). He would turn out on frequent occasions to delight audiences with his skills as a raconteur.

Always a fit man, Tony Jones had been an enthusiastic rugby player. He had been a vigorous front-row forward for the Old Paulines and for the Army and Combined Services. He played for Middlesex when they won the County Championship in 1951. He also acquired a pilot's licence, and was a keen offshore sailor.

As the *Daily Telegraph* obituary put it: "Tony Jones led by example and inspired absolute confidence and loyalty in colleagues, superiors and subordinates. An immensely cheerful, sociable and intelligent man, he created a pleasant, friendly atmosphere wherever he went."

His wife Biddy, whom he married in 1956, and their two daughters survive him.

*WGHB FWEF WCC RWME PRTD DAB-W ACP*

**MAJOR J G VANREENEN**

*Born 8 October 1923,  
died 25 March 1999, aged 75.*

GORDON Vanreenen fought in the Burma campaign during the Second World War with the Bengal Sappers and Miners, which he had joined at 17. He went on to complete a distinguished career in the Royal Engineers before becoming a marketing manager in the construction industry.

John Gordon Vanreenen was born in India, where his father was a surgeon in the Indian medical service. Educated at Hurst Grange School, Stirling, and Glenalmond, Perthshire, he loved Scotland. He excelled at sports and singing, and later became president of his school's Old Boys, which gave him enormous pleasure.

Vanreenen joined the Bengal Sappers and Miners at the outbreak of war, while scarcely more than a schoolboy. He fought in the notorious Burma campaign. His was a hard war but he conducted himself with honour and had the major advantage of speaking fluent Urdu, which he had learned as a child. A humourous man, while serving in the North-West Frontier Province in 1946 a fellow officer – now a general – joked with Vanreenen about his Scottishness. He sent Vanreenen a McTavish's Greeting Card bearing the instruction: "Write in pencil so it can be used again". The card was regularly exchanged over the next half-century.

After the partition of India, he returned to service with the Corps. He married Lydia Daly in 1948 and their first married quarter was a tin hut in Egypt. His post-war years were spent in Cyprus, the United Kingdom and Germany.

Vanreenen left the army in 1964 and joined the construction giant, Wimpey, where he became

marketing manager for the East of Scotland. Always known as "The Major", he was an efficient organizer and a great perfectionist. Old habits died hard, with one employee joking: "We don't go on holiday here any more – we go on leave at 1730hrs tonight."

In 1977 he surprised his directors by asking to be allowed to resign as he had suddenly and unexpectedly been offered the appointment as secretary to the Honourable Company of Edinburgh Golfers, at Muirfield. He departed the same day to serve the game he loved.

During his time at Muirfield he continued the secretaries' tradition of genial irascibility, but is remembered by the captains as being hardworking, supportive, and efficient. He was secretary during an Open Championship, when he mixed with the great golfers with ease, humour and charm.

Even after retirement and with the use of a buggy, he continued to play. As an honorary life member, he celebrated his immunity from rising subscriptions.

He was enlisted into the unsaintly order, The Monks of St Giles, in 1979. His poetic contributions were more McGonagall than Scott, but the first Monday of each month was a happy evening. Not the tallest of men, Vanreenen was ordered to stand on a small wall and was granted the monastic title, Father Balbus, which he took in good spirit.

Above all, the quality for which Gordon Vanreenen will be remembered is his devotion as a loving husband, father and grandfather. His wife, Lydia, children Lorna and Morag, and three grandchildren survive him.

*Reproduced, by kind permission.  
The Scotsman, 24 May 1999.*

**BRIGADIER W F ANDERSON CBE MC\***

*Born 17 June 1905, died 27 August 1999,  
aged 94.*



BRIGADIER William Anderson, was awarded an MC on the North West Frontier of India in the 1930s and a bar to it in 1940 in the Battle of France. In the closing stages of the campaign in France, Anderson was captured within a few miles of Dunkirk, when his unit was surrounded by Germans. While interned at Laufen, he was suspected (rightly) by the Germans of being the mastermind behind various attempts to escape. Consequently, he was transferred to Colditz Castle in Saxony, which the Germans believed to be escape-proof. There he continued his attempts to outwit his captors, and also used his spare time to draw and paint, using scenes in Colditz for his subject matter.

William Faithfull Anderson was born at Ramsgate, Kent, on 17 June 1905. The family came from Bruges with William of Orange in 1689. On his mother's side, Anderson was descended from "Capability" Brown. Young William was educated at Rugby (where he was a

scholar), Woolwich (where he won the King's Medal) and Emmanuel College, Cambridge, where he was awarded an Exhibition and took a First in Mechanical Sciences. He was commissioned into the Royal Engineers in 1925 and from 1927 to 1934 served on the North West Frontier of India, building roads and bridges in the very difficult Khyber and Chitral areas. There he was also a founder member of the Chitral Ski Club and was lucky to survive being buried in an avalanche.

In 1936 he served in the Western Desert as Adjutant, RE, in 5 Division when the British were keeping a watchful eye on Mussolini's moves. Towards the end of the year they moved to Palestine to stop the Arabs sabotaging the oil pipeline. In 1937 he returned to India, where a brisk war was taking place with dissident tribesmen in Waziristan.

As a field engineer, Anderson was responsible for the initial reconnaissance, organization of labour and construction of 15 miles of road from Sararogha to Barari through an actively hostile area. His 128 local tribal contractors were mainly without any previous experience and were by no means easy to handle: they were allergic to discipline and also continuously subjected to enemy action, often carrying on their work under fire. For his work in the dispute with the Waziris, Anderson was appointed MBE in 1937 and awarded an MC in 1938.

He returned to England before the outbreak of war and in May 1940 his unit, 61 Company, RE, was posted to Arras. The garrison was fiercely resisting attacks by the German 7th Armoured Division, commanded by Rommel, and other strong German forces, yet it held out and had even managed to counter-attack. The garrison consisted of the Welsh Guards and a squadron of 12th Lancers. Anderson discovered that the south and south-east of the town were level and open, being an enormous locomotive and marshalling yard. All the drivers had vanished and groups of dead refugees lay on the platforms. Anderson organized his Sappers to push the goods wagons together to form an anti-tank obstacle a mile long and three wagons deep to cover the south and south-east, and although this was later bombed it continued to form a useful obstacle to the German tanks.

When Arras was surrounded and in flames, Allied HQ ordered its defenders to leave on the night of May 23. They managed to do so after the Welsh Guards had charged and broken through a



sector of the encircling German troops. For his work here, Anderson was awarded a bar to his MC.

After leaving Arras, his unit was first of all put into defensive positions and then ordered to break up into small parties, each to make their way on foot to Dunkirk. However, Anderson's party contained a wounded man, which greatly slowed them down. After travelling by night and hiding by day, they reached a farmhouse close to Dunkirk; but here they were surrounded and captured. Anderson was sent to Laufen (Oflag VIIC) in Bavaria, and then to Colditz.

In Colditz, Anderson's artistic skills proved extremely useful in forging travel documents and making items such as a camera, which used a lens from an old pair of spectacles and took the photographs necessary for forged passes. He also assisted Group Captain Douglas Bader to smuggle items inside his artificial legs when Bader was allowed walks outside the castle on parole. Anderson became sufficiently skilled as a blacksmith to repair Bader's legs when needed. Many of his paintings were posted back to England to his wife, who used them in exhibitions to raise funds for prisoners of war. In 1995, on the 50th anniversary of the liberation of Colditz, his pictures were displayed at the castle.

After the war, he went back to India as Cantonment Planning Officer, moving on to become Deputy Chief Engineer for the Overseas Food Corporation in Tanganyika, where he also helped to build Kongwa Church. From 1949 to 1953, he was with the War Planning Team, Middle East, and from 1953 to 1956 Chief Engineer, Malaya Command, during the Emergency. He was appointed CBE in 1956. His last posting was as Chief Engineer, Northern Command, but on retiring from the Army in 1959 he became manager and Chief Engineer of Ground Surveys Limited. From 1961 he was manager of a specialized drilling firm and also worked for Richard Costain Limited, before moving to Farnham Maltings, a derelict building which he converted into a fine arts centre, mainly with voluntary labour.

William Anderson was not merely a first-class soldier, committed Christian and talented artist: he was also an inspiration to others to make the best of themselves, whether as soldiers, prisoners of war, artists or civilians.

He married in 1938, Kathleen Hunt, who died in 1995. They had three sons and two daughters.

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Daily Telegraph.

**COLONEL H W B MACKINTOSH**

*Born 6 April 1928, died 6 December 1999,  
aged 71.*



HUGH Mackintosh was one of the Corps' most experienced and able technical staff officers. His career, typically varied as one of the immediate post-war generation in many of the hot spots of Britain's withdrawal from Empire, was to contribute significantly to the ability of the Corps to meet its responsibilities in the 1980s and 90s.

Hugh joined the Army as a national service private straight from Wellington College and thence to Intake 1A at Sandhurst, receiving his commission in the Corps in October 1948. Tours at regimental duty took him to Hong Kong (50 Field Squadron) in 1949, Aldershot (9 Training Regiment) in 1950, Hameln (26 Field Engineer Regiment) the next year, Egypt (50 Field Squadron) in 1952 and Maidstone (37 Field Squadron), with a four-month operational tour in Cyprus, in 1955. These seven years of invaluable unit experience were to give him that special understanding of the practical needs of engineering in the field, which was of huge benefit to the Corps in due course. The next four years added

three more important specializations to his portfolio: bomb disposal, for which he was an instructor at Horsham in 1956; plant, the main business of 143 Plant Regiment at Walsall, of which he became Adjutant in 1958; and armoured engineering, as Second-in-Command of 26 Armoured Engineer Squadron in Germany in 1960.

That same year Hugh joined 15 Technical Staff Course at Shrivenham and from there onwards his career was concentrated in technical appointments. His squadron command, 54 Field Park Squadron in Singapore, from 1965 to 1967, spanned a period of high intensity for the Corps in the Far East, with Operation *Crown* and Confrontation in Borneo in progress. The end of this tour also saw the end of Hugh's world travels and the start of four influential staff appointments: GSO 2 (Tech) at Southern Command (1967), GSO 1 Defence Operational Analysis Establishment, West Byfleet, GSO 1 General Engineer Equipment, St Christopher House and TSO to the Director of the Military Vehicles Experimental Establishment at Chertsey. A junior colleague at that time remembers Hugh as "... one of the most helpful and sensible people with whom I worked. He had a very down to earth approach to difficult situations and a wonderful (and mischievous) sense of humour particularly when deflating the pompous!"

In 1977 Hugh Mackintosh was appointed Project Manager General Engineer Equipment, back at St Christopher House, bringing to the post those qualities which he had demonstrated and developed over the years; not simply practical experience but also professional integrity, persistence and a gift for communication with conviction and persuasion. In the financial climate of the times it was not easy to win the battle for new equipment but the Corps can be grateful to Hugh for enjoying, during the 1980s and 90s, possibly the best equipment it ever had since 1945. The list of items in which he had a hand is long (several thousand) but it includes the Chieftain AVLB system, Medium Girder Bridge, M2 Amphibious bridge, Combat Engineer Tractor, Dynamic Compaction for Airfield Damage Repair, the early stages of BR 90 and maintaining the plant fleet in date according to the Lindsell doctrine. Another colleague remembers Hugh as "a deeply understanding person with a strong liking for his fellow men. I admired him for his ability to face up to difficulties calmly and wisely, often under

very trying circumstances. [His] staff, military and civilian, respected and trusted him implicitly, consequently they were a happy and industrious team.”

This work was brought to an untimely end by the major heart attack that Hugh suffered in 1979. Fortunately he recovered from this and was able to resume work in the equipment business, this time, however, as a retired officer back at Chertsey in the post of Personal Staff Officer to the Director.

The misfortune that ended his career opened another door because while convalescing after his illness and before finally retiring from the active list, Hugh was employed in the EinC's department to work on Corps History. His wide experience and unstuffy approach to this was then to contribute significantly to the quality and character of Volumes X and XI. For the latter he was a volunteer member of the Institution's

working party and in due course was project officer for its publication.

Hugh and his family settled in Camberley in 1969 and he became an energetic and creative member of the local community. Central to his life, particularly after his recovery from his heart attack, was his spiritual life in the Church. Amongst much else, he was an active worker for the Gideons. He continued to take a close interest in Corps activities. At the time of his death he had just completed a booklet written for the Friends of the RE Museum on military transportation in the Canal Zone. He was a keen fisherman and was able to combine this with his love of his Scottish roots by regular fishing holidays in Scotland.

In 1957 Hugh was married to Patricia (Tricia) Reid whom he had met in Cyprus two years earlier. She, a son, three daughters and eight grandchildren survive him.

*RC ELVW GWAN*

**COLONEL BRIAN COOMBE GM**

*Born 25 July 1921,  
died 19 December 1999, aged 78.*



COLONEL Brian Coombe, who has died aged 78, was awarded a George Medal for his actions in Cyprus in 1955 when ambushed by terrorists on a road through mountainous countryside.

Although remote, the road was considered "safe", but when Coombe was on his way to visit a detachment, a sudden burst of machine-gun fire killed his driver. Coombe jumped out, climbed a spur and looked for the attackers, who were in a group below, 30 yards away. He had only two magazines of ammunition for his gun, and after he had fired both the terrorists were still unscathed. The range of his revolver was too short to be effective, but then he remembered that the dead driver had had a Sten gun and ammunition.

Collecting the gun, he worked round to the back of the terrorists and opened fire again. Three of them walked out with their hands up, shouting "don't shoot", but as he moved forward, a fourth opened up with a machine-gun from a hidden position in a gully. Having no alternative he shot the three bogus surrenderers then turned on the machine-gunner, who also came out to "surrender" but then dashed to the head of the gully and disappeared.

Only one of the first three terrorists was dead, so Coombe kept the other two covered. Although

he had no ammunition left they assumed he had. This tense situation lasted for half an hour until, fortunately, a routine patrol of the Gordons came along the road and took over. The escapee, a notorious Eoka terrorist, was not captured on that occasion but was shot dead in an ambush a year later.

Brian Jackson Coombe, was born on 25 July 1921, the third son of the managing director of Spear and Jackson, steel manufacturers of Sheffield. He was educated at Wellington College and at Sheffield University. After the outbreak of war, he was commissioned into the Royal Engineers and served in North Africa and Italy.

During the landings at Salerno in 1943, he was attached to the Americans and was mentioned in despatches for his courage and coolness as beachmaster. He was in a highly vulnerable position directing units to their destinations, and was constantly under fire.

After the war, Coombe took a first-class engineering degree at the Military College of Science, Shrivenham. Then came Cyprus, where the Engineers' task was to build camps and huts for the peacekeeping force. From 1968 to 1970 he was Military (and Naval) Attaché in Saigon; this was the period of the Tet Offensive, the only time when Viet Cong troops fought within the city.

After retiring from the Army in 1975, Coombe became active in good causes, and became director of the Avon County Red Cross (1982 to 1985); he refused to take a salary until he had raised enough money to enable the charity to be self-supporting.

Coombe headed the successful campaign against a bypass through the Limpley Stoke Valley, Wiltshire. He also saved the Osborne House Convalescent Home on the Isle of Wight.

He would never speak of his own achievements, but could galvanize others into action.

He is survived by his wife, Elizabeth, his daughter (who is married to Lt Gen Sir Mike Jackson) and two sons.

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## Memoirs In Brief

*Brief memoirs are published below of distinguished men whose deaths have been notified recently in the press and who served in the Royal Engineers.*

**Major John (Jack) Priestman MBE**, who died in Canada in April last year, had been President of both the Canadian Society for Civil Engineering and the Engineering Institute of Canada.

Born in Carlisle in 1912 into an old Quaker family, Jack Priestman, already a qualified engineer, volunteered for service in the Corps in 1940 and was demobbed in the rank of lieutenant colonel in 1946. He was appointed MBE for “dangerous and arduous work” reconnoitring and developing forward airfields during the advance of IV Corps in Burma in 1945.

After the war he spent five years in Lagos on a housing resettlement project and then emigrated to Canada. He initially worked for the British Columbia Power Commission and later pursued a distinguished career as a consulting engineer, retiring from Ker Priestman and Associates in 1976.

**Major Jack Pittam MC**, who died in November 1999, aged 82, had been a wartime Sapper who served in North Africa (with First Army), Sicily, Italy, Palestine and Greece. He was awarded the MC in April 1945 for “his leadership and devotion to duty” in the crossing of the Po at Pontelagoscuro.

After demobilization he continued the career in civil engineering in which he had qualified and practised before the war, becoming engineer to Havant District Council and director of a contracting firm at Chichester.

An outstanding sportsman who had excelled at rugby, boxing, and athletics, as well as most ball games, he became a successful golfer and was captain and, later, president of Bognor Regis Golf Club.

*(Courtesy Daily Telegraph 20 November 1999)*

## Correspondence

### HONORARY COLONELS

*From: Colonel W H Hore TD DL*

Sir, – I was very interested to note the first three names on your Appointments list in the *Supplement* to the *RE Journal* for December 1999 as two are former honorary colonels of 135 Indep Topo Sqn RE(V) and the third now occupies that position. Colonel Sir Idris Pearce 1989 to 1994, Major General Roy Wood 1994 to 1995, and the present Lord Mayor, Colonel and Alderman Clive Martin, who assumed office on 14 July 1999. All three are also members of 135 Officers Dining Club. The club, with some thirty members, was established so that former officers of the squadron could maintain friendships made whilst serving and, importantly, assist the squadron in any way possible.

Having earlier in the year received the Freedom of the Borough of Epsom and Ewell as part of its 50th Anniversary celebrations, an honour I believe unique for a small unit, the squadron is now able to face the next 50 years with confidence and optimism. Yours sincerely, Freddie Hore.

(Colonel W H Hore TD DL, founder member 135 Svy Engr Regt TA 1949, CO 135 Svy Engr Regt TA 1951 to 1956, Hon Col 135 Fd Survey Sqn RE(V) 1978-84.)

### GAUGE BOOK

*From: Brigadier A P Lavies CBE*

Sir, – I can shed some light as to why the Brigade Major felt it necessary to start up “The Gauge Book” (*Journal* December 1999), as I confess it was my batch which clearly aroused Major Everett’s wrath; although, in self defence, it was probably more the fault of the senior batch who were carrying out the gauging ceremony in February 1931.

I don’t know what was the custom on previous batch nights, but one object of the batch night for 20 YO was clearly to make us the worse for drink, and who were we newly commissioned second lieutenants to dispute this evidently accepted custom. I do remember being carted off to bed after being plied with a great many whiskies, which I had never drunk before and which put me off drinking whisky for the next ten years. We all felt pretty ill and there were green faces and some absentees on early parade next morning.

More to the point I remember one officer who shall be nameless having the temerity to sit on the knee of the awesome figure of the Brigade Major and stroke his cheek murmuring “Pretty Pussy”! No wonder there were repercussions!

That’s my story, and as there are only three of us left I doubt if I shall be contradicted. Yours faithfully, A P Lavies.

### WHAT IS GOOD WRITTEN STYLE?

*From: Brigadier J A Thorp CBE*

Sir, – I applaud Captain Provan’s search for style in writing; would there were more like him. In gardening no amount of pruning will salvage a tired, uninteresting plant; in writing no amount of editing will salvage an undeveloped vocabulary.

“In a nice bar...” NICE? Yuk. Pleasant, congenial, agreeable, welcoming, comfortable perhaps; but NOT nice.

“You smell nice.” Aaarrrgh. Tempting, appetizing, palatable, exquisite, luscious, delicious, delectable, sensuous, racy. All convey the boulder’s intentions more vividly.

However, even the most exquisite shrub can succumb to honey-fungus lurking in the loam, the horticultural equivalent of bad grammar. “How can a good looking girl like you be SAT alone?” Be sat? I hope that Jenny was later able to demonstrate to CDR the difference between “lying on a bed” and “being laid on a bed”! Yours faithfully, Brigadier J A Thorpe.

### DRESSED TO KILL?

*From: Captain R S Morton*

Sir, – I was very interested to read Lieutenant Colonel “Sticky” Whitchurch’s article in the December 1999 issue of the *Journal*. I would like to offer my support for his proposal that the 1897 pattern Mess Dress is re-adopted.

Lieutenant Colonel Whitchurch has exposed the advantages and disadvantages of his proposal but it is clear to me that here is an opportunity not to be missed. The 1897 pattern is smarter, demonstrates considerably more style in my opinion and is an authentic part of our history. As we enter the 21<sup>st</sup> Century we must remember our Corps’ past and what better way of doing so than by reverting to the 1897 pattern.

There may be those who will accuse the Corps of aping others, however, the 1897 pattern would serve as a reminder to our brother officers of more junior Corps of the heritage of the Royal Engineers.

I challenge readers to convince me that our current pattern is more stylish than the 1897 pattern. I am convinced that if put to a ballot then style will prevail and the 1897 pattern will be adopted. Yours – Roger Morton.

#### DRESSED TO KILL?

*From: Captain A J Page*

Sir, – May I suggest for those of us members of the “fairer sex” who are equally keen to “dress to impress”, that should the new uniform be adopted, we have the same (tailored to the female form!) May I also recommend that the “Christmas Tree Fairy” dresses are withdrawn in favour of a long black skirt.

Two ideas spring to mind – firstly a plain, black, straight tailored skirt or secondly, a long, straight black skirt with two knee length side splits (to assist movement) and bordered in red (to imitate the male trouser stripe). This style exists with the Canadian REME mess kit.

If anyone has any smart ideas about women in tight mess trousers – think again! This is not a popular option! Your “fellow” Sapper, Andi.

#### DRESSED TO KILL?

*From: Capt W D Whishaw*

Sir, – In response to the article in the December *Journal*, I agree that our present uniform is somewhat like that of a waiter and welcome an improvement. However, does comment apply to the “red-tabs” too?

I would suggest the recommendation to rekindle the mess kit of 1897 is a good idea; in fact, this uniform would not look out of place on Capt James T Kirk of the *Star Ship Enterprise*, star date 2097!

More seriously, I support the proposal for a change; however, I have three points. Firstly, clothing of yesteryear was designed for use in large, draughty and unheated messes. Our present mess dress is still too hot for most centrally heated mess-do venues. I recommend that the concept and style, panache and élan be adopted, but that the material or *at least* the lining be scrutinized. Secondly, the line of buttons from neck to navel does no justice to a typical male belly if he is aged over 28 and out of training. The Greenjacket, Bde

of Gurkha or King’s Troop RA type horizontal fixing arrangements complement a male’s front (and a female’s?) better. Finally, the 1897 design shoulder ensemble is perhaps rather ostentatious and I make the comment that a stylish, but slightly understated design could perhaps be more impressive. Yours sincerely, W D Whishaw.

#### OPERATION AGRICOLA SEX SCANDAL

*From: WO1 C C Abraham BEM*

Sir – The logisticians at LAND Engineer read with great interest “Operation Agricola Sex Scandal” in the December 1999 *RE Journal*. The article regrettably had absolutely nothing to do with sex; my disappointment was however short lived when I realized it was about Engineer Logistics Support to Operation *Agricola*.

There was a number of logistics lessons learned during the squadron’s tour in the Southern Balkans (February to September 1999). After some in-depth discussions it was decided that I should volunteer to submit a response to the article, in order to inform the readers of the action LAND Engineer is taking to address the issues raised. Extracts from the article are shown in italics.

**Allocation of Shipping Space.** *Insufficient shipping space was initially allocated (600 linear meters requested 60 linear meters allocated), Engineer Resources were not given sufficient priority on the Desired Order of Arrival in theatre.* The priority for allocation of shipping space for the operation was set by the force commander, using the information supplied to him by his advisors, including engineers. Priorities were passed to PJHQ and LAND. LAND Engineer pursued every avenue to try to change the movement priority. Arrangements were made to move stores by road, as this proved quicker than by sea.

**Resources Specialists.** Being a resources man myself, I reinforce the point Maj Tomlinson made regarding *misemployment of resources specialists*, of which the Corps faces a shortfall of some 37 per cent post-SDR. A diving or bedding store is not the place to employ these tradesmen since there is no experience in training for operations to be had stacking blankets. Resources specialists need to practise in peace what they are expected to do in war, ie to supply the right materiel/equipment in the right quantities and configuration, at the right place, at the right time in accordance with the requirements of the chain of command. The use of information technology (such as Global,

Vital, Oliver, Merlin and E-Commerce) by the resources specialist is increasing and should be an everyday aspect of the job. The speed at which resources specialists can work will be directly dependent on their experience, qualifications and the tools they have to work with. The advent of information technology has made the trade more technically demanding, which will make it a more attractive career employment for our soldiers and will hopefully assist addressing the shortfall in the trade, as will the introduction of a national vocation qualification for resources specialists, which is also being staffed.

**Engineer Workshop Support.** *Artisan tradesmen are significantly under utilized through lack of decent equipment or, to quote Maj Tomlinson, "penny pinching Ministry of Defence sends carpenters to war without bench saws".* This matter has progressed in the past few months. A statement of requirement for a deployable engineer workshop has been developed and staffed. The statement has been approved by LAND G3 Operational Requirements and passed to the Capability Manager for inclusion in the equipment programme. Additionally, 15 Fd Pk Sqn successfully deployed an ad hoc engineer workshop on Operation *Agricola 2*. This will be used as a template to develop an interim solution, to be held in the base area and deployed on operations when required, until the full system is procured. The interim system will be developed from the excess equipment resulting from the closure of 45 Fd Sp Sqn's workshop in Osnabrück together with that from the Split engineer workshop, which is also closing. Finally, a clear way ahead in terms of policy for engineer workshops has been developed, which will underpin future developments of both equipment and training and will be promulgated in the near future.

**Transport.** *The Squadron holdings of Drops vehicles are inadequate.* The shortage of Drops vehicles is army wide. The peace entitlement of Drops vehicles for field support squadrons is four with four trailers; in war this is doubled, accomplished by using the pairing mechanism (more on this later). During operations other than war, units are deployed at best effort and, where a commander identifies a shortfall in equipment and/or manpower, requests for enhancements should be submitted through the chain of command. This is the bread and butter of LAND Engineer when mounting operations. The five field support squadrons will also be issued with rough terrain container handlers.

**Manning.** *65 Squadron did not deploy with its full complement and was therefore unable to deploy a forward detachment.* The circumstances surrounding the deployment were unusual in that not only was Operation *Palatine* still under way, but it was likely that the support squadron on Operation *Agricola* would need to be replaced. In addition, SDR enhancements, in particular the creation of the fifth field support squadron, had not taken effect. It was considered essential to maintain tour intervals and avoid institutionalized six-month tour intervals, therefore the decision was made to support both Balkan operations from the single field park squadron. In addition, 65 Sqn was also required to maintain its static elements remaining in Hameln. SDR enhancements and the creation of Engineer Park (Germany) will create five balanced field support squadrons, each with a deployable strength of 124, with no residual in-barracks responsibilities to maintain, therefore enabling a tour interval of 24 months.

**War Fighting and the Pairing Mechanism.** Although there was no specific reference, in OC 65 Sqn's article, to war fighting, my understanding of the pairing mechanism is that units in the formation readiness cycle in 1 and 3 Divs will be paired. In essence, pairing to achieve a logistic squadron at war fighting establishment requires two logistic squadrons at peace establishment, leaving some additional shortfalls in specific trades (such as plant operator mechanics and drivers) and equipment. All need to be found from elsewhere.

**Financial and Contractual Delegations.** *Civilian Secretariat resisted granting adequate financial delegations for the first four months of the operation.* This problem is recognized and has been widely commented on in several post op reports. A summary of the issues, together with a proposed way ahead, which suggests what levels of delegation should be made across the engineer chain of command, has been presented to LAND G9 Budgets for further staffing with PJHQ. The matter is also connected to the wider issues of procuring services, which are embodied in the rewrite of Joint Warfare Publication 4.05. A satisfactory resolution to this issue is anticipated.

**Operating Stock.** *Civilian Secretariat refused to allow the Squadron to establish any form of operating stock.* This issue has been included in the work on delegations and has been used as an example of why it is necessary to provide adequate delegations. The point is that it should be for the CRE to decide what materiel he needs to



undertake his tasks and to secure that within the financial limits set on him. Should he go beyond the limits set, he must refer to the next higher level in the engineer chain of command.

**UK Sourced Materiel.** *The lead-time for the procurement of Water Supply chemicals was poor.* OC 65 Sqn comments on the success of both the Engineer Resources Management Cell at the Supply Chain Operations Centre in Bicester and the Defence Clothing and Textiles Agency to provide materiel from UK sources, but notes the poor response to the provision of water supply chemicals. This is a difficult subject to resolve because of the shelf life limitations placed on such chemicals. In addition, demand was extraordinarily high due to the requirement to provide water to a large number of refugees. The Defence Clothing and Textiles Agency enabling arrangements should be adequate to meet the most demanding joint rapid reaction force requirement. The problems have significantly broadened the experience of staff, trainers, equipment support managers, procurers and users. The amendment to the "Joint Rapid Reaction Force Special Purpose War Reserve", currently on distribution to formation headquarters for assessment and comment, will partly address this problem. This proposes an initial 30 days supply of chemicals with an automatic replenishment of stock every 30 days. It is therefore essential that the initial request for water supply chemicals for operations be staffed correctly, in accordance with the "Operational Demands for Engineer Material Instruction". This will ensure the demand is given the highest priority at all levels and the materiel is supplied within the quickest possible time frame.

**Co-operation between the Logistic Squadron and Military Construction Force.** *Proper use of resources specialists and direct liaison between*

*the military construction force and the logistic squadron led to more effective support.* This is a good point, well made and one which we are constantly striving to deal with. Recent efforts to advertise the importance of engineer logistics in support of engineer operations have added significantly to the liaison, which we now see. In addition we are trying to enhance the strength of the link with the third leg of the engineer triumvirate: the designers. A joint design and resource working group is now being convened to take this forward.

**Tendency to Skip War Time Accounting.** *The pace and scope of operations increased the temptations to skip peacetime accounting.* It was good to see that such a temptation was resisted; not to have done so would have attracted serious adverse comment, as it would have been against all current regulations. There is little we can do to develop this point except to ensure all advice from the staff continues to stress the formal position and for the Inspectorate of Engineer Resources to monitor units (particularly early in an operational deployment) closely, to ensure adherence to the regulations.

**Summary.** We at LAND Engineer have a strong desire to serve the Corps and the Army to the best of our ability and strive in every way to do so. We understand too well the frustration of the troops on deployed operations when the system does not react in the desired way and the consequences of not having the material and equipment to carry out a task. We have taken on board the lessons learnt during 65 Fd Pk Sqn's tour on Operation *Agricola* and are taking action where possible to address these issues. I welcome correspondence regarding any matters on Engineer Logistics. In conclusion, we continually need feedback from the field army to continue to improve our systems. Yours faithfully, WO1 C C Abraham BEM.

## Reviews

### **NINE BATTLES TO STANLEY**

NICHOLAS VAN DER BIJL

*Published by Pen & Sword Books (Leo Cooper)  
47 Church Street, Barnsley, S70 2AS  
Price £19.95 – ISBN 0 85052 691 1*

ALTHOUGH published seventeen years after the Falklands war, this book gives a refreshing account of the land operations involved in recapturing the Islands from the Argentinians in 1982.

As an officer in the Intelligence Corps at the time of the war, the author was the only member of that Corps in Headquarters 3 Commando Brigade and, as such, has a particular interest in the Argentinian forces involved as well as a detailed knowledge of the operations of 3 Commando Brigade and additional units placed under command. What he has produced is an even-handed, blow by blow account viewed from both the British and Argentinian aspects. In fact, at times it is difficult to remember which side he is considering as commanders' names and unit titles are often very similar. In addition, he puts the whole affair into context by covering the historical aspects of the Argentine claim to the Falkland Islands as well as the structure, deployment in Argentina and training of the Argentine armed forces. He also makes it quite clear that, in his view, combat intelligence was not accorded the priority or importance it should have been and this view is strongly supported by Major General Julian Thompson, the Commander of 3 Commando Brigade during the Falklands war, in his excellent foreword. The lack of patrolling to capture prisoners is mentioned, as is the failure of units to send prisoners, when captured, to brigade headquarters for interrogation. His remark that "It is surprising how many commanders want to fight without knowing much about the enemy" neatly sums up his feelings.

As a former member of Headquarters 3 Commando Brigade, the author identifies very closely with the Royal Marines and frequently takes their side when inter service problems occur, particularly those with the SAS who were regarded as "experts with influence", always ready to consult contacts in the United Kingdom, in preference to those with local knowledge, and a law unto themselves.

When considering the performance of supporting arms, Royal Engineers units receive much favourable comment, particularly 59 Independent Commando Field Squadron, which supported 3 Commando Brigade throughout. He also makes an interesting comment about the use of armour, particularly the lack of armoured support for 2 PARA at Goose Green when the CVR(T) vehicles of the Blues and Royals might have provided very welcome supporting fire. He puts this down to the fact that Royal Marines rarely operated with armour and were not familiar with the capabilities of the CVR(T).

Unfortunately, the standard of editing is not as good as it could be leaving a number of irritating errors and, in one case, the use of the adjective "servile", in describing the British infantry and cavalry, grates although he explains that by "servile" he means servants of the government!

All in all, a book well worth reading which fills a hitherto vacant niche.

FGB

### **THE ROYAL BOMBAY SAPPERS AND MINERS 1939–1947**

COMPILED UNDER THE CHAIRMANSHIP OF  
BRIGADIER D A BARKER-WYATT CBE

*Privately published for the Royal Bombay Sappers and Miners Association. A few spare copies remain, available on application to the Secretary, Lieutenant Colonel D L Jones, 2 Mulberry Grove, Everton, Lymington, SO41 0ZN – Price £40*

THIS is a book of many surprises to the casual reader. The first is to learn of the extraordinary breadth of the involvement of the Bombay Sappers in the campaigns of the Second World War and its immediate aftermath. Apart from North-West Europe there seems hardly a single theatre of operations in which they did not have a hand. While most of us in the postwar generation would immediately think "Burma" in connection with any of the Indian Engineers, it is easy to forget, for example, what a major part Indian sappers played in the Italian campaign.

This splendid book has been compiled under the auspices of a committee set up to fill a gap which had been identified during the 1995 celebrations

of the 175th anniversary of the Bombay Sappers adopting the title "Sappers and Miners". Therein lies the second surprise. Committee-produced books are notoriously difficult to make hang together. The odd hiccup may be noticed but the variety of authors makes for great diversity of interest. The accounts, presented theatre by theatre, are based on war diaries and memories, backed by established published sources. Plenty of anecdotes provide good reading – for example the one about the two officers in Burma returning to their basha to find a large snake hanging over it ... Over sixty maps are included. By no means all perfect, they serve their purpose well and tend to crop up at the moment of need.

The next surprise, or perhaps reminder to the better-informed, is to learn of the arrival of 4th Indian Division in Egypt as early as 16 August 1939 with a Royal Bombay-based HQ RE, a field company from each corps and a Madras field park. These were to provide the majority of Sappers in Wavell's victory over the Italians at Sidi Barrani. The Division then moved to Sudan where 5th Indian Division joined them for what became the Abyssinian and Eritrean campaigns; unique, we are reminded, for being the only theatre in which no British formation took part. The first Sapper Victoria Cross of the war, won by Second Lieutenant P S Bhagat, serves as a reminder of the intensity of that fighting.

The biggest surprise, perhaps, is the story of the Italian campaign. The challenges faced there by the Indian soldiers were enormous, not least from the ghastly winter weather. The story of 21 Field Company's work on Cavendish road during the Cassino battle is as good an example of resolution, courage and professional pride as any. But it is invidious to select any one incident from a campaign so dominated by demands on the engineer imposed by an enemy who had made full use of the ideal defensive terrain.

The Burma section, though less of a surprise, has a wealth of similar stories to tell. The action in which Havildar Pandurang Sanawne won the Military Medal moving forward ahead of infantry and tanks, clearing anti-tank mines and booby traps during the Imphal battles seems the quintessential sapper operation. Less obviously perhaps, but equally critical, may be cited the work of 30 Field Company ferrying men and stores across the River Shweli in February 1945, steadily taking casualties but carrying on to see two brigades

into the bridgehead. The resourcefulness of men determined to see the job through despite shortages of equipment, hostile terrain and a tenacious and ruthless enemy, illuminates these chapters.

That the Bombay Sappers were not alone in these achievements is also clear from the book. Whether or not a similar volume will emerge from the Bengal and Madras Sappers, the compilers of this history have done posterity a great service with what must have been a colossal task. Future researchers would do well not to overlook it. They will read of adventures galore; they will learn much about the campaigns and something of the spirit that motivated officers and men to endure and to perform acts of extreme selflessness. They cannot help being struck by the special human relationship that underlay the success of the Indian Army nor Britain's good fortune in having such a force to call on in its hour of need.

GWAN

**FORTRESS EUROPE  
FORTS AND FORTIFICATIONS, 1939-1945**  
J E KAUFMANN AND R M JURGA

*Published by Greenhill Books, Lionel Leventhal  
Limited, Park House, 1 Russell Gardens,  
London NW11 9NN – Price £25  
ISBN 1 85367 341 2*

THIS book presents a good overview of European fortifications during the Second World War, whether of Allied, Axis or neutral powers. The origins, rationale, design and siting of the fortifications are given country by country. Each chapter contains sections on land fronts and coastal defences where existing, and discusses them as systems and examples of individual works. Details of armaments are given. Chapters also contain sections on background and history and on the extent to which the fortifications concerned had a role or were tested during the Second World War. However, in places this organization of material has produced a structural awkwardness. The book is profusely illustrated with photographs, maps, plans and a large number of cut-away isometric drawings, a particularly strong element of the book and a welcome aid to interpretation. The author, Kaufmann, is American and Jurga is a Polish artist who was responsible for the creation of the very fine technical drawings included.

The variety of fortifications portrayed will be an eye-opener even to those who are knowledgeable on the subject. New governments of recent years have opened many historical archives and just one of the benefits of this book is the clearer picture which it is able to present of Soviet and Finnish defences. Importantly, the author has tried to assess the value and effectiveness of the fortifications at both a strategic and a tactical level. This will, no doubt, continue to be an area for debate.

It is interesting to see the defences of Britain described and assessed from the perspective of a foreign historian. The picture presented is in some ways superficial and selective but the drawings of a British pillbox, Tett Turret and Pickett-Hamilton Fort are excellent.

The scope of this book is very ambitious and it was a courageous undertaking. It is a valuable compendium of information. Although clearly not the last word on this subject it is certainly recommended reading for those who are seriously interested in fortification during the Second World War.

The acid test is whether the reviewer will buy his own copy of this book – and he will!!

VTCS

**THE KOREAN WAR  
THE WEST CONFRONTS COMMUNISM  
1950-1953**

MICHAEL HICKEY

*Published by John Murray, 50 Albemarle Street,  
London W1X 5BD – Price £25. ISBN 07195 55590*

IN choosing an all-embracing title for this book, Michael Hickey set himself a considerable task, but in its 400 packed pages has achieved an often enthralling history. Since 1950, when the North invaded the South, many books have been written about the Korean War, but most of them are out of print. Fifty years on, Hickey brings us up to date, backed by his extensive research and personal experiences when commanding a RASC (Royal Army Service Corps) transport platoon through the first terrible winter of the war. To declare my hand, I was there for its other two, more static, winters, which were less testing for most of us.

In his preface, Michael Hickey limits his aim to showing something of the British and Commonwealth contribution, in relation to the far greater undertaking of the Americans and

South Koreans. I was surprised, therefore, to find Brigadier C N Barclay's authoritative First Commonwealth Division (Gale & Polden, 1954) omitted from Hickey's extensive bibliography. Conversely, the writings of Brigadier George Taylor DSO, who was "quietly relieved of his command", are perhaps given unwarranted prominence. General Jim Cassels was indeed an inspired choice to command that unique and politically sensitive division!

Engineering can be an understandably difficult subject for non-sappers: Hickey gives due recognition to isolated incidents, like Major Tony Younger's 55 Field Squadron blowing the Han bridges, also to the splendid contribution of Captain George Cooper's troop to the defences of The Hook, but, of course, I would have liked more. There is no mention of the division's minefield policy, based largely on trial and error, for the laying of trip-wire and pressure operated anti-personnel mines (all of them American) in quantities never previously contemplated by the Royal Engineers. Bulldozers, with a single D8 proving more effective on most days than many tanks, gain no mention. Without sapper roads the gunners would have received little ammunition, and without gunners none of us could have stayed in Korea.

A tiny, but significant, error in the Glossary defines CRE as Commander Royal Engineers, a Lieutenant-Colonel... In fact, it was for the Commonwealth Division that the full Colonel CRE organization was first introduced. Both Colonel E C W Myers CBE DSO, the CRE, and Lieutenant-Colonel P N M Moore DSO\*\*, MC, the CO of the engineer regiment, were truly outstanding RE officers. How each strove to make the new and sometimes difficult arrangements work could have filled another book!

Hickey is at his best when recording strategic and political history, which includes General Douglas MacArthur's Korean triumphs and disasters. He all too nearly twice lost the whole land of Korea, the first time when he and the West were so obviously unready at the outbreak of the War, the second during the retreat from the Yalu, when too many under MacArthur's command inexcusably lost their will to fight.

I very much enjoyed Michael Hickey's highly informative book, which, probably intentionally, tends to raise further questions. Would it, I wonder, still be fair to ask "Supposing the West had not confronted Communism in Korea...?"

DGR

**THE BRITISH FIELD MARSHALS  
1736-1997  
A BIOGRAPHICAL DICTIONARY**  
T A HEATHCOTE

*Published by Pen & Sword Books Ltd,  
47 Church Street, Barnsley, S70 2AS, price £25.  
ISBN 0 85052 696 5*

THIS fascinating handbook by Dr Tony Heathcote, for many years on the academic staff at Sandhurst, marks the end of the five-star rank (field marshal and its equivalent in the other services) unless some exceptional circumstances warrant its reintroduction. There have been 138 altogether, including the first created by George II in 1736 but of those only 118 were regular officers of whom 107 actually ‘...stood up in battle to be shot at...’. The book comprises an alphabetical series of potted biographies that not only tell of the careers of these great men but also give some delightful insights into the less well-known aspects of their lives. Some of these are humorous, not necessarily at the time (eg that Templer was wounded by a grand piano, Evelyn Wood by a giraffe). Others reflect the mores of their times and the place of the Army in society.

The route to the baton was apparently highly varied. However, discounting the Royal Dukes and other honoraries, by and large hard operational experience was essential. Thereafter luck and longevity played a considerable part. Our own Lintorn Simmons, for example, had a meteoric early career studded with brevets and foreign active service but was not actually promoted field marshal until aged 69, two years after he had retired from public life. Napier was even older, 73, when his promotion came up; and Burgoyne at 85 was nearly but not quite, the oldest, that record (91) being held by the Marquess of Drogheda. Nicholson did it the other way, after a modest (though active) start, by being in the right place at the right time (Whitehall in 1910 as Chief of the new General Staff) and becoming indispensably efficient there. For Kitchener, a mere 59-year-old, the honour simply marked the start of the greatest stage of his whole remarkable career.

Unfortunately this book has no portraits and a few irritating editorial errors. Minor quibbles about some of the content are inevitable, too. For example, the Fashoda incident is treated as if

Kitchener had happened upon the French column by accident rather than as the significant event it was. These aside, the book is certain to prove indispensable for libraries and individual researchers as well as being highly enjoyable to dip into by anyone with a general interest in the history of the British Army.

GWAN

**A HISTORY OF THE PENINSULAR WAR  
VOLUME IX. MODERN STUDIES OF THE WAR IN  
SPAIN AND PORTUGAL 1808-1814**

EDITED BY PADDY GRIFFITH

*Greenhill Books, 1 Russell Gardens, London  
NW11 9NN – price £30.  
ISBN 1-85367-348-X*

CHARLES Oman published his great work on the Peninsular War between the years 1902 and 1930 and such was his research and scholarship, not to mention magisterial prose, that alongside William Napier’s passionate account it became one of the classic histories of the conflict. But this is not to say it is inviolable and a vast amount of new evidence has come to light since Oman laid down his pen, some of it challenging his statements and some adding immeasurably to them. Thus, seventy years on, as Paddy Griffith, the excellent editor of these Studies tells us in his introduction, it is time “to reassess Oman’s contribution in the light of modern scholarship”.

Peninsular enthusiasts are going to welcome this book but those whose interest is lukewarm might profitably begin at Chapter Four, in which Philip Haythornthwaite discusses overall aspects of service in the War. By following this with his contribution on sieges – Chapter Nine – one can discover what was required, in particular of the Engineers, when the capture of a very strongly fortified town was necessary. Given the conditions, materiel, primitive communications and the fact that everything required immense physical labour, it makes awesome reading. And Haythornthwaite, as frequently as Oman, rightly quotes William Napier, our man on the spot, who summed it up so unforgettably, “To the discredit of the English government, no army was ever so ill-provided with the means of prosecuting such enterprises. The engineer officers were exceedingly zealous... but the ablest trembled when reflecting upon their utter destitution of all that belonged to real service... the best officers

and the finest soldiers were obliged to sacrifice themselves in a lamentable manner. The sieges... were a succession of butcheries, because the commonest resources of their art were denied to the engineers”.

Elsewhere in these Studies, totalling fourteen, rare recent research is presented on “The French Army in the Peninsula” a most comprehensive and interesting review. Another writer considers Oman’s underestimation of the role of the Spanish guerrillas. A third discusses “Oman and the Operational Art” and a fourth dwells on his view of the Spanish Army during the War. Several are sharply critical and this may shock his ardent adherents, indeed, given that he was writing a century ago plus the exceptional quality of his work, a few writers might have chosen their words more carefully but most maintain their objectivity with courtesy.

All in all these Studies considerably advance our understanding of the war, and one cannot ask for more than that.

JVP

**GENERALLY SPEAKING  
“THEN HURRAH FOR  
THE LIFE OF A SOLDIER”**

GENERAL SIR JOHN AKEHURST

*Published by Michael Russell Publishers Ltd,  
Wilby Hall, Wilby, Norwich M16 2JP  
Price £19.95 – ISBN 0 85955 253 5*

YOUR reviewer bought this book for a good holiday read and was not disappointed. John Akehurst is well known to many Sappers and it is clear from it that many have amused and even impressed him throughout his career.

The only conventional aspect is that it is written in the normal chronological autobiographical manner. Not surprisingly the book reflects the man. It is entertaining and he is not afraid to tell a good story against himself. It is utterly professional, yet handled with a light touch, and he strikes an excellent balance between stories of childhood and family life, military campaigns, chiefly Malaya and Dhofar, and matters of the moment. These are interspersed with illuminating accounts of his three postings to Camberley. It is an honest book and his advice to any youngster considering joining the Army today is typically pragmatic.

The many lighthearted anecdotes are a sheer joy. More seriously, one is left with the impression that

he would like to have said more than he did about the recent Defence Review and the way that the Army, and in particular the Territorial Army, is moulded by ill advised financial constraints. Nevertheless he manages to leave a powerful message.

This book is recommended strongly to any reader who wishes an informed, amusing but expert *divertissement* of Army life in the latter half of this century.

SRG

**THE BOER WAR  
SOUTH AFRICA 1899-1902**

MARTIN MARIX EVANS

*Published by Osprey Direct UK, PO Box 140,  
Wellingborough, Northants, NN8 4ZA  
Price £19.99.  
ISBN 1 85532 851 8*

A LONG and hard war, it started with costly set piece battles and turned into a grim guerrilla campaign. It characterized the modern South African state for decades, and still provides us with some interesting military lessons. Field operations covered an area about the size of France. Initially, brigades moving ten miles a day faced an enterprising and unpredictable enemy often able to move his forces ten miles in an hour, to block and strike with skill. The Boers fought to live, and not to die. As the author says: “Dying was for the professionals”. Now try and bring all that to life in 160 pages!

He generally does, and with commendable success, but to maintain the strength and direction of the narrative he has had to cut out much of the politics and strategy that shadowed field operations and reduce descriptions of most actions to the bare bones. There are inevitably some prodigious simplifications, but without losing the essential thread of the story. Better maps or schematic diagrams of battles are needed and the narrative very occasionally lapses into obscurity for the lack of them.

Contemporary maps help us to “read” the battles, but a few are poorly reproduced and sadly almost unusable. These original maps, or their optimistic interpretation by commanders, often mutely contributed to unsound planning and the misdirection of the breathtakingly hazardous attacks that followed – the inaccurate map of the Colenso battlefield being a notorious example.

Items from the RE Library's excellent collection enrich the book.

Carefully chosen old and new photographs capture the elementary minor tactics used, the harshness of the terrain, and the tough conditions that had to be endured. Extracts from thoughtful contemporary personal accounts give nuggets of depth and colour. The book unveils the essential humanity, courage and sacrifice, and increasing ruthlessness, of those who fought. With restrained objectivity, and thus more impact, it also outlines the harrowing consequences of the war to the many civilians of all races whose lives were often needlessly wrecked or lost by some of the callous and thoughtless attitudes of the times.

This was also the largest RE deployment before World War I, peaking by May 1901 at 5470 of which some 20 per cent were Militia and Volunteers. We fielded our most recent bridging and signalling equipment, searchlights, captive balloons, and traction engines, and we modernized our transportation and fortifications skills. Otherwise, we were still at the pick and shovel stage in a horses, boots and rifles army with outdated tactics, artillery and logistics. Shimmering in his new Mess Dress, any contemporary "Sticky" would have relished the challenges.

Martin Marix Evans writes in a brisk, lucid, vigorous style that holds the reader's interest and attention. His book is useful, well structured and generously illustrated, and is published at fair value for money. It is a praiseworthy introduction to the Boer War and its principal sites and a good purchase as a gift in these Centenary years; or before investing in many, less good, others.

MC McC

**A NOBLE CRUSADE  
THE HISTORY OF  
THE EIGHTH ARMY 1941-45**

RICHARD DOHERTY

*Published by Spellmount, The Old Rectory,  
Staplehurst, TN12 0AZ – price £24.95.  
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FROM a wealth of sources the author has written quite a short comprehensive history of a remarkable field army, from its roots in the Western Desert Force of 1940 until it became British Troops Austria after the war. He has produced a fascinating story that covers the whole spectrum

from the strategic derivatives of each campaign, touching on the sometimes conflicting aspirations of the many national forces serving in or alongside Eighth Army, and thence to vivid descriptions of battles, especially in the desert war. Unfortunately the rather sketchy maps do not always help the reader.

The German onslaught on the USSR began in June 1941 but D-Day was not until June 1944. For much of the war Eighth Army, and later the British First Army with the US Fifth Army, were the only land forces of the Western Allies engaged with the common enemy. Their role was important, politically and strategically, and as a means of drawing valuable enemy resources away from the embattled Eastern Front over a very critical period and later also from North-West Europe.

O'Connor's brilliant victory at Beda Fomm in Libya in February 1941 removed the Italian threat to Egypt, but the simultaneous departure of many of the most experienced Eighth Army formations to the lost cause in Greece coincided with the arrival of Rommel and the Afrika Korps in Tripoli. It was not until the Battle of Alamein in November 1942 that the reversals that followed were retrieved. By then Allied forces were landing in North Africa and it was the short-lived First Army, reinforced with two Eighth Army divisions, that achieved the final defeat and surrender of all the Axis forces in Africa. Africa, the Suez Canal and Malta were now safe.

The campaigns in Sicily and landings in Italy led to the early armistice with the Italians. Thereafter, apart from securing airfields for the Allied bombing campaign, the long slog up Italy became more of a war of attrition. Commanders were frustrated through lack of resources, by the removal of experienced formations to other theatres or to reinforce the nominally all-American US Fifth Army, and by the shortage of reinforcements to make good the heavy casualties. However, Allied supremacy in the air and in artillery counter-balanced the enemy's advantages of interior lines of communication and of well-prepared natural defensive positions.

The Sappers get a fair coverage and are acknowledged as being "some of the most vital members of the Eighth Army, that their tasks were many and varied and often extremely dangerous". The book could not be expected to go into any depth on engineering matters, such as

the tremendous boost to Sapper capability given by the first arrival in North Africa of earth-moving plant and the Bailey bridge, but does record the emergence of armoured assault engineers towards the end of the war. Some of the many bridging operations of field companies are mentioned. One is described as “typical of the many occasions on which Sappers of Eighth Army performed incredible tasks almost as a matter of routine”. Another is the Bailey bridge built under heavy and continuous fire over the River Rapido at Cassino at a frightful cost in casualties.

This book is well written and researched with few errors but inevitable omissions. It could be of topical interest to those working in international situations with multinational forces, but most of all it will appeal as a saga of the deeds of an indomitable but ever changing army. It is a testimony to the bravery and tenacity of the great majority of its soldiers, far from home like the Poles, gallant New Zealanders and others from the old Empire and Commonwealth, faced with years of bitter fighting in adverse conditions against a skilled and determined enemy, and finally rewarded in 1945 with a victory ranked by the author as Eighth Army’s greatest.

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### ARTILLERY’S ASTROLOGERS

PETER CHASSEAUD

*Published by Mapbooks, 17 St Anne’s Crescent, Lewes, BN7 1SB, price £50. ISBN 0-9512080-2-0*

PETER Chasseaud is an acknowledged expert in the field of cartography and map production with a deep interest in maps of the First World War. He has written widely on this subject and assisted in the production of recent popular television programmes.

In writing this historical volume on the 1914-18 War, the author has distilled the results of his research over twenty years, producing a magnificent book which makes fascinating reading for anyone connected with the discipline of mapping for military purposes, or who may wish to access a work of reference on the personalities, organizations, and techniques for surveys and maps developed largely to support the artillery. The increasing accuracy requirements for indirect fire, and the developing arts of flash spotting and sound

ranging and how these affected RE Survey and Artillery organization, doctrine and training are examined in detail.

Other works have dealt with global events leading to the War and the military and political experiences of the early part of the twentieth century. Peter Chasseaud leads the reader through the pre-war background of national mapping in the United Kingdom and on the continent and the contemporary state of development in surveying instruments, photo mapping, both ground and air, including balloons, and in surveying for indirect fire. The lack of surveys for field batteries, and the consequent waste of ammunition for ranging shots, sets the scene for many of the improvements in artillery surveys during the course of the war.

There follows the experience of the first few months of the war and the inevitable rapid review of requirements, methods, resources and organizations. Early contact with the Germans revealed their superiority in directing artillery fire by visual signals. Experiments by the 1st Ranging Section RE emphasized the need for accurate surveys and maps to assist with aerial spotting of targets and to lay down accurate indirect fire. At this stage of the war it became clear that many gunners regarded the business of survey with awe and were remarkably ignorant as to its potential. This view was to change in subsequent months!

The policy on maps and surveys through 1915 to 1916 is covered in some detail, from the need to acquire existing maps of the theatre of operations, the production of trench maps, with their ever-changing pattern, map distribution, and the formation of topographical sections and field survey companies “to coordinate and control all work in connection with the preparation of maps and the fixation of hostile objectives”.

In this artillery war the influence of survey was considerable. The intense experimentation and continual developments during the four-year period are detailed in this definitive operational history of field survey organization, units and personnel on the Western Front. Peter Chasseaud has brought together a mass of well-researched historical information in a well-presented volume, surprisingly detailed despite the loss of many documents from that period. The volume is not exactly bedtime reading but it would be a valuable addition to libraries and to geographic organizations.

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