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Editorial

THIS is somewhat of a "bumper" issue to ensure the inclusion of Operation *Telic* articles. More details can be found on page 239.

The remainder of this issue follows the normal pattern, with a good mix of articles across the whole spectrum of our Corps and associated activities. Added to this are some excellent Memoirs recording the life and times of some very interesting "Sappers"

I have received some letters complaining about the amount of abbreviations in articles and how difficult many of the more recent, operational articles are to read. To authors please, whereposssible, restrict the use of "in house" abbreviations to a minimum as this makes many articles unreadable and somewhat boring. For our readers, we do update the abbreviations pages whenever we spot a new one but understand the frustration of jumping back and forth.

The Budget, Membership and Publications Committee have recently reviewed the recommendations made by the Journal Review Working Group (the draft report was published in the *Journal* August 2003). The Committee recommend to Council that in outline the procedures, editorial and content of the Journal should remain as they currently are. The recommendation to change (at a suitable time) to an A4 publication, similar to the Royal United Services Institute and British Army Review publications is endorsed. Some members however, have asked that we do not change and the Journal should stay the size it has been for the last one hundred years or so. If you have a view or opinion please let me know.

For the third year running we start this edition with the Engineer in Chief (Army)'s report on the Corps. It speaks for itself. Have a safe and pleasant Christmas and spare a little thought for those members of the Corps who are unable to be at home at this time of year.

Editor

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Introduction

Not surprisingly, this year's annual report is dominated by the Corps' contribution to Op *Telic*. It was (and continues to be) a truly extraordinary achievement. Op *Telic 1* drew upon 54 per cent of the deployable Corps, representing over 14 per cent of the Land Component. In percentage terms, it was the largest operational deployment of Royal Engineers since WW2 and was achieved with breathtaking speed. Once again, the Corps was able to demonstrate its full range of skills in support of all three Services and the versatility afforded by multiskilling – the envy of just about every Army in the world. But sadly, the Corps' undoubted success on the operation must be balanced against the loss of SSgt Simon Cullingworth and Spr Luke Allsop. Our thoughts and prayers are with their families and friends, particularly at this time of year.

In addition to unprecedented levels of commitment in 2003, the Corps has also grown in size with the reformation of 12 (Nova Scotia) HQ Sqn, 10 Fd Sqn (Air Sp), 30 Fd Sqn and an additional 72 personnel at 33 Engr Regt (EOD). Just as we reach the desired "size and shape" laid out in the Strategic Defence Review of '98, we are now well into planning another reorganization under the banner "Future Army Structures" (FAS). This is likely to result in some significant structural changes for the Corps that reflect the need for an Army that is more expeditionary in nature, easier and faster to deploy whilst still being able to deliver a sizeable punch. Although I am unable to explain in great detail the new structures under discussion, I can confidently say that the Corps' role in support of the three Services will not diminish.

Of course FAS is only one piece of work that will affect us all in the future. Add to this Whole Fleet Management, Digitization, the Defence Training Review, Command Leadership and Management, Review of Officer Career Courses and the Non Commissioned Engagement and Career Structure Study, and it becomes evident just how important it is to be able to cope with the never ending stream of change. My Headquarters continues to monitor the impact of these and additional initiatives on the Corps, and I remain confident that we are heading in the right direction both from an "individual" and a "collective" perspective. Generating sufficient trained manpower in the short term is proving to be a challenge and we are still suffering from overstretch and poor retention in certain trades (notably the Fitter Group and C3S), and structural problems (EOD and MWF) which it is hoped will be largely addressed by FAS. Additionally, we are unable to offer trade training to soldiers at the rate required without enhancements to the RSME.

Organization

The implementation of SDR has continued successfully. In addition the creation of a Joint CIMIC Group has been endorsed, planned to be based at Minley. Detailed work is ongoing to facilitate this plan, but it will see adjustments to the establishments of CVHQ RE, 29 (Corps Sp) Engr Bde and MWF (V), with the probable outcome being the move of some 29 (Corps Sp) Engr Bde support staff (currently at Minley) to join the Bde HQ at Aldershot with MWF (V) moving to co-locate with MWF at Chilwell.

26 Engr Regt. 26 Engr Regt's temporary home remains Ludgershall until Swinton Barracks' extension is delivered under Project ALLENBY in 2005. 30 Fd Sqn is due to be formed up by December 2003 in time for 12 Mech Bde's training year in 2004.

23 Engr Regt (Air Asslt). 23 Engr Regt's deployment on Op *Telic* hastened the form up of the Regt, with Initial Operational Capability being declared in Jan 03 and Full Operational Capability in Mar 03. The Regiment remains dispersed between Waterbeach, Aldershot, Ripon and Maidstone until its permanent home at Woodbridge is complete in mid 2006. In the meantime, 9 Para Sqn will move to a temporary home at Buller Barracks in Aldershot between Jan-May 04.

10 Fd Sqn (Air Sp). 10 Fd Sqn (Air Sp) have re-formed at RAF Leeming.

MWF. The creation of a third CRE (Wks) and increase in MWF establishment continues to be implemented, and is due to be complete in 2005. The proposed increases in establishment are key in reducing the short tour intervals within MWF. Project CHILWELL, a joint LAND/4 Div project, will deliver the accommodation for the remainder of the MWF growth.

Undermanning. Corps undermanning has increased in 2003 and measures to address it have been taken by HQ EinC(A), ATRA and HQ RE Th Tps. HQ RE Th Tps has identified

where, within the Front Line Commands, this undermanning should be borne[1], and how the impact will be managed and ameliorated.

OPERATIONS

2003 HAS been dominated by operations in Iraq, and Op *Telic* has caused considerable disruption to the tour and exercise plot. At the height of operations the average tour interval for the Corps was down to nine months but this has now steadied at just under 11 months in the last year. We are therefore still breaking Harmony Guidelines[2] and deploying our soldiers more frequently than we wish to. The RE TA and reservists have provided substantial support to operations, in particular to Op *Telic* which has seen not only the backfill of over 500 individual augmentees to Regular units, but the mobilization of 131 Indep Cdo Sqn (V), 100 Fd Sqn (M), 507 STRE (Rly) (V), 508 STRE (Wks) (V), 412 Amph Tp (V), and the use of 101 Engr Regt (EOD) (V) on both Op *Telic* and Op *Midway*. This support has been essential in enabling units to meet operational commitments throughout the year. The peak of the Corps' commitments was whilst Op *Fresco* (MACA to cover the Fire Service strikes) was running and Op *Telic* was being mounted. During that period only a single RE sub-unit was un-committed to operations.

Iraq. The Force campaign began with a declared D-Day of 19 Mar and transition to Phase 4 operations on 18 Apr 03. The RE contributed 14 per cent of the Army force on Op *Telic 1* with 1 (UK) Div and 7 Armd Bde being supported by 28 Engr Regt, 32 Engr Regt and a Fd Sp Sqn, 16 Air Asslt Bde by 23 Engr Regt and 3 Cdo Bde by 59 Indep Cdo Sqn and 131 Indep Cdo Sqn (V). The JFLog C was supported by 36 Engr Regt and a Fd Sp Sqn, whilst HQ 12 (Air Sp) Engr Bde, 39 Engr Regt and 529 STRE provided support to STRIKE. Elements of MWF, 33 Engr Regt (EOD) and 42 Engr Regt (Geo) deployed as Force Troops. A Joint Force Engineer staff were established as part of the National Component HQ. Op *Telic 2* has seen a reduction in force levels to a 2* HQ commanding a Multi-National Division including a UK Brigade, with associated force troops; the RE contribution is currently a CS Regt providing both a CS and GS capability, an Air Sp Sqn, a Fd Sp Sqn, an EOD Sqn (-), a CRE (Wks) and a GSG(-).

Kosovo. As part of the drawdown of troops in the Balkans, 26 Engr Regt were not replaced on completion of their Op *Oculus* (Kosovo) tour in May 03. The LAND commitment to Kosovo is now found from the Operational Reserve Force, based on an Infantry Battle Group, with a RE troop (+) providing Combat Support. The commitment is rear- based, double hatted with the Spearhead LAND element.

Bosnia. An RE Sqn, in the wheeled role, continues to provide engineer support to both MNB (NW) and the UK Light Role Battle Group, rouling in April and October. Additionally, an EOD troop and an STRE (Wks) (-) supports the Brigade.

Afghanistan. ISAF 4 is now commanded by AFNORTH. The UK is providing an Inf Coy Gp in Kabul from within the Afghanistan Infantry Roulement Battalion (ARIB). In addition, the UK now provides a Provincial Reconstruction Team (PRT) at Mazar-e-Sharif to create the conditions outside Kabul to allow the Afghan administration to operate. MWF are providing infrastructure support to the PRT. RE Th Tps continue to provide J4 Infra Staff and rear based EOD capability to Op *Fingal*. 45 Fd Sp Sqn were the last Sapper subunit deployed, returning from Afghanistan earlier in the year.

Falkland Islands. The requirement to provide the maintenance section continues and they remain stretched in coping with the level of equipment held in theatre. The annual squadron level construction exercise (Ex *Kelp Fire*) for 2003 did not take place, but is planned for 2004. Having recovered from Op *Telic*, the Lead Air Support Squadron will resume exercising on a regular basis in FI.

Northern Ireland. The pace of life and activity, with "normalization" works and support to Public Order, has resulted in the forward basing of the Roulement Engineer Squadron for both Summer and Winter tours. Roulement dates have been realigned to mid-March and mid-September to ensure that one squadron can cover all the marching seasons, thus reducing the training bill.

Cyprus. The SBAs in Cyprus provided essential support to Op *Telic* with 62 (Cyprus) Sp Sqn and

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[1] All RE CS, GS and AS units are undermanned by approximately 16 per cent in the Spr-Cpl bracket. A number of Medical, Signals and Logistic units are also being "gapped" their established RE tradesmen.

[2] Harmony Guidelines aim to achieve a 24-month Tour Interval.

elements of MWF providing significant support to the forces mounted from Cyprus. Op *Tosca* endures and a small RE detachment continues to be provided.

Sierra Leone. The UK led IMATT continues, with a Garrison Engineer and three Clerks of Works serving in OCE posts. In addition there are nine RE personnel serving in Sierra Leone with their role centred on the provision of a training package for the Royal Sierra Leone Armed Forces (RSLAF). 10 Fd Sqn (Air Sp) (-) deployed for a month in support of the Spearhead Lead Element in February, who were responsible for providing additional security at the time when individuals cited for War Crimes were due to be tried.

Democratic Republic of Congo (DROC). 42 Fd Sqn (-) deployed in Jun 03 for a six week deployment in support of the French led EU Mission in the DROC. The Sqn took a French Air Sp Engr Tp under command to assist in the tasks centred on Bunia Airfield. These included the constant overnight repair of the main operating surface and the three fold increase in capacity of the parking apron for UN aircraft, thus playing a key role in enabling the speedy EU hand-over to the UN.

RAF Operations. 12 (Air Sp) Engr Bde has provided extensive support to the RAF, not only on Op *Telic* but also covering Deployed Operating Bases in a variety of locations in the Middle East and, to a lesser extent, in the Balkans.

Collective Training

DUE to Ops *Telic* and *Fresco* a significant number of Special to Arm (STA), Joint and Overseas Training (OTX) exercises were cancelled, and even essential combined arms training for many units was disrupted or curtailed. Ex *Warpaint* (which enables BATUS training) was significantly delayed and downscaled, but thanks to swift work from 35 Engr Regt essential training area maintenance was conducted which allowed 20 Armd Bde (supported by 35 Engr Regt less those elements deployed on Op *Telic*) to complete their BATUS training.

The drive to bring greater clarity to the linkage between policy and capability continues apace. The process for showing the linkage between SDR, the Joint Essential Task List (JETL), the Mission Essential Tasks List (LAND) METL (L) and training activities is now in place and continues to be developed and refined via Projects CENTURION, CHURCHILL and CARDINAL. The other Front Line Commands are developing their own METL. Once fully in place this process will ensure that limited training resources are used to deliver operational capability in the most cost-effective manner. Operations have again highlighted the need for all sapper units to maintain their artisan skills and be ready to complete construction tasks in remote and austere environments so the value of the existing construction exercises must not be underestimated. Following operations, the STA OTXs are resuming with *Crabapple 03*, *Northern Quest 03*, *Pinestock 03*, *Oakapple 04* and *Sailfish 04* to mention a few.

Reserve Forces and the TA

THE focus for all RE TA regiments and squadrons in 2003 has been provision of support to Operations *Telic 1* and *2*, the largest mobilization of the RE TA since the Second World War. On Op *Telic 1*, the RE TA provided 14 per cent of the total Royal Engineers in theatre, with sizeable contingents from the five RE TA Regiments, but also including 131 Cdo Sqn RE (V), 507 STRE (Railway) (V) and 412 Amphibious Tp RE (V) from Germany. Additionally, Explosive Ordnance specialists from 101 Engineer Regiment (EOD) (V) provided operational substitution to 33 Engineer Regiment (EOD) on Operation *Midway* in the UK. On Operation *Telic 2*, a further 221 RE TA personnel were mobilized, primarily in formed units producing 100 Field Squadron (Militia) and 508 STRE (V).

In total 24 per cent of the total RE TA manpower has been deployed on Operations this year. As with the Regular element of the Corps this represents a very significant contribution to Op *Telic*; the RE TA comprises 6.8 per cent of the TA but provided 11.2 per cent of the mobilized reservists.

A number of significant lessons have been identified as a result of the mobilization process, which will greatly improve future mobilizations. The "intelligent mobilization" process, and the role of Commander RE TA as the Cap Badge Champion, supported by the well established RE TA Training Plan, greatly assisted the timely provision of reservists to the operation. However the absence of a third PSI in RE TA sub-units and a shortage of permanent staff in TA units caused much pain and overstretch during mobilization, again reinforcing the need for these posts to be re-established.

In addition on average 35 TA Officers and soldiers were supporting the Corps throughout the

year on Full Time Reserve Service (FTRS) and "S" type engagements.

Routine exercise deployments at home and abroad have continued, albeit at a reduced level, including EOD support to Sennelager Training Centre, MWF(V) support to Op *Tosca* in Cyprus, various construction projects and Civil Affairs Group support to disaster relief planing in Nepal. Sadly the first 29 (Corps Support) Engineer Brigade FTX in the ARRC role had to be cancelled due to Op *Telic*.

Recruiting and marketing strategies have produced dividends, with an increase in the overall RE TA strength to 89 per cent. With the move of TA Phase 1 training to the ATRA, the highly successful RE TA recruit courses (RESTART) have ceased at Gibraltar Barracks after over 25 years. The RE TA Officer training plan is now well developed and being incorporated, in line with the Command, Leadership and Management (CLM) plan, into DI Trg (Army) thinking.

The combination of Op *Telic* preparation and growing RE TA strength have manifested themselves in improved attendance on recruit and career courses, producing a better trained RE TA.

It has been an extremely successful year for the RE TA, where the military and civilian skills of the TA sapper have been fully utilised on operations, on exercise and in the provision of military assistance to home base tasks.

Engineer Logistics

THE pace and range of engineer logistic operations this year surpassed even that of 2002. The main effort has focused on supporting the Joint Force deployment, sustainment and first tranche of drawdown from Op *Telic*.

Between Jan and Mar 03, RE logistic staff across the three Services and the Defence Logistics Organisation (DLO) planned for and delivered over 7,500 tonnes of engineer materiel[3] by sea and air to Cyprus and Kuwait whilst at the same time redeploying plant and materiel from Afghanistan into Kuwait. This deployment was larger even than Op *Granby* and delivered in half the time – a tremendous achievement. The challenge presented to the Corps' Fd Sp Sqns was enormous and in places required them to be brought up to War Fighting Establishment and then to be further reinforced in order to cope with the demand.

The Fd Sp Sqns were greatly assisted by new Mechanical Handling Equipment (the Rough Terrain Container Handler and the JCB Loadall) and the rapid introduction into service of a new computer based accounting tool, the Deployable Multiple Account System (DeMAS). This has been an outstanding success, greatly reducing the accounting burden on Resources Specialists for the £77M complex inventory of expeditionary campaign infrastructure (ECI) now deployed in Iraq.

More recently engineer logistic support has been provided to enable the 42 Fd Sqn deployment to Bunia in the Democratic Republic of Congo (DROC). A mix of ECI and Engineer Construction Plant was flown into theatre to support the Sqn effort in maintaining and expanding the airstrip.

The above achievements are testament to the close and effective liaison developed between formation engineer logistic staff and the DLO (in particular the Engineer Systems Support Integrated Project Team, the Engineer Resources Management Cell at Bicester and Headquarters Defence Supply and Distribution Agency) and a reminder of the critical role played by Sappers embedded in the Defence Supply Chain.

Military Engineer Services

OPERATIONAL commitments on the MES community in the past year have been significant. In addition to enduring commitments, Op *Telic* resulted in the deployment from MWF of a HQ CRE (Wks), 2 x STRE (Wks), 1½ x STRE (BP), 521 STRE(WD) and the first deployment of 528 STRE(Util). Support to the Air Component was provided by 529 STRE(Air Sp) and elements of CRE (Airfields). MWF(V) also deployed specialist manpower to provide oil and gas infrastructure expertise, as well as elements of 507 STRE(Rly)(V) and individual augmentees.

As Op *Telic* becomes an enduring commitment, overstretch on MES individuals and units is likely to be even more acute. MWF (V) continue to take a share of the burden, providing a composite STRE (Wks)(V) for Op *Telic* 2 and a number of individuals to fill staff posts. The nature of

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[3] Deployment included all operational stocks of bridging (Log Sp Bridge and Gen Sp Bridge) and water supply equipment and a considerable Urgent Operational Requirement bill of Tactical Fuel Handling Equipment, water development and bulk storage, and Temporary Deployable Accommodation.

Op *Telic* also identified the requirement for expertise in heavy infrastructure; this was provided jointly by the Engineer and Logistic Staff Corps RE (V) and MWF (V), although a proposal is being staffed for this expertise to be more readily available from MWF (V) by means of three specific roled STRE (Infra)(V). MES staff also assisted with the design of the Op *Telic* fuel and water plans as well as providing technical support to Urgent Operational Requirements such as Temporary Field Accommodation, field hospital enhancement package, water dispense racks, reverse osmosis plants and water purification units for small groups.

Enduring commitments may, in the future, be reduced by greater use of Contractors on Deployed Operations (CONDO), the policy for which is now in place, and the Contractorised Logistics (CONLOG) draw off contract is due to be let in Nov 03.

Detailed responsibility for the RE Fortification Steering Group has been passed to the new SO2 Security Engineering in EinC(A) although the renamed Working Group (WG) will continue to be chaired by Colonel Engineer Services. This WG will be subordinate to the newly formed Defence Force Protection Engineering Steering Group (DFPESG), chaired by the EinC(A). One of the first tasks of the WG will be to produce the synopsis, statement of work and contract for ME Vol IX Part 1 (Improvised Fortifications).

Undermanning of all technical rosters continues to be critical, and is exacerbated by the requirement for additional staff posts to support operations. Recruiting to meet the SOTR targets for technical feeder trades and long technical courses remains a priority to meet the current 10 per cent shortfall in the rosters against liability.

Revised estate management policy enshrined in Project ALEXANDER is likely to impact on MES posts. The separation of Demand through Customer Estate Organizations (CEstO) and Supply by Defence Estates is already in place in mainland UK and being developed for the overseas estate with Germany close behind. Of particular note is the creation of a CEstO in PJHQ and the Rest of the World Business Unit within DE, the latter to be headed by a CEng Colonel. Regrettably, work on the supporting parts of JWP 4-05 (Infrastructure Management on Joint Operations) has stalled because of the deployment of MES staff as defence augmentees to Op *Telic* infrastructure appointments.

The Works Inspectorate posts within HQRE Th Tps were cut under Landmark and are due to be disbanded in Apr 04. The options for how this function will be exercised in future are still being addressed.

Work on publications continues. The Joint Service Water Supply Committee WG, which is led by MES, has completed work on JWP 4-01.1 (Joint CSS Functions (Water)). MES WGs have delivered ME Vol IX Part 2 (Deliberate Fortifications) and ME Vol XII (Fuel Installations) to the Corps' Editor and are managing a defence contact with QinetiQ for the production of ME Vol X (Electrical Power in the Field), to be delivered in mid 2004.

ROYAL ENGINEERS (GEOGRAPHIC)

THE year has been another challenging and rewarding period for the Geographic Engineer Group (GEG), with operations in Iraq dominating proceedings. Operations aside significant contributions have been made in developing capabilities and training to support both in-house and wider Joint audiences.

The GEG made a sizeable contribution to Engr operations in Iraq with a total of 118 geo staff engaged on deployed Op *Telic* activities at the height of the crisis. The Geographic Support Group (GSG) that deployed on Op *Telic 1* was based on 14 Geo Sqn in Germany but comprised personnel from across 42 Engr Regt (Geo), including a Geo Tp from 135 Indep Geo Sqn RE(V). The level of formation HQ augmentation provided by the GEG to this operation was unprecedented and is an indication of the growing recognition of the key role played by geo staff on the battlefield. In addition, the Royal School of Military Survey (RSMS) at its UK base carried out crisis response printing of both standard mapping and psychological operations products.

42 Engr Regt (Geo) continues to provide a Geo Sect to the pan-Balkan theatre but enjoyed a slight operational reprieve with the repatriation of the Geo Teams from Afghanistan and Sierra Leone. Additional equipment and personnel were again deployed to support operations in Northern Ireland and the Regiment supported military firefighters engaged on Op *Fresco*.

A continuous technical development programme has provided a backdrop to the year, ensuring that that geo equipment has evolved to meet the needs of deployed forces. The Digital Geographic Support System (Light) (DGS(L)) was deployed on numerous exercises and was thoroughly tested on Op *Telic* – this laptop

based system has proved to be a vital capability. Delivery of the new 14-ton vehicle mounted digital pre-press system occurred in time for Op *Telic* I and it proved to be a significant capability enhancement in the field. The Regiment's newly formed Data Preparation Section (DPS), designed to provide fully configured geospatial datasets to deploying staff, was a huge success and may provide a stepping-stone into the future joint environmental data arena.

As part of the Command Battle Space Management (Land) (CBM(L)) programme the geo staff establishments in formation HQs are being increased to provide the data management skills necessary to support BOWMAN. Additionally, the GEG has provided the first of geo staff needed by the eight BOWMAN Training and Advisory Teams (BOWTAT).

This year saw three more SNCOs attend full time in-service MSc/BS degrees at Sheffield Hallam University and London School of Print; all three took up instructor appointments within RSMS on graduation. Negotiations with Sheffield Hallam for RE(Geo) soldiers to be awarded Foundation Degrees on completion of Class 1 training have been successful, with the final contract being signed early last summer. The first 30 students have already embarked on this degree programme and it is hoped that the initiative will prove a recruiting boon.

Recruiting, Manning and Career Management

Officer Recruiting. Once again we expect to take our full quota of new officers into the Corps; and the quality remains high. The Corps continues to attract a significant numbers of potential officers and this year my Recruiting Liaison Staff had involvement with 180 entrants into RMAS, three times our requirement. Although it takes a fair amount of support, this key area will remain a priority.

Soldier Recruiting. On the soldier side I am pleased to report that the Corps achieved 99.9 per cent of its target by the end of the 2002/03 recruiting year. The Regional Recruiting Teams (RRT) and "Special" Recruiters contributed significantly to this success. Due to the SATT backlog, there is currently a pause to RE recruiting (less Fitter General and Geographic Technicians) which will undoubtedly have an adverse affect on our recruiting targets this year. Attracting potential recruits, however, has not stopped and the RRTs are actively engaged in visiting school, colleges, ACFs and other youth organisations. A pan-Army initiative to address Operational Pinch Points in the form of "Golden Hellos" and Bursaries will shortly be in place to attract recruits for those technical trades in which there remains a critical shortfall.

Soldier Career Management. We are now approaching the 4th year of the Annual Career Advice Notice (AcrAN) for soldiers. It is widely recognised as being a good initiative; it ensures that the advice given to soldiers by commanders is in line with that provided by RE MCM Div. I am pleased to note that there is an increasing market in inter-cap badge transfers. This year we have made a profit; more soldiers have transferred in than have left us for other capbadges.

Soldier Manning. The Corps continues to expand under SDR arrangements, though the recruiting and training organisations are under pressure to catch up. I have therefore established a manning policy, which gives direction to RE MCM Div on where to place the necessary gapping. Further, it makes best use of available tradesmen, for instance, by calling them in from non-RE units (such as Field Hospitals) with the promise of intensive support to these units only when it is required. Having mentioned last year that further improvement in retention will be one of the keys to re-establishing full manning, I am pleased that soldier PVR (at 6.3 in FY 02/03) is at its lowest rate for a number of years.

Soldier Promotion. The overall volume of promotions continues to reflect the SDR increases. Another new record of 1329 soldier promotions this year takes the average of post-SDR years volume to 146 per cent of the average for pre-SDR years. This good news is contributing, in part, to improved retention. We expect our post-expansion rate to settle down at about 134 per cent of pre-SDR volume.

Impact of Op *Telic* on Soldier MCM. The substantial deployment on Op *Telic 1* forced decisions on whether individual soldiers should deploy or stay behind to undertake a career course on which he was already loaded. Many were allowed to deploy. This provided an opportunity for others to pounce on the course vacancies arising, though some training output was lost at the RSME. While these losses will cause some adjustment within ATRA, RE MCM Div is confident that, at the individual level, no soldier has been, or will be, disadvan-

taged. Everyone will still have the opportunity to qualify for promotion by the time they zone in for consideration, or at the very least, before the end of the promotion year in which they have been selected.

Direct Entry Officers. We should not be complacent about our ability to retain our high quality and experienced officers; however, we appear to be returning to more predictable levels of PVR which this year has been the lowest since FY 99/00. Officers now benefit from a Formal Career Review on promotion to Major (FCR1) and to Lieutenant Colonel (FCR2).

Group B Rules Changes. I wish to give my Specialist Officers (SO) wider employability and allow RE MCM greater flexibility in manning the Corps. I also recognize that many SOs wish to be more closely aligned with their mainstream counterparts in order to exploit wider employment and promotion opportunities. My staff are therfore staffing a proposal to grade all RE majors for promotion to lieutenant colonel together, thereby removing the old Group B Rules for the promotion and employment of SOs.

Late Entry Officers. LE officers continue to make a significant contribution to the Corps, both in traditional employments and, increasingly, in hitherto "mainstream" posts. The LE career structure continues to evolve and will be enhanced, in time, with a number of new initiatives. Some LE officers will have the opportunity to attend the new ICSC and the very best may find it advantageous to seek to convert to DE terms of service. Having done so, the most capable might be able to compete, at the end of their careers, for promotion to full colonel.

Individual Training

In last year's report I explained that, following my presentation to a 1* training tribunal, the requirement for multi-skilled Sappers was accepted by the LAND Individual Training Board. This requirement has been reinforced in recent operations, particularly in Afghanistan and Iraq, where the ability of engineer units to switch quickly from combat operations to infrastructure and humanitarian support tasks has been necessary and efficient. The operational flexibility provided by multi-skilling is the envy of US Forces and others, and has been commended in post op reports. As a result pressure on our multi-skilling policy has receded. However we must continue to examine opportunities for reducing costs of training and ensure that all our training is justifiable against operational needs. In line with Army direction, we are seeking to link training outputs to Mission Essential Task Lists wherever possible. RETDT are taking this detailed work forward alongside their other tasks.

Operational commitments, particularly in Iraq, have affected the number of soldiers available to attend career courses. Individual priorities have been well managed by units and REMCM Div and although some soldiers' attendance on courses have been delayed, the impacts on individual soldier's careers are manageable. REMCM Div will manage any exceptions identified.

The RSME Main Effort (in common with the rest of the ATRA) remains to meet the Army's requirements for trained recruits (Phase 2 training). Last year's very successful recruiting has improved throughput and RSME forecasts output of 94 per cent of the Statement of Training Requirement (SOTR) for Phase 2 courses in 2003/04. For Phase 3 training, which has been affected by operational commitments, RSME forecasts output of 80 per cent of SOTR this year.

The success of RE Recruiting over the past 18 months has delivered record numbers of trainees through Minley. The ability of Chatham to expand its trade training output to cope with this surge is limited and the numbers of Soldiers Awaiting Trade Training (SATT) has risen to historically high levels. ATRA and RSME are now looking at how numbers can be reduced, by both increased output (where feasible) and control of recruit inflow. Adult recruiting into Phase 1 courses (excluding certain trades) is currently being restricted but Junior Entry is not affected. Recruiting restrictions are undesirable at a time of continued Corps undermanning, and I hope to persuade DG ATR to turn the recruiting tap back on quickly to prevent long term damage to Corps recruiting.

The impetus for change across the Army continues unabated. Below are updates on a number of key initiatives:

- RSME PPP. Following a detailed evaluation of Best & Final Offers (BAFO) the RSME PPP Project Board was able to recommend a Preferred Bidder and the decision to select the Holdfast Consortium was made public by ministers in Feb 03. However, at the time of writing the issue of affordability has yet to be resolved. Owing to the size of the financial commitment, an average of £60 million annually for 30 years, decisions on priorities are required at the

highest level of the Department. The PPP has the full support of AG and he recently briefed ECAB on the project; the ensuing timetable will depend upon its recommendations. The PPP remains value for money and is recognized as the best way to guarantee the delivery of trained manpower to the Corps and the Army.

- **Defence Training Review (DTR).** In discussions with industry a "convergence" phase has been completed, resulting in "packaging" of the training outputs into two or possibly three packages. Suitable bidders have been identified and, assuming Ministerial endorsement is provided, an ITN will be issued by the DTR IPT to Industry by January 2004. Defence Training Establishments are being set up, initially as "virtual" and then as "federated" Schools under existing training agencies. The largest of these is the Defence College of Logistics, which will include the Defence Explosives, Munitions and Search School (DEMSS). DEMSS will take on the delivery of training currently provided by DEODS, NSC and the Army School of Ammunition.
- **Non Commissioned Engagement and Careers Study (NECSt).** ECAB has endorsed the direction of this Study, which will lead to introducing a new Variable Engagement (VENG) to replace current Notice Engagements. Revised terms of service are unlikely to be widely introduced until 2008 but will offer flexibility for the Army to offer extended service of up to 37 years for soldiers in some career streams where this is considered desirable. Arms and Service Directors will have flexibility to determine the most appropriate approach for their Corps structures.
- **Command Leadership and Management (CLM) Training.** The Army has issued guidance on the new requirements for CLM training for soldiers on promotion to JNCO, SNCO and Warrant Officer. Current EFP courses will be replaced by CLM courses in education Centres wef 1 Jan 04. Arms and Service command courses must include mandatory training elements wef 1 Apr 04. The Junior Command Course and RE SNCO course will be adjusted to include the new requirements, and a new three day RE Warrant Officer CLM course will be introduced from 2004.

DOCTRINE

ENGR 2 has increased in size with the setting up of a Force Protection Engineering cell consisting of an SO2 and a warrant officer. The branch continues to ensure that appropriate engineer input is provided to assist with the development of Army, joint and multinational doctrine in order that our capabilities are understood and represented at all levels. This has been a significantly busy period in terms of emerging concepts and doctrine, and the key areas of work are as follows:

- **Future Army Structures (FAS).** FAS work continues to examine force structures in accordance with revised DPAs and Defence Strategic Guidance 03, the outcome of which will doubtless affect both Regular and Territorial elements of the Corps to some degree.
- **Future Land Operational Concept (FLOC).** A Manoeuvre Support sub-concept is being developed which will support the higher level FLOC paper and at the same time provide a coherent linkage to other Royal Engineer doctrine, which will flow from it.
- **Future Rapid Effects System (FRES).** Work continues in order to develop a FRES CONEMP which is coherent with FLOC and FAS and which will deliver an agile effects based medium force, which will contain appropriate levels of engineer support.
- **Army 2020.** FLOC points the way to Army 2020 and Part 1 of this study has already been endorsed by ECAB, establishing a pan Army view. Part 2 is described as "Defining the Route Map" to Army 2020 and a wide range of options across the LODs are being considered. Part 2 will be taken by ECAB in early 04, mindful of FAS, FLOC and the Defence White Paper due in Oct 03.
- **NATO Engineer Doctrine.** Development of NATO Engineer doctrine has continued with the most significant development being the ratification of AJP3.12 "Joint Engineering" by the UK "with reservations". Additionally, as custodian of ATP52A the tactical level doctrine publication, the UK (Engr 2) are charged with carrying out a complete rewrite which is ongoing.
- **Force Protection Engineering Steering Group and Conference.** The terms of reference for the Defence Force Protection (FP) Engineering Steering Group (DFPESG) have been agreed by DCDS(C). The underlying principles are balance, co-ordination and flexibility. Threat and risk will be balanced to provide a flexible response and fully integrated system. A Defence FP Engineer Conference was held at RSME Chatham on 23 and 24 October 2003.

EQUIPMENT

CLOSELY linked to doctrinal work is my role as Second Customer dealing with user aspects of new equipment. There have been major successes over the past year.

Mobility Support. The TITAN and TROJAN programme is progressing well towards its 2006 ISD and the first prototypes are undergoing contractor development trials at RETDU Bovington. They are based upon an upgraded CR2 and will have many capabilities to which the rest of the CR2 fleet aspire. The Breaching and Dozing Capability (BaDC) programme is looking at a replacement for some of the in-service mine-ploughs and UDKs. Though it is running in paral-

lel with TITAN and TROJAN, it is intended to bring some capability in early. With the MINDER programme now stopped the Countermine capability needs in the future will be met by the Dismounted Countermine Capability (DCMC) ISD 2007, the Mounted Countermine Capability (MCMC) ISD 2007+, and the Recce Countermine Capability (RCMC) ISD 2013+. Python will be remounted on AVRE Trailers (2 Python per trailer) and will be called HYDRA and the Future Major Minefield Breaching System (FMBS) will replace Python in 2011. In addition BOOMSLANG, ISD tbc, intends to replace the NOBLES APers minefield breaching system, recently deployed on Op *Telic*.

Bridging. The Air Portable Ferry Bridge (APFB) system will enable light and medium forces to deploy an airportable/air droppable 14m bridge, an air transportable 28m bridge, and a RO/RO ferry, all at MLC 35. It is carried on DROPS but the basic 14m bridge can be towed on special to role trailers behind light vehicles. The Two Span Bridge (Pontoon) (TSB(P)) has an ISD of early next year. It will allow a 62m crossing at MLC 80(T) and MLC 110(W). It is moved on 4 DROPS from which it is launched and constructed by a team of 12 men.

Counter Mobility. Turning to look at counter mobility the story is not so positive. The Area Defence Weapon programme has been stopped which means the only Atk mines in service beyond 2008 will be SHIELDER and Barmine (which will be run on passed its original out of service date). The new Future Counter Mobility System (FCMS) programme will plug any capability gap by 2011.

General Manoeuvre. The Corps' requirements for special to role and general purpose armoured vehicles has been embedded in the Future Rapid Effect System (FRES) programme to provide a Rapid Intervention and Manoeuvre Support capability. The requirement now includes FRES AVRE, FRES AVLB, FRES Armoured Engineer Tractor (AET) and FRES Remotely Delivered Mine System (RDMS) with an ISD 2013+, though it should be noted that these vehicles are not currently funded.

The Future Command and Liaison Vehicle (FCLV), ISD 2007, will provide armoured and mechanised units with wheeled armoured vehicles for roles such as Tp CVs, Tp Recce, SSMs and Rebros.

C Veh PFI. The IAB and Min DP have approved the recommendations made by the MGBC to adopt a PFI solution for provision of the C Vehicle capability and select a preferred bidder. At the time of going to press, Treasury endorsement and a formal ministerial announcement had not been made.

C Veh Procurement. Following the recent purchase of the new JCB LWT Fleet, conventional C Veh procurement has virtually ceased. An asset programme is part of the C Veh PFI programme, new cranes and MHE will be the first equipments to arrive under the service, with capabilities such as quarry equipment and tipper trucks to follow.

Operational Accommodation. The Concept of Use paper is being rewritten in light of recent operational experience. It is expected to show that key shortfalls remain in hygiene and ability to provide skeleton camps for use in early periods of an operation, including TRCs and Concentration Areas. TDA was procured under UOR arrangements for Op *Telic*; however, Main Gate approval will be sought in Mar 04.

Deployable Engineer Workshop System (DEWS). The SRD for the DEWS has been issued for comment after which the ITN to industry will be released. The requirement has been loosely based on the 15 Fd Sp Sqn deployable workshop, which has proved a great success on operations; however, the new system will be significantly enhanced and more capable. ISD is presently Oct 2006, and there is currently funding for three systems.

Water. Advances in Water Technology will include: The Water Packaging Plant (WPP) ISD 2007; Replacement for WPU(NBC) which will tie in with the OSD 2012; The new lightweight and heavy Drill Rigs which are with 521 STRE and are experiencing some teething problems; and WPU (Small Groups) which is an All Arms equipment designed to support company sized deployments. Issued early for Op *Telic* and worked well, ISD end of 2003.

FEPS. Mobile electrical power in the 8 to 40 Kw range is presently provided by a range of generators manufactured by a variety of companies, of differing ages and quality. The FEPS project replaces these with a single generator fleet of 3 variants, covering the 8/12 Kw, 16/24 Kw and 40 Kw range, providing electrical power to the three services.

Digitization. The term Command and Battlespace Management (Land) is now used in preference to Digitization Stage 2 (DS2) as it is

accepted that digitization will be an ongoing and incremental process. 26 Engr Regt will be the first engineer unit to convert in Jan 04.

MAKEFAST. MAKEFAST is the engineer element of digitization. It will provide tools to support the recce, design, resourcing and C2 of engineer tasks in order to improve mobility, counter mobility, survivability and sustainability support to the Joint Force. It will be used by RAC support troopers, infantry assault pioneers and RLC pioneers as well as by Royal Engineers across the spectrum of conflict and in all phases of operation. Importantly, its funding line has been re-profiled providing it with a more realistic amount of money (£5.5M). The timeframe is: Down-select to one contractor (Logica or Thales) Nov 03; Manufacture Phase Dec 03 – Sep 05; Fielding Apr – Jun 06 probably to 22 Engr Regt.

Regimental Affairs

Corps Charities. Two initiatives have had a significant effect on our charities. In Sep 02, we decided to join the Army Common Investment Fund. I am pleased to report that, up until Sep 03, our funds have increased by 7 – 9 per cent including a cash dividend of approximately 2.5 per cent. It continues to outperform its benchmark and I am encouraged by the fact that others have joined the Fund including the Royal Navy Benevolent Fund and SSAFA. Secondly, we were the first Army charity to be reviewed by the Charity Commission. Their Report, issued at the end of last year, is positive and quoted many examples of best practice. All outstanding recommendations have been implemented and I am confident that our charities are in a healthy state.

The Institution. We now have 43 new Honorary or Honorary Associate Members including the local Members of Parliament of all UK regular units and independent squadrons. It remains important to nurture these important local contacts; we have a good story to tell! The Museum has had another good year. It held a most successful Zulu event with over 1400 visitors including two royal Zulu princes. The Endowment Fund continues to grow and income is holding up. I am grateful to all those who continue to contribute in kind or through donations. I must also mention the Foundation who have agreed to fund improvements to the entrance area which are under way as I write.

RE Band. This year has been an unusually busy year for the Band. After they had completed a 3 month tour in Cyprus at the end of last year, they found themselves on Operation *Telic* along with much of the Corps! They were affiliated to 16 Close Support Medical Regiment with 16 Air Assault Brigade. There is a rumour that they were exchanging busbies for red berets much to the chagrin of the Parachute Regiment Band! They performed magnificently and proved that their military talents are as highly regarded as their musicianship. There was much praise of the latter following their September tour to Germany and they are now back in to the normal busy round of engagements.

RE Association. The REA continues to provide support to both serving and retired sappers, their spouses or widows and their dependent children who are suffering severe financial distress. Last year the number of cases the REA assisted was approximately 1,200 at a cost of £460,000. About two thirds of this comes from the serving soldier who through his generosity is helping those who are experiencing hard times. I am immensely grateful to those who have chosen to bequeath donations to the Association; these topped £150,000 last year. I must also thank SSAFA and the Royal British Legion case workers who work selflessly on behalf the needy. As expected, there is evidence this year that the number of cases is falling but the cost of individual grants is increasing. Apart from benevolence, Veteran's Weekends and Family Events around the UK continue to be a success; they are much enjoyed by all who attend. I know Association members appreciate the efforts of those units who are involved in helping to organize such events.

Adventure Training. Despite an initial lull due to operations, financial assistance was provided to 344 RE officers and soldiers taking part in 37 level 3 adventurous training expeditions or challenging pursuits by the end of Sep 03. The expeditions mounted included: diving in Chile, Africa, Australia, Belize, Malta, Gibraltar, Gran Canaria and the Red Sea; caving in Mexico; parachuting in the USA and the Czech Republic; skiing in France, Austria and Sweden; mountaineering in Alaska and Italy; sailing off Denmark and Gibraltar; and trekking in Peru and South Africa.

Corps Sport. There is no doubt that Op *Telic* reduced the availability of individuals and impacted on the strength of Corps and unit

teams, but we managed a presence in virtually every Army and Inter-Corps competition. In cricket the Corps comprehensively defeated the Gunners in the first ever three day fixture between the sides, the game was extended by a day to ensure a result – and finished at the end of day two, a fitting end to the involvement of SSgt Bunn, the team skipper, who has been a Corps player since 1982 but leaves before the 2004 season. In unit level cricket 42 Svy Engr Regt finished runners up in the Army minor units final.

The Army Triathlon Championships were held at Bournemouth and 42 Svy Engr Regt won the minor units title with 3 RSME Regt finishing 3rd in the Major Units, individually Capt Katie Hislop was 2nd in the Women's event and Cpl Westoby 3rd in the Men's championship. Lt Col Martyn Allen won the Army Matchplay Golf title for the first time after several near misses; in winning he defeated another sapper, Cpl Taylor. Corps tennis has been particularly active, first in winning the Inter-Corps Winter league and second, in completing a very successful tour to South Africa. In the Devizes to Westminster canoe race we had a magnificent return, winning the Services Trophy, finishing 2nd in the Open event and providing the first Service finisher in Captain Richard Walker. The motor bike club was only formed in October 2002 but has made a very successful start both in competition and the numbers it has attracted. The membership of the RE Rowing Club is thriving with many very good novices prominent at the Army regatta in May and Spr Dancer representing the Combined Services and Army during the season. The Corps Rugby League team continues to be the backbone of the Army side and in Cpl Goddard we have the Combined Services Player of the Year. 1 RSME Regt won the Army Major Units title defeating SEME 38-4 but in the Champions Cup on 2 Oct against the Germany champions, the Duke of Wellington's, lost in a hard fought final by only two points. Corps Boxing is at the crossroads after a magnificent five years managed and coached by WO2 Chadwick. During this period the Corps produced individuals at National level and in high-profile charity boxing evenings at the London Hilton and similar venues. This "golden era" included an ABA title in 2000 for Cpl James but there is now an urgent need to identify a suitable successor to the worthy Mr Chadwick, as he shortly leaves the Corps.

Finally, after over 30 years involvement with Corps football, both as player and Senior Coach, Lt Col Mickey Doig has stepped down from the Committee. His contribution to Corps and Army football over this period has been immense.

Military Secretary Appointments, Honours and Awards. Major General P A Wall CBE was appointed Colonel Commandant Corps of Royal Electrical and Mechanical Engineers.

Military Secretary appointments of senior officers were: Major General J D Moore-Bick CBE became Special Defence Advisor Serbia and Montenegro in Nov 03, a newly created appointment. On promotion to Brigadier: Colonel C J Boag to be CRE Theatre Troops, Colonel B J Le Grys to be Chief Engineer ARRC, Colonel J D Wootton MBE to be Commandant RSME and Colonel A D Harking OBE to be Director Strategy of AFPAA.

Even before Op *Telic*, the past twelve months has seen an impressive number of honours and awards conferred on serving members of the Corps, including the award of CBE to Brigadier J W R Thorn and Brigadier T M Brown (formerly RE Postal), 2 OBE, 15 MBE, 3 QGM, 6 QCVS and 1 QCB. At the time of writing, the Op *Telic* Operational Honours List has just confirmed the award of a CMG to Brigadier A E Whitley, 1 CBE, 4 OBE, 8 MBE, 3 MC, 1 QGM, 4 MiD and 10 QCVS. Without considering the auspicious individual acts and contributions behind these awards, this represents over 16 per cent of the Army total and reflects the huge and continuing contribution made by the Corps to this operation.

Conclusion

2003 was an exceptionally busy year but I have no doubt that 2004 will present fresh challenges. The reorganization of the Army under Future Army Structures will dominate the lives of many serving in staff appointments and new operational deployments will be added to the list of current commitments. Officer and soldier recruiting are presently very strong but we must not relax our efforts in the face of strong competition from both within and outside the Services. One of our biggest challenges is to ensure that we continue to train our soldiers to the high standards and in the numbers required to sustain the Corps in the longer term.

Humanitarian Demining – How the Other Half Clear Mines

CAPTAIN J D WEBSTER BEng

The author was commissioned into the Corps in 1998 and served as a Troop Commander in 51 Fd Sqn (Airmobile). He was Recce Tp Comd at 38 Engr Regt and has visited all the usual locations: Northern Ireland, Kosovo, Kenya, Eritrea, Canada, Cyprus, Belgium, Germany and Poland. He is currently serving at the UK MITC in Minley, and led the RSME demining training team to Kenya this year.

Introduction

The RSME has been training the Kenyan Army in UN standard Humanitarian Demining techniques for the past two years as part of the Op *Hodari Sapper* project. This has enabled them to deploy up to Squadron sized formations on demining operations with the United Nations Mission in Ethiopia and Eritrea (UNMEE). This article is designed to give the reader an insight into how the range of NGOs, military units and commercial organizations conduct mine clearance, and draw some possible lessons for future operations.

UN Humanitarian Mine Action

UN mine action is all activities that aim to reduce the social, economic and environmental impact of mines and UXO. This comprises of five complimentary groups of activities:

- Mine Risk Education (MRE) known also as Mines Awareness.
- Humanitarian Demining (HD).
- Victim assistance, including work programmes.
- Stockpile destruction.
- Advocacy against the use of anti-personnel mines.

This article will primarily look at Humanitarian Demining, and the planning stages for this work.

Mine Action Assessment

Planning for mine action requires accurate and timely information on the form, scale and impact of the threat posed by mines, UXO and other explosive hazards. Typically this will be collected by means of a Landmine Impact Survey (LIS) that usually takes about a year to complete. This will establish the extent and specific areas of contamination, for example: the Americans dropped over twice the tonnage of ordnance on Vietnam as the Allies did on the European Axis powers during the Second World War, however it was only dropped on about 25 per cent of the landmass.

Information is gathered from local people, former warring factions, released bombing data and NGOs, and combined to form a comprehensive picture of the problem. This is stored on a specially designed database in each country known as the Information Management System for Mine Action (IMSMA). This system also allows accurate mine maps to be produced from entire country sheets down to 1:50,000 scale pages, as well as providing data on types of ordnance, minefield patterns and injuries to deminers.

This process was previously known as Level 1 survey, and allows mapping to be produced with danger circles marking areas of suspected mine

and UXO threat. No actual verification or marking takes place on the ground at this stage.

Technical Survey

The aim of technical survey is to confirm the perimeter and content of a contaminated piece of land, and where appropriate restrict access by fencing. The aim is to reduce the danger area from a grid square to the actual minefield, which may only be a football pitch sized piece of land. This work is conducted by survey teams with prior demining experience, who will produce a minefield record similar to the military AFW 4017, with reference points and markers for teams to use in future clearance operations.

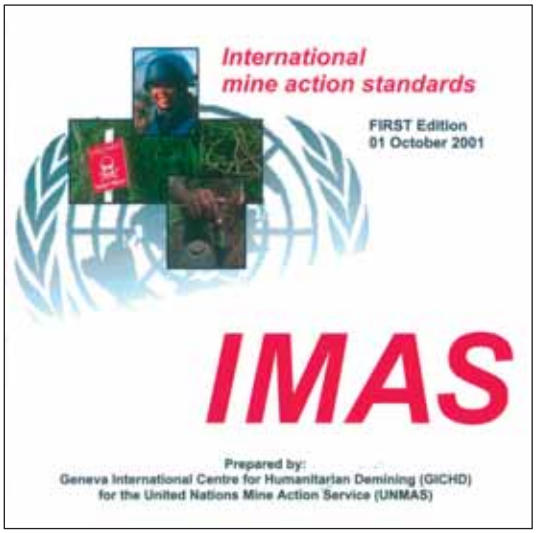
Technical survey has also been known in the past as Level 2 survey, and may involve some small amount of clearance work before fencing is complete. The marking of minefields is problematic as fencing stores are often removed by local people for alternative usage. Other forms of marking such as painted rocks are sometimes used to ensure some form of marker remains, therefore reducing injuries. This also prevents the creep of minefields whereby they get progressively larger due to the uncertainty of the boundary and caution of successive marking teams.

There are increasing legal implications of fencing dangerous areas and conducting MRE. The ongoing "Orahovac Case" in Bosnia involves the prosecution of the Director of the Federal Demining Centre in Sarajevo for the deaths of three children in April 2000 to a minestrike. The prosecution claims it was his duty to ensure fencing of the area, whilst the defence argues that it had been fenced several times but the materials had been repeatedly stolen.

The reduction of large areas of suspected land can be undertaken by mechanical assets or dogs until a mine is actually discovered. This is a rapid method of determining the extent of contamination in an area. The distinction between what is termed "Area Reduction" and technical survey is not always clear, as they are a similar process.

Basic Clearance Principles

The aim of HD is to make sure that land is 100 per cent safe of all mines and explosive remnants of war, so that it can be responsibly handed back to the people. To ensure this, most NGOs and demining contractors clear all metal to a specified depth, usually 200mm. This is then quality assured by another organization before being released to the local community.



IMAS: The UN demining SOPs.

The local people are briefed on the danger and the clearance operation to ensure they have an understanding of the process. This avoids not only the risk of injuries, but also the suspicion created by fencing off large areas of local land. Community liaison is an essential part of the process, before, during and after demining, and is usually combined with MRE work.

To ensure that standardized safe clearance procedures are being used, the UN has its own set of demining SOPs known as the International Mine Action Standards (IMAS). These have become the benchmark for all mine clearance activities amongst the demining community. These were also used as the basis of the RSME training of Kenyan Army deminers during the *Hodari Sapper* training courses.

Deminers often talk of the "toolkit" approach to mine clearance, which consists of combining the three main elements: manual demining, mine detection dogs and mechanical systems.

Manual Demining

Manual demining is based around the use of a metal detector, with prodders and other tools used to excavate and verify a mine or UXO. Deminers work in 1m wide lanes, safely spaced apart from each other depending on the mine threat. Using the metal detector, any metal reading is investigated with a prodder and then excavated, and if simply scrap metal then removed

Manual Demining – Demonstrating the 1m wide clearance lanes.

Mine Detection Dogs – Undertaking quality control and area reduction tasks.

from site. The sides of the lane are marked with posts every 1m to indicate cleared areas from dangerous. If a mine or UXO is uncovered then it is left in situ and the lane closed off until the end of the working day when all items are blown in place before work ceases. The seats of mine explosions are later marked to ascertain emerging minefield pattern

Most demining takes place in the kneeling position, and deminers wear protective visors and suits with insert plates on the chest and groin. Due to the quantity of metallic soils worldwide, most deminers will have ground-compensating detectors that can be set to ignore the background clutter in the ground and simply pick up metal abnormalities. Every group of deminers (6-10) will have a supervisor who will check all daily work by detector as an initial quality control measure.

Most landmines and UXO are cleared by manual teams, as it is the most effective method of clearance. It is relatively simple to train deminers (typically five weeks) and little academic qualifications are required. Where local labour costs are low, this is both an economic method of clearance and ensures wages are being pushed into the local community.

Mine Detection Dogs

Mine detection dogs, also known as Explosive Detection Dogs (EDDs), can be used as the main detector tool on clearance operations, utilising the dogs ability to smell low concentrations of vapours. Humans can detect one contaminant part in ten thousand (1 in 10^4) whereas dogs can detect 1 in 10^{15} or less. The dog indicates the presence of a mine to the handler, who then hands the task over to a deminer. The use of dogs to detect mines began during the Second World War, but has become extremely effective during the last ten years. Today there are an estimated 750 dogs being used in HD projects in 23 countries (about half are in Afghanistan and Iraq).

Dogs are trained to detect specific vapours such as TNT variants, and are an effective method of covering large amounts of ground, such as route clearances in a low threat area. They can detect mines with little or no metal content, and are not distracted by other metal contamination in the soil that slow down manual teams with metal detectors. Dogs can also be trained to recognize tripwires, not as a routine detector, but to provide additional safety to the handler and animal whilst working in minefields.

Unfortunately they are not 100 per cent accurate, having difficulty when mines are close together and the scent merges, and can occasionally be distracted by food and other dogs. Much depends on the skill of the handler, but improved training techniques have led to significant capability increases in recent years. Dogs are an effective part of the “toolkit” but take time to train and can have cultural implications in communities where canines are disliked.

Mechanical Clearance

An ever increasing number of commercial companies are designing mechanical equipment for mine clearance work. These are typically variations on military types such as rollers and flails. Some are purpose built vehicles such as the Aardvark used by the Corps, and some are attachments placed on conventional plant equipment, so that it can also be used for construction work elsewhere.

All systems involving chains being rotated on either a shaft or drum are flails. These are divided into three categories: mini flails (up to

Mechanical Clearance Equipment – Large purpose built flails.

5t) midi flails (5-20t) and heavy flails (20t +). Systems with a large drum fixed with metal teeth or spikes are known as tillers. Most forms of flails and tillers are limited by their ability to only absorb multiple Anti Personnel (AP) mine blasts, and must be withdrawn from an area after contact with an Anti Tank (AT) mine.

Other systems have been designed that either sift or crush soil to process it, and separate mines out for detonation at a later date. Successful work was done in Kabul by NGOs with cranes and plant equipment to excavate collapsed building rubble that might contain mines, now buried at some depth. This was sifted or laid out so that a manual deminer could check it with a metal detector afterwards. This was a good example of elements of the "toolkit" being combined for a specific scenario.

Unfortunately machines achieve variable clearance rates, and are expensive to maintain, particularly in developing countries. They are limited by terrain and the incline of the ground, with most new designs demonstrated on flat agricultural land. Therefore they are mainly used to reduce the risk to subsequent manual deminers, by covering an area first to remove tripwires, some AP mines and clear vegetation. Often mechanical assets are used to locate the extent of the mined area, as part of area reduction work, before allowing manual deminers to proceed.

Other Available Technologies

Ground Penetrating Radar (GPR) consists of a pulse that is sent into the ground, and reflected at different speeds depending on what it has contacted. Its ability to detect buried objects whether metal or plastic makes it suitable for minimum metal mines. Their costs are high, and can give false alarms depending on soil humidity, but are very effective when combined with metal detectors. This is seen as a potential development area that can produce viable technology to aid mine clearance.

Infrared detectors were trialed to detect small areas of temperature variations, which would indicate buried objects. However it is currently difficult to gain the resolution good enough to detect small mines, so it is still in the development stage and will potentially only be used for AT mines.

Remote Explosive Scent Tracing (REST) involves the gathering of vapour onto filters that can then be analysed later. Samples are collected and checked by dogs or detection equipment at a base location. Positive results indicate a patch of land or stretch of roadside for further investigation by deminers. Rats are also being used for testing with some success, and are marketed as a future alternative to dogs for REST work.

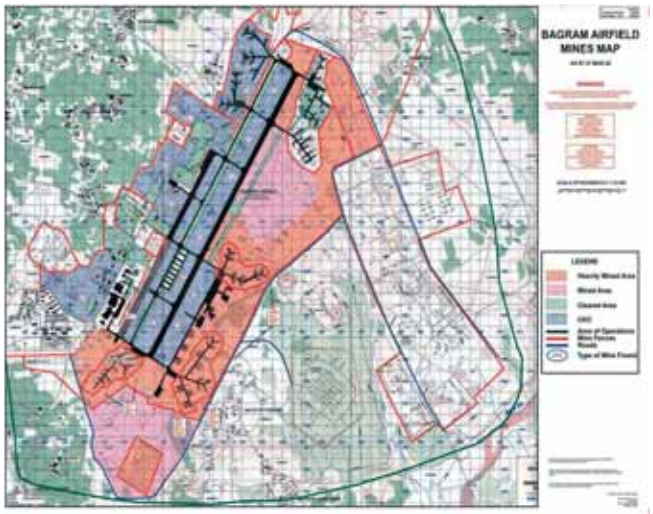
Quality Assurance

The quality of work is maintained by a two-stage approach. Firstly all demining organisations are accredited and monitored by the relevant country UN Mine Action Centre (MAC). Secondly after a clearance task is completed another organisation will conduct sample checks of the land to ensure it is metal free, on behalf of the UN MAC. Only after this quality control check will land be released to the local people, with an acceptable level of confidence that it is clear. Local people are informed that the area has been cleared, but that some low level of risk will always remain.

Relevance to the Corps

As operations increasingly become expeditionary affairs, the Corps is often required to conduct some form of area clearance to allow construction of bases to begin. Frequently these are former warring faction facilities such as airfields and barracks, previously defended by mines of various types (Bagram Airfield, VJ Barracks).

Currently when these facilities are handed over as



Future British Bases? Bagram Airfield: Note that the red and pink areas are mined, and the blue contains UXO.

British Troops leave the country, they often require the UN to task an organization to clear them again before they can be handed on to local people responsibly. Figure 1 shows a scale on which Combat Engineer Breaching is at one end and HD at the other. Currently what we are doing is somewhere in the middle, finding a balance between speed, risk and protection of our soldiers, against the operational requirement.

This raises several questions, but the few that will be highlighted are these: Are we providing enough training and protective equipment for our soldiers, particularly in the Warfighting/PSO dilemma of most mine clearance operations? Are we causing a duplication of clearance efforts for the UN? What are the legal implications of a minestrike in an area cleared previously by British soldiers?

There is still some confusion over the exact definition of warfighting that will allow Combat Engineers to conduct clearance of mines and UXO. The "EOD only" approach to clearance has resulted in a training gap for the remainder of the Corps in dealing with basic mines and pieces of UXO. The "EOD only" approach begins to become strained when a sizeable formation is deployed and those scarce assets quickly become swamped with tasking orders. This has been reflected in most unit post Op *Telic* reports.

Demining organizations, both commercial and civilian, have tackled this issue by teaching ammunition recognition to all personnel in some detail. Deminers can then clear all types of mines, grenades, rifle grenades and mortar bombs up to a set limit (usually 84mm) by blowing the item in situ. All other types and sizes must be referred to a specialist EOD team, as are items that need moving. They avoid casualties by training deminers to recognise their limits, and practice the disposal of those basic types.

The detail of UXO clearance is given in ME Vol 2, Pam 6, Breaching Minefields and Other Explosive Obstacles. However a Combat Engineer does not dispose of a grenade or mortar bomb in training, and this has led to skill fade. The addition of grenades and mortar bombs for disposal on demolition range days in training would significantly improve Combat Engineer skills. Area clearance serials using real munitions on exercise, such as during the special-to-arm training at BATUS, could reinforce this.

The Corps does not conduct HD at present but retains the ability to train personnel to do so if required. The French have a HD Training Centre (CNDH) as part of their Engineer School. It uses IMAS as the basis of training, and has trained Troop sized groups. The Americans train Special Forces personnel in HD techniques so that they can subsequently set up indigenous demining programmes overseas. The RSME is one of the only military engineering schools worldwide, to have taught HD using IMAS, to sub-unit sized groups.

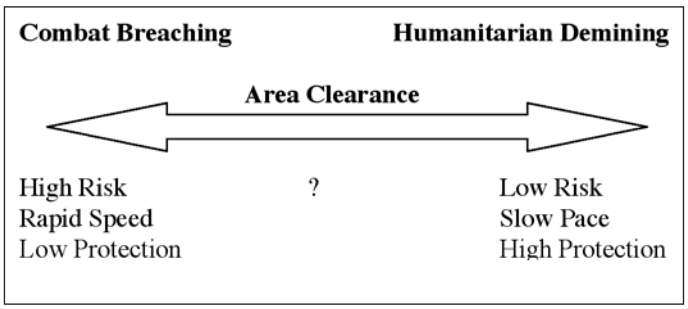


Figure 1 – Differences between Combat Breaching and HD; Area Clearance is somewhere between the two.

Over the last twenty years mine action has become increasingly political, and it is a rare operation when Royal Engineers are not asked to provide some form of Mines Awareness/MRE to local people. The *Hodari Sapper* HD training teams provided by the RSME are funded through the Department for International Development (DFID), which poses the question of whether MRE and HD may become increasingly common tasks for the Corps over the next twenty years?

Lastly, as part of the Ottawa treaty a state undertakes to clear all mines in its territory within a set timeframe, usually ten years. Consider then the issue of the estimated 25,000 mines in 117 minefields in the Falkland Islands awaiting a technology leap to allow clearance to take place.

Conclusions

HUMANITARIAN Demining is big business, and is being conducted in most countries where the British Army is currently deployed on operations. This article should have helped to raise awareness of how mine clearance is being conducted outside of military circles. For any further information please contact the UK MITC on (9)4261 3623.

Disaster on Project Mercury

MAJOR GENERAL EDWARD FURSDON CB MBE DLITT

General Fursdon enlisted as a Sapper in 1942, attended Birmingham RE University Short Course and was commissioned in 1945. He served with the West African Engineers as a Tp Comd in India, Burma and The Gold Coast: thereafter in UK, Singapore, Canal Zone and Cyprus as Adjt 35 Engr Regt; Op Musketeer *Port Said 1956; Kenya Op* Vantage *Kuwait 1961 as OC 34 Indep Fd Sqn; Borneo; UK as 2i/c 38 Engr Regt; BAOR as CO 25 Engr Regt; COS/Dep Comd Land Forces Gulf; HQ BA0R; Service Fellow Aberdeen University, MOD Director Defence Policy (Europe & NATO), MOD Director Military Assistance Overseas and finally Senior British Officer Rhodesia/Zimbabwe. In 1980 he became The Daily Telegraph Defence Correspondent, later joining the defence magazine world. He was lucky enough to have covered events in NATO; Africa; the Near, Middle and Far East; The Falklands and South Georgia; The Iraq/Iran War; the Contras in Honduras; Northern Russia; The Gulf; Bosnia and Kosovo.*

FIFTEEN miles to the west of Nairobi stand the Ngong Hills. A small isolated group, they rise sharply to a crest of a little over 8,000 feet and separate the dry wild Masai plain to the west, with its tribal herds and wild animals, from the sophisticated residential suburbs of the city where trim green lawns, bourgainvillea hedges and cocktails on the verandah symbolize Nairobi suburban life.

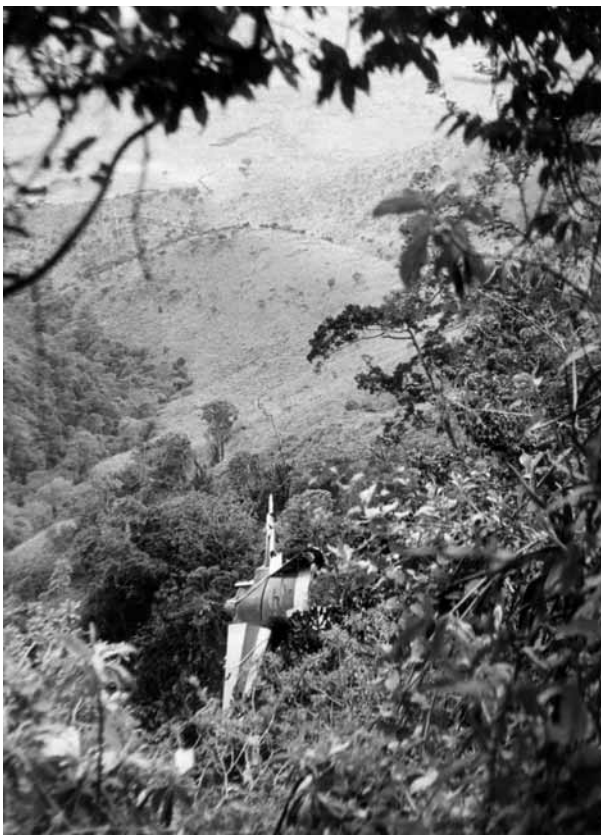
On May 19th 1962, at 11.30am, a United States Air Force C130 Hercules flying a support mission for the National Aeronautics Space Administration's *"Project Mercury",* was approaching the Ngong Hills from the west on a let-down circuit for Nairobi Airport. Low cloud and mist obscured the hills themselves, though the airport and surrounding plain were clear. Suddenly disaster struck the morning air, for the Hercules crashed into a narrow ravine on the Masai side, 500 feet below the crestline. The local RAF Rescue Team from the nearby Eastleigh base sprung into action immediately, assisted by the local police. A USAF Investigation Team from France was flown in the same day. Slowly but thoroughly both Air Force teams started work at once on their grim tasks of searching for, digging out and identifying the mutilated remains of men and aircraft, and of trying to establish the reason for the disaster. Initially there was some doubt as to how many men were aboard, but eventually, not without great difficulty, all save one of the dead men were accounted for. The nose, wings and engines of the plane lay askew, smashed and dismembered amongst the black earth and scarred trees: the rear part of the fuselage and the tail section were still reasonably intact, however, but projected awkwardly and unnaturally up into the air.

At 10 o'clock on Monday May 21st the telephone rang in the OC's office of 34 Independent Field Squadron stationed at Gilgil, eighty miles north of Nairobi. Could he take on a demolition task for the USAF at once, to try and locate parts of a missing body? He was to report to HQ East Africa Command in Nairobi in two hours time for further information. After giving a rapid initial briefing and warning order to No 3 Field Troop Commander (Lieutenant Chris Lloyd), he drove off southwards at high speed. All he found at Command HQ was a message to report at once to the USAF Investigation Team HQ at Ngong Police Station.

Arriving there at 1 o'clock he was told the extent of his problem. Firstly he was to blast away the nose, wings and fuselage of the Hercules, but without disrupting the ground, in order to try and reveal any clue to the one body still missing. Secondly, he had to disintegrate the fuselage and tail, which were at that moment

precariously balanced in a near vertical position, in such a way the they presented no possible future danger of toppling over on or injuring any of the local tribesmen, who in due course were bound to climb up from the Plains and salvage anything of value. Thirdly, for security reasons, he had to locate and destroy all the aircraft's four engines, plus the one spare being carried in the fuselage.

The OC soon left the Police Station with the OIC RAF Rescue Team, and together they bumped and skidded their way up the rough jeep track that led near to the summit on the Nairobi side. They got out, but looking down over the wide sweep of the Masai plain below, there was no plane to be seen. The Flight Lieutenant then pointed to a rope, secured at ground level to the base of a tree stump, and which just dropped away below them out of sight. "It's down there", he said, "in a concave bit of the hillside, to steep below for us to see it from here".



The crashed USAF Hercules aircraft.
The photograph's copyright belongs to East African Newspapers Ltd, who in May 1962 gave Maj Gen Fursdon permission for its use.

Hand over hand the OC gingerly descended the rope, breaking often to searching for footholds in the long slippery grass and rocky earth face that led 500 feet down to the crashed aircraft. It was lodged in a concave recession in the hillside, near the head of a small ravine. The ground was so steep that moving about without a rope or holding onto a tree was difficult, and the air was heavy with the familiar stench peculiar to air disasters. As he crawled in and around the wreckage, the OC quickly realized that he had a a peculiar problem not only in the demolition technique to be adopted, but in getting all the required explosives and equipment to the actual work site. Slowly he hauled himself up to the summit again, lagging well behind the bounding chamois-like steps of the OC RAF Mountain Rescue Team. Back at the Ngong Police Station he telephoned Lieutenant Lloyd regarding stores and equipment, and then arranged for a special release of explosives from Command Headquarters. It was going to be a long day, so work was planned to start just after first light.

Next morning, after winding their ways hazardously up the jeep tracks through the early mist, the OC and the Troop met and unloaded the kit near the head of the rope. Every officer and man had brought an empty pack with him so that everything, including all the explosives and detonators, could be loaded manpack for the descent. Eventually, with the aid of the RAF team, all the stores were dumped near the Hercules, parked on ledges which those who had been first to descend had dug out of the hillside.

There were many tasks to do. One field section, under corporal Bond, worked away directly under the dangerously poised aircraft tail section, cutting away trees and bush which might otherwise interfere with and restrict its fall after explosive disintegration. A particular problem here was to select and leave a safe minimum of trees and stumps propping up what was left of the plane in its present awkward stance, to ensure its continued stability whilst work went on around it! On the other hand, such props were not to be too many, or individually too thick or solid that they could not be ultimately disinte-

grated by explosive charges at the same time as the aircraft was finally blown up. Another section team split open old condemned canvas fire hoses and filled them with four ounce sticks of plastic high explosive at a rate of two pounds weight per foot run. These hoses were then bound up together again with white tape to create huge explosive snakes. This special *ad hoc* snake technique was the only way to attack the high and wide protruding tail and fuselage sections; without them, the Hercules could never have been properly disintegrated in the quick single-phased operation demanded. The remainder of the Troop worked with crowbars and levers clearing small unstable plane and jungle debris from the main wreck area, sending it crashing down to a permanent safe resting place in a river bed far below.

When all the preparatory work was done, the snake and other charges had to be positioned and secured. This was difficult, because parts of the aircraft were in themselves unstable relative to each other, and any premature displacement would not only cause severe injury to anyone underneath, but would also upset the pattern of explosive forces around which the demolition plan had been designed.

Bulk charges were eased into those spider's webs of twisted metal which permitted of no more sophisticated method of attack. The engines, all having been located, were prepared with a continuous line charge along their length, plus a bonus small bulk charge inside the turbine vanes. After deciding the line on which the high level heavy snake charges were to run, the next stage was to throw a rope line over the aircraft to fall and follow the predetermined snake position. Then the rope's end was tied to the snake's head, and it was pulled slowly up and over into position. It was important that the snake did not undergo any sudden change of direction such as would break the explosive continuity of the many four ounce sticks of which it was made! The small protrusions standing proud from the skin of the tail, wings and main fuselage of the aircraft, together with their high angle and polish, made the whole operation a long and frustrating process! Once the snake was positioned exactly, it had to be tightly secured to the aircraft in order to achieve proper explosive contact with the part to be destroyed, and also to prevent physical slip. Finally the separate electrical and detonating cord ring main circuits were laid out to connect all the various bulk, snake, engine and fuselage tree prop felling charges together.

Where was the firing point to be? For the firing party to go downhill, having initiated the safety fuse, was dangerously impracticable on the steep hillside. To go uphill, and be dependent on climbing up a rope for the classic confident walking pace exit was obviously not very sensible either! The only solution was therefore to do a scramble to one side on approximately the same contour: luckily a small concave area of dead ground was found on the contour, but only forty yards away from the nearest charges!

At last, late in the afternoon, all the circuits were completed and tested. Everyone who was not in the firing party loaded tools and equipment no longer in use on to their backs, and wearily hauled themselves up the rope to the summit. Sentries were posted in all directions to prevent any stray tribesmen entering the danger area.

After a final check and electrical re-test the safety fuse was lit, and the OC's small party scrambled back along the slippery slope to the firing point where the alternative electrical firing means was located. After waiting a few seconds in the strangely still and silent hillside, looking out for almost thirty miles across the bush plains, the OC ordered the electric firing button to be pressed.

With a mighty roar 380 pounds of plastic explosive disintegrated the ill-fated Hercules into fragments. A great pall of smoke, flecked with pieces of aircraft, rose hundreds of feet to just short of the Ngong summit. Pieces of aircraft and engine fell like hail or floated down parachute-like according to their aerodynamic shape and weight. The steel-helmeted firing party were well in the fall out area but, although there were some near-misses, no-one was injured. The echoes and re-echoes from the small ravine flooded wave upon wave across the Masai Reserve like some ju-ju made thunder; then, suddenly – a terrifying silence.

The danger to the local tribesmen had been removed; the security men could relax about their secrets; but the poignancy returned afresh when the USAF Investigating Team descended from the summit to continue their grim work. The now open hillside revealed many further remains and pathetically detached possessions; for this alone, the most human aspect, the task had been more than worthwhile.

With the USAF officers and Kenya police now gone, the sappers were left alone to clear up the

site. In the shadow of the approaching twilight they gathered up their remaining tools and started to climb the rope. For everyone it had been a long long day, and footholds did not come as easily as they had done earlier in the day. Pieces of rock were carelessly loosed by tired feet, and crashed down the line of rope towards those below. A Corporal above the OC swung to one side after a warning shout from further up. The rock caught him on the kneecap, and momentarily losing consciousness and his grip, he started to slide downwards out of control until luckily a big tuft and a ledge stopped and saved him. Meanwhile the rock accelerated and grazed the OC's leg as he too swung to avoid its rocket like descent, before it plunged onward to the depths below.

Finally, casualty and all, everyone regained the summit and relaxed to tea and a hot meal, while the tropical darkness quickly enveloped the Ngong Hills, and a twinkling carpet of lights outlined the city of Nairobi away to the east.

After setting the Troop off for Gilgil, the OC headed back into Nairobi for, at the last moment before leaving the site, he had discovered another passport and some personal items. Feeling extremely dirty and very much out of place he bravely ventured into the dazzling smartness of the New Stanley Hotel, and handed over the bundle to the Investigation Team. Finally, with a crescendo roar, his landrover shot through the brightly lit suburbs and out into the black African night along the long dark road northwards – for home.

Torture? Me?

BY
M11

*"The charge is torture. And today, on a remote airfield somewhere in the wilds of Norway, thirty nameless men will speak up in defence of Britain". (*Daily Express *headline, 2 May 1974). I was one of those nameless men, identified only as M11.*

The Background

One reads about torture almost daily, but it is not something normally associated with Britain's armed forces, so how did we come to be accused? It all goes back to the middle of 1971 when, with the security situation in Northern Ireland deteriorating, the Northern Ireland Government decided to bring in "Internment". Though the IRA knew that internment was always a possibility and several of the most prominent members had fled south to the Republic in anticipation of possible arrest, the Army did not believe it would happen. Contrary to public opinion at the time, soldiers on the spot actually found the decision repugnant but, despite protests, were told to get on with it. Internment was basically a political decision.

Detailed planning for Operation *Demetrius* did not start until about 48hrs before it was intended to mount the operation. Orders were issued to arrest suspects, and lists of names and addresses were supplied by Special Branch. It was essential that there should be total surprise and because of a possible leakage of information the date of the operation was brought forward by one day, to Monday, 9 August 1971. There was little time to prepare orders, bring extra forces over from the mainland and establish Regional Holding Centres (RHCs).

Arrest squads were commanded by an officer, warrant officer or senior NCO and the aim was to make arrests as quickly and quietly as possible and to get detained persons away to the three RHCs, via unit collecting points. Detained persons were given sufficient time to dress before being taken out of their houses. Soldiers making the arrests were given written instructions detailing the exact words they were to use when making an arrest and were also told that no bonds were to be used, although where a person resisted arrest, handcuffs were permissible. Firmness with courtesy was the order of the day. With the order was another form which covered details of the arrest and any injuries the detainees might have suffered as a result.

Ballykinler Weekend Training Centre was used for one of the RHCs: Sappers quickly erected a barbed wire perimeter fence, huts were completely emptied, including anything such as stoves which could be broken up and used as makeshift weapons, and orders were given to Ordnance to provide stores on camp scales. Everything was arranged in such a hurry that it was not possible to provide everything that was necessary in advance of the first detainees arriving. However, a Medical Officer was present with instructions to examine each detainee on arrival and at any subsequent stage of his detention. Allegations were made later about ill treatment in helicopters used to move parties of detainees to the RHCs or onwards to detention in the Maidstone Depot Ship, moored alongside a quay in Belfast Docks, but these were probably due to unfamiliarity with helicopters. Everyone followed the standard army drills for boarding and leaving, though for safety reasons where there were a number to be moved detainees were handcuffed together. Any other complaints were of a very minor nature and were dealt with on the spot.

Reaction to internment was both swift and violent. In addition to violence on the streets, which was anticipated, there was a barrage of accusation and vilification in the republican press. What had not been foreseen was the extent of propaganda that had surely been prepared in advance. Soldiers read avidly, and with mounting astonishment, about all the atrocities they were accused of inflicting. One was heard to remark "I always wondered how they fitted those electrode things to people's b...s! Now I know". As nobody had access to any of the detainees at that time, the accusa-

tions could only have been pure invention. In reality, things had been very different. The vast majority of detainees had come quietly. There were comparatively few really hard core terrorists in those early days and many felt an element of relief that, for them, there would be no more fleeing, they would get three square meals a day and, when they were eventually released, they would be heroes to their local communities, not to mention the whole republican movement. As for interrogation, many could hardly be stopped from telling their stories but for the few hard core detainees some in-depth questioning was needed. This latter questioning was carried out at special centres prior to their being lodged in detention in Crumlin Jail on the 16 and 17 August.

The Charges

Complaints were received from 11 men who were subjected to deep interrogation and these subsequently formed the basis for allegations of torture. Complaints covered:

- Hooding
- Continuous Noise
- Enforced Posture on wall
- Sleep deprivation
- Bread and Water Diet

Resulting from these complaints, the Home Secretary set up what became known as the Compton Committee to make an impartial inquiry. Despite the fact that at that time many of our own forces, including cadets at Sandhurst, underwent deep interrogation as training to resist questioning in the event of capture in any future war, the Committee concluded that "physical ill-treatment" was inflicted, though it did not amount to "brutality". The Committee also investigated 40 individual complaints, though only one complainant came forward to substantiate his allegations, and concluded that in two cases there was a measure of ill-treatment.

In presenting the Report, the Home Secretary drew attention to the circumstances leading up to the imposition of internment and the importance of eliciting information while it was still fresh so as to effect the capture of persons, arms and explosives, and thereby save lives. He pointed out that the principles applied in the interrogation of suspects, and the methods employed, were the same as those employed in all previous emergencies. The Government rejected any suggestion that the methods contained any element of cruelty or brutality, but nevertheless decided that it would be right to consider whether the procedures required amendment and appointed a committee of Privy Councillors under the Chairmanship of Lord Parker to conduct this review. They were unable to produce a unanimous report, the majority concluding that deep interrogation techniques should not be undertaken without the specific authority of a UK Minister and that new guidelines should be laid down for the assistance of Service personnel, while the minority report questioned the legality of such techniques and concluded that we were breaching the Geneva Convention.

Despite the British Government's actions, the Irish Government lodged an application with the European Commission of Human Rights in December 1971 and followed this with two supplementary memoranda in March 1972. After legal arguments, the Commission held hearings with both parties and took evidence from 13 witnesses over the next two years and then invited the two countries to reach a friendly settlement. This did not prove possible and the Commission decided it was necessary to hear further evidence.

Like its partner, the Court of Human Rights, the Commission normally sits in Strasbourg but in this case, for security reasons, it was transferred to the Sola Military Base, a remote military airfield 15kms from Stavanger on the south western tip of Norway, a setting that would have done credit to any product of the imagination of John le Carré. There were two main charges: that the United Kingdom had contravened the European Convention of Human Rights by the imposition of internment and that the Security Forces had contravened Article 3 of the Convention by subjecting certain detainees to "torture or inhuman or degrading treatment".

The Summons

In May 1974, I received a letter and a Summons from the European Commission of Human Rights in Strasbourg stating that it had decided to call me as a witness to give evidence before the Commission's delegates. The proceedings would be held "in camera" and, for security reasons, I would be given the

code number M11. The attached summons ordered me to appear at 0930hrs on 10 May 1974 before the Commission's delegates at Sola Military Base, near Stavanger, Norway. At the same time I received Joining Instructions from the Director of Personal Services at the Ministry of Defence requesting me to report to RAF Brize Norton ready to emplane on Flight 6424. I was not to report to the main Air Passenger Terminal but to a building near the cinema from where I was to be taken to a remote corner of the airfield for boarding. I would be accommodated and fed by the Norwegian Army and I was to be in civilian clothes and wear a hat and dark glasses in Norway!

On arrival at Brize Norton we were briefed that our aircraft would be blacked out – presumably in case someone in a passing aircraft should look in and recognise one? We were also told that we were all to remember our code numbers and to use them at all times. None of us knew who else would be on the aircraft, so it was interesting to look round and see one's fellow passengers: in addition to the military, there were RUC and several Special Branch who one had had dealings with at the time and had not seen for nearly three years. When we got to Sola the aircraft was parked in a corner of the airfield, well away from prying eyes and we were hurried into a blacked-out coach and taken to our accommodation in the fenced off area of a hutted camp. In addition to the barbed wire round us, there were long-haired Norwegian soldiers in armoured vehicles, manning machine-guns. We never did discover whether they were to keep us in or to repel hordes of people intent on assassinating us!

The illustrated English language guide that was issued to us showed that we were some 13kms south of Stavanger and that the Vikings from this area brought home goods, slaves and the best looking women they could find which was the reason for the beauty and charm of the local girls. Sadly we were never able to verify the truth of this assertion as we were strictly confined to barracks, where we seemed to live on a basic diet of raw herring, fine for those who like raw herring. Amenities were sadly lacking within the Base so we had to make do with the ubiquitous sauna.

We wondered where everyone else was. It turned out that, for the 83,000 inhabitants of the sleepy town of Stavanger, known as the fish canning capital of the north, the hearing and the obsessive secrecy surrounding it had presented a security spectacle the like of which they had not seen since the German occupation. Stavanger was already on the fringes of the North Sea oil boom and there were only seven hotels to accommodate the two Government delegations, scores of media representatives and what *The Times* diarist described as "the unnamed plain clothes officers who pace the hotel lobbies showing studied concern for the sparse decor". Always present was the threat of an IRA reprisal, unheard of in a part of the world where the the main job of the police at this time of the year was traditionally escorting the first family of ducks from the harbour to their summer home on the local lake.

Apparently the only rooms the Irish delegation could find were in the St Svithun, a hotel which they discovered to their horror was owned by a Norwegian Missionary Society, and consequently totally dry. If we had known this at the time, they would have had scant sympathy from us, though it might well have raised our morale.

THE COMMISSION

THE Commission was set up like a court but with no less than seven judges sitting on a raised dais; all of them came from countries that had either been occupied in the war or ones where they themselves were the occupying power. They would know all about torture. The Irish Government, the applicant, was represented by the Legal Adviser from their Department of Foreign Affairs, the Attorney General, Chief State Solicitor, various Barristers and a Professor of Psychiatry from University College, Cork. The respondent Government, ours, was represented by the Legal Counsellor at the Foreign and Commonwealth Office, various QCs and other Barristers, the Treasury Solicitor's Department and a Civil Servant from the Ministry of Defence. Together with interpreters, stenographers and court officials, it was a formidable gathering and not a little daunting, especially for those who had not been in a court before.

The UK Government objected to the layout of the court and demanded that witnesses for the defence should speak from behind screens to maintain anonymity, but the Irish side pointed out, not unreasonably, that it was essential for counsel to see the witnesses if they were to be

able to cross-examine them properly as so much depended on the witnesses' demeanour. After some argument, a compromise was reached whereby a screen was placed between the two opposing sides so that only leading counsel could see the witness. Thus was honour satisfied.

In due course, I was called as a witness and taken through my prepared statement which had been drafted in conjunction with the Treasury Solicitor. I had been instructed not to answer questions on interrogation techniques during cross-examination but was asked a number of related questions, mainly to do with the arrangements for arrest of suspected terrorists, their initial questioning and their detention. In reply to one of these, I was able to tell the court, in my best Belfast accent, that there was an old Irish saying: "Sure, what's the point of having a secret if you can't tell anyone?". Some bizarre allegations followed, including an accusation that I had allowed soldiers to urinate on detainees while they doubled round in a circle. "Sure, and what do yer tink o' that?", asked the leading Irish Counsel. I didn't know what to think, but as it turned out, I had got it wrong. What he was really accusing me of doing was making detainees run round in a circle while *they* urinated! I was still trying to work this out when my Counsel leaped to his feet to ask why this "evidence" was being introduced at such a moment when I had not actually been present myself, and previous witnesses, who had been in actual charge of the detention centre had not been confronted with this. A long legal argument ensued while I reflected on what it was all about. Eventually, my cross-examination over, I was allowed to leave the court and, on conclusion of the whole hearing, we were all flown back to UK in our blacked-out aeroplane, complete with our dark glasses and hats pulled well down over our eyes!

It had been an extraordinary experience, remarkably clinical, even friendly, but we were given no clue as to the possible verdict. According to the newspapers, the Commission could take a year to deliver its findings but the *Daily Express* was in no doubt as to the true verdict. In a strongly worded editorial, the paper said "Let us have done with the preposterous pantomime at Stavanger in the name of human rights" and went on to condemn the Eire Government in Dublin. It pointed out that it seemed that human rights only seemed to relate to those detained, questioned, tried and sentenced for the most horrific crimes against humanity in Ulster. It asked "What about the victims? Do they not have rights?"

The Commission, having completed its deliberations, published its Report on 2 September 1976. As far as the allegations of torture went, and despite the abandonment by the UK Government of the so-called "Five Techniques" of Deep Interrogation (wall-standing, hooding, use of noise machines, deprivation of sleep, and of food and water) in March 1972, the Commission felt bound to express an opinion on the use of these techniques. Its conclusion was that they constituted "a practice of inhuman treatment and torture in breach of Article 3 of the Convention. In reaching their conclusions the Commission accepted that HMG had taken important measures to compensate individuals who had suffered ill-treatment and had generally shown itself willing to do anything possible to ensure the observance of its obligations under the Convention.

The Report merely recorded the opinions of the Commission. It was not a final, binding decision on whether violations of the Convention had occurred. The usual course was for the parties to accept the conclusions of the Commission and not pursue the case further but the Irish Government decided to refer the case to the European Court of Human Rights which would now have to reach a formal decision on the allegations. The Court heard the case the following year when the Report of the Commission formed an important element in the evidence the Court had to weigh.

It was not until January 1978, nearly four years after the hearing in Sola, that the British Government was formally cleared by the European Court of Human Rights. The judges decided by 13 votes to 4 to overthrow publicly the earlier unanimous finding by the European Commission of Human Rights that five sensory deprivation techniques constituted an administrative practice of torture. But the techniques were ruled to be inhuman and degrading, in breach of Article 3 of the Human Rights Convention. The judgement was read out in court, all 83 pages of it. Fortunately witnesses were not required to attend! In particular, the judgement lifted a threat that had hung over the

British security forces since the complex and bitterly contested case was opened in 1971. On 25 June the Committee of Ministers' Deputies in Strasbourg, which had been considering the European Court of Human Rights' judgement on the Irish State Case, adopted by 18 votes to nil, with Greece abstaining, a draft Resolution tabled between the Irish and UK representatives. The Resolution was to the effect that the Committee invited the UK to inform it of the measures taken in consequence of the Court's judgement, heard the UK explanation as to why no further measures were considered necessary, and declared that it had discharged its function under Article 54 of the Convention on Human Rights (which required it to supervise the implementation of the Courts judgements). The final stage was the formal recording of the Resolution in the annals of the Committee, together with an Appendix stating the measures which the UK had already carried out. As a post-script, *The Leveller*, a somewhat scurrilous magazine, printed an article in December 1976 entitled *The Torturers' Who's Who'*, purporting to expose Britain's hypocrisy and telling the "truth". It was written in the aftermath of the Commission's report, named a number of the witnesses and invented some new types of torture carried out by the RUC, the more interesting ones being the beating of one man on the buttocks until he bled from the rectum and the hanging up of a man by his handcuffs, with his toes just touching the ground while he was belaboured by four men stripped to the waist. The motive for "blowing Britain's cover" was the necessity "to lay bare the machinery of a systematic policy of repression which protected the police and army while Old Age Pensioners were disgraced for lifting cans of dog meat from Sainsbury's".

So now you know!

Back on Track in Iraq

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Major Jeremy Holman was commissioned into the Corps in 1991. Early tours included Berlin, 35 Engr Regt, six months in BATUS with 2 RTR (as the first OPFOR) and two years at Minley as a B3 and then B1 Troop Commander. Caught in the year of birth trap, he left the Army in 1997, got married and embarked on a 10 month round the world backpacking honeymoon. Realizing that he made an appalling civvy, and the SDR enhancements to MWF had moved the goal posts, he applied to rejoin, which entailed a six month deployment to the NATO HQ in Sarajevo, working as the only British Officer in the J5 branch. He had to play catch up at JCSC, then attended the PET (E&M) course and came away with an MSc in Construction Engineering and a nice suntan from 16 months in Sydney.

On first sight most tasks that you are volunteered for don't always appear that appetising, but more often than not they turn out to be some of the best jobs that you ever do. This was one such job.

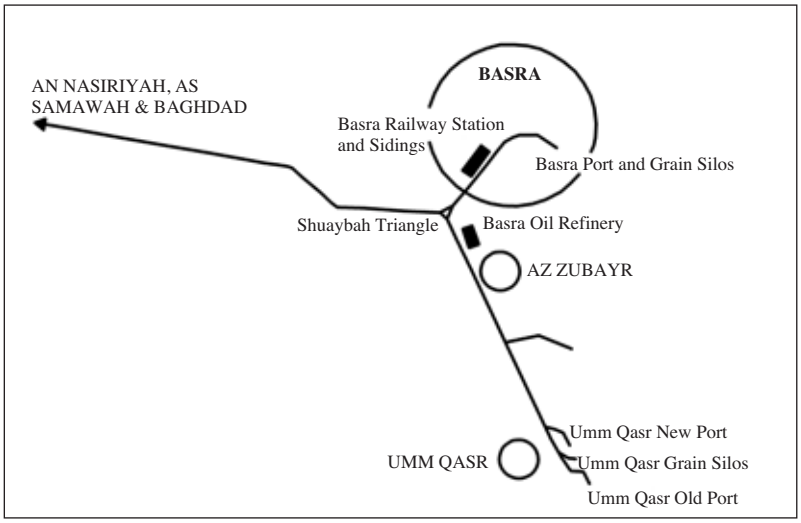
As the Second in Command of the newly formed 528 Specialist Team Royal Engineers (Utilities) I, like many others, deployed on Op *Telic* and on D + 6 ended up in Umm Qasr where the rest of the team started to congregate. Our initial task was to work with 17 Port and Maritime Regt RLC and open the port. This was later expanded to include restoring power to southern Iraq, no mean feat.

This article has nothing to do with utilities, as after two weeks in Umm Qasr, Lt Col Guy Wilmshurst–Smith, CO 64 CRE (Wks) volunteered me for the post of OC 507 Specialist Team Royal Engineers (Railways).

507 STRE (V) (Rly) are a TA team made up of civilian railway specialists. They had been mobilised as a formed unit in order to open the Iraqi rail network to allow the distribution of humanitarian aid. Unfortunately the team deployed without their OC and nine members of the team arrived in Iraq looking somewhat shell shocked, admittedly, not half as shell shocked as I was when I realized the importance of the task ahead. I did take solace in the fact that because we weren't expected to deal with either snow or leaves on the line, and as long as nobody was planning to run high-speed services; I felt it was a task I could deal with.

Since Options for Change, railways have been a TA responsibility. Although they are often used for the movement of armour, repairing and building them is very much a specialist task, and hence up to date knowledge from the civilian sector is essential. I would be the first to admit that my knowledge of railways was scant. In total it was limited to a one day briefing on the PET course, building my two year old son's wooden railway set and some distant memories of a childhood Hornby 'Double–O' set we had at home.

At the beginning of April, 507 STRE (V) (Rly) arrived in Umm Qasr. This seemed a good place to start work. Umm Qasr had a comprehensive network of tracks connecting the various port facilities that 528 STRE (Util) were repairing. Because Basra hadn't been secured at this time, there was no chance of getting anywhere near that end of the line so we concentrated our efforts on repairing tracks in Umm Qasr. It was not long after the team's arrival that CO 28 Engr Regt offered up 4 Troop from 29 Armd Engr Sqn to act as the Military Construction Force (MCF). This was very well received as it allowed the team to carry out their proper function, which is



Schematic Diagram of the Rail Network in Southern Iraq.

to give technical advice, assess rail infrastructure and oversee tasks being carried out. For 4 Tp (commanded by Capt Chris Adams) it was an opportunity to get to grips with a major task that was different to your normal run of the mill Sapper work. This freed up some members of the team who were able to start conducting recces of the tracks north towards Basra and out west towards An Nasiriyah.

We were aware that the rail infrastructure hadn't been targeted as part of the air campaign, and therefore we anticipated that the most likely damage was either from fighting on the ground or sabotage. A combination of recce personnel and methods were used and the results provoked some interesting discussions, between the Team's Structural Engineer Sgt Jackman and the Recce Sgts of 29 Armd Engr Sqn, especially concerning the load classification of some of the more "rustic" bridges. On the whole the best method used to check the integrity of the line was to conduct aerial recces. This proved very successful as it allowed great distances of wide open desert to be covered relatively easily but also allowed the recce element of the team a chance to get an excellent view straight down the track. This enabled them to check the alignment and focus on possible problem areas. Later on in Basra the only realistic way to examine the tracks was on foot. There was no shortage of volunteers for the helicopter recces, although after Cpl Sunderland and Sgt Ford returned with stories of alarms going off, flares being fired and evasive action being taken, the queue did diminish somewhat. On a more serious note the interaction of mainstream and specialist Sappers worked fantastically. Whilst the team members could ply their specialist trade, the regulars from 4 Tp (such as SSgt Macpherson who was a Royal Engineer Search Advisor), were much more attuned to the tactical situation, more mines and force protection aware and thus added another valuable dimension to the recce and assessment process.

The Iraqi Republic Railway (IRR) network stretches from Umm Qasr in the south to well north of Baghdad. The area of interest was to be Umm Qasr to Shaibah Triangle and into Basra, and Shaibah Triangle to Baghdad as this was how aid would be brought into the two main cities. The condition of the track varied immensely. In the ports and local areas of Umm Qasr there was some minor damage from fighting, although the main problem was that of neglect. It was fairly obvious that IRR had no concept of planned maintenance and that all work done on the track was reactive, not proactive. The 70 km stretch from Umm Qasr to Shaibah Triangle and into Basra was in terrible state, again some damage was from fighting, but the majority was due to lack of maintenance. From Shaibah Triangle west to Baghdad there were some excellent stretches of continuously welded track, similar to that used in the UK (although theirs doesn't buckle in the summer heat!). The facilities in the UK AOR were large, varied and complex. In Umm Qasr there were two ports (the old and the new) as well as a huge grain unloading and storage facility, all with rail links. In Basra there was a port, another large grain facility and two large marshalling/unloading yards. The aid agencies were interested in using all of these.

One of the points that had been impressed on me through the PET course and my early days at MWF was to always focus on the end-state of a task, not just of the military task but also the political one. 507 had no intention of being responsible for the day to day maintenance of

the Iraqi rail network until some "over the horizon" contractor came into view. IRR is a state run organization and any contractor would be foolish to ship into Iraq large numbers of workers, when there was obviously a large workforce available in country. As the operation of a rail network is a logistic operation, it was the RLC responsibility to locate trains, rolling stock and drivers, however we worked closely together as our missions were inextricably linked.

Ultimately my end-state (both military and political) was to get the track open for the movement of humanitarian aid and the locals back to work looking after the track, with support from a contractor.

To do this 507 had to complete the following major tasks:

- Quickly repair the network to pre-war standard so that movement of aid could start.
- Locate the local IRR personnel responsible for the fixed rail infrastructure (track inspectors, repair teams etc).
- Find some mechanism (and funding) for getting them back to work.
- Prepare the groundwork so that through the Office of Reconstruction and Humanitarian Assistance (ORHA – now called the Coalition Provisional Authority), a contractor could take over the much needed improvements and investment in the network.

507 STRE and 4 Tp 29 AES carrying out a repair in Umm Qasr.

Repairing points north of Umm Qasr.

If we achieved all these points the team would have completed its mission and could hopefully return to the UK, leaving the railways in the capable (?) hands of the IRR staff and a contractor. The guiding principle was that there was only one railway STRE and it was unable to stay in Iraq indefinitely. More importantly it was not the role of the military to run the railways. Major General Whitley (late RE) was quite adamant about this. This may seem fairly obvious to those working in the local infrastructure and G5 areas; the locals needed us to provide security and financial assistance but technically they were capable of running their own infrastructure as they had done before the war. Because they were used to the harsh local conditions they were probably better at doing it that we would have been. This fact was something that I spent a great deal of time explaining to some of our non-forward thinking American friends.

In conjunction with the MCF, RE EOD teams and RLC train drivers from Rail Troop, 17 Port and Maritime Regt RLC, 507 were able to open the Umm Qasr to Basra line. Once aerial inspections had been carried out, the team focused on possible problem areas, repaired damage and removed obstacles. Detailed visual checks were conducted by walking sections of the track and inspecting the bridges and culverts. The final test was to prove the track using a shunting loco-

Proving the Umm Qasr to Basra line with a shunting diesel.

motive and sacrificial rolling stock that had been found in Umm Qasr New Port.

With the team and MCF busy, I visited the HOC to gather more information about the plans to use the rail network to move humanitarian aid. The ethos that the team had adopted was to initially repair the track to a passable standard, however at the HOC there was huge interest from the main contractor in investment opportunities and major upgrade works, rather than getting initial functionality restored. There was no talk of using the locals, the method to pay them or how to encourage them to return to work. It was almost as if they felt the local population didn't exist and that we, the military and aid agencies, were going to have to run the railways and do everything on our own. Some of them appeared to have no concept that the locals would want to return to work and that this was the key to getting the railways operating. I found this particularly frustrating and in a passionate presentation to ORHA, the aid agencies and NGOs, I summarised the state of play with: "We haven't bombed the track, we haven't hidden the rolling stock, we haven't shot the staff, and you need the network to move the same volume of freight as it was doing before the war? They can operate their own railway, they want to. All they need is paying!"

Once Basra had been secured, the RLC Rail Troop located some large locomotives and 507 and the MCF repaired that end of the line. Using both their military train drivers and local staff, who had been sleeping in the cabs of the engines to protect them from looters, they moved some of the newer locomotives to the secure area of Umm Qasr New Port. On the 19th April 03 there was an official opening of the Umm Qasr to Basra rail line, attended by local dignitaries, senior military officers and most of the media in Southern Iraq. What was noticeable here was the way in which the media operate. They all accepted that 507 and the MCF had done a fantastic job to clear and repair the tracks, however, and let's be honest here, track isn't very sexy, many people would say that neither is a moving train, but at least it moves and makes better TV than wood and steel lying on the ground! The team had to work hard to get the recognition it deserved and steal some of the limelight from the RLC, after all they were only driving the train and how hard can that be?!

Following this success, the US Forces, who do not have specialist infrastructure teams like the Royal Engineers, requested the assistance of 507 STRE (V) (Rly). Although they had mobilised some members of their National Guard 757 Railway Battalion, they are train operators rather than infrastructure specialists and needed some technical advice on damage and repairs to track. Over the night of 21 April, word that we were trying to open the railways had obviously spread and a train driven by locals arrived in Basra, having come from Baghdad. The crew did however report some faults with the line at As Samawah in the US AOR, halfway between An Nasiriyah and Baghdad. Approval from HQRE at 1 (UK) Armd Div was granted and two thirds of the team were flown by the US to the site. Advice was given and the team also took the opportunity to recce and assess the huge rail repair workshop located nearby. Three days later after being grounded at Tallil airbase due to bad weather, they finally returned to Umm Qasr.

On 1st May 03 Maj Gen Whitley arrived in Umm Qasr (by train) with news that he had been in Baghdad Central Station talking with senior IRR management and obtaining all the payroll details for the thousands of employees. Emergency payments were to be made as soon as the details had been verified. With the locals starting to return to work and trains beginning to operate, the team focused on compiling all the reconnaissance and assessment

information and making recommendations for investment and improvements. This was then passed to the contractors as part of the handover process.

In total the team was in Iraq for seven weeks, a relatively short but very intense deployment, which was invaluable to both the humanitarian mission and assisting with the immense task of returning the locals to work, providing some semblance of normalisation and getting essential transport services running again. It is hoped that this article has highlighted the role of one of the lesser known specialist teams on Op *Telic* and show that as Sappers, repairing infrastructure isn't our only role, we also can facilitate much, much more. As with any journal article, a short summary of lessons identified is a good way to end:

- Define your end state, so that you know what you have to achieve. Don't just look at the military objective, what is the political objective? If you are the only unit in theatre with a special capability, the chances are you will be needed elsewhere.
- The G5 area is a mess, don't expect clear lines of communication. If you do get to work in this area, don't wait for NGOs to come and find you, be proactive and hunt them down and be forceful. In a war-fighting environment, we as the military, often have much better freedom of movement, meaning that they want (and need) information from us. Some NGOs such as the International Committee of the Red Cross were fantastic; others seemed reluctant to leave their Kuwaiti hotels.
- Don't underestimate the ability of the locals. Before the war IRR quite happily (in their own unique way) ran the railways. They can and will do it again. They don't need us to take over and run it for them. What they do need is our assistance, be it security, funding, resources or technical advice.
- The TA holds many specialist skills that the regular Army does not. We, the regular Army, do need their technical assistance. The mixture of their skills integrated into regular military command and control worked brilliantly.
- Don't rise to the bait about having an anorak, a tartan thermos flask and being a train spotter; railway track is much more interesting (so I am told……)

The Siege of Manila – 1762

N C HAYES MA

After graduating from the University of Lancaster in 1977 with an honours degree in History and Politics, Nicholas Hayes taught full-time in a number of secondary schools. Since completing a Master's Degree at the University of Buckingham in 1992, he has worked as a researcher, part-time teacher and free-lance writer specializing in military and naval history.

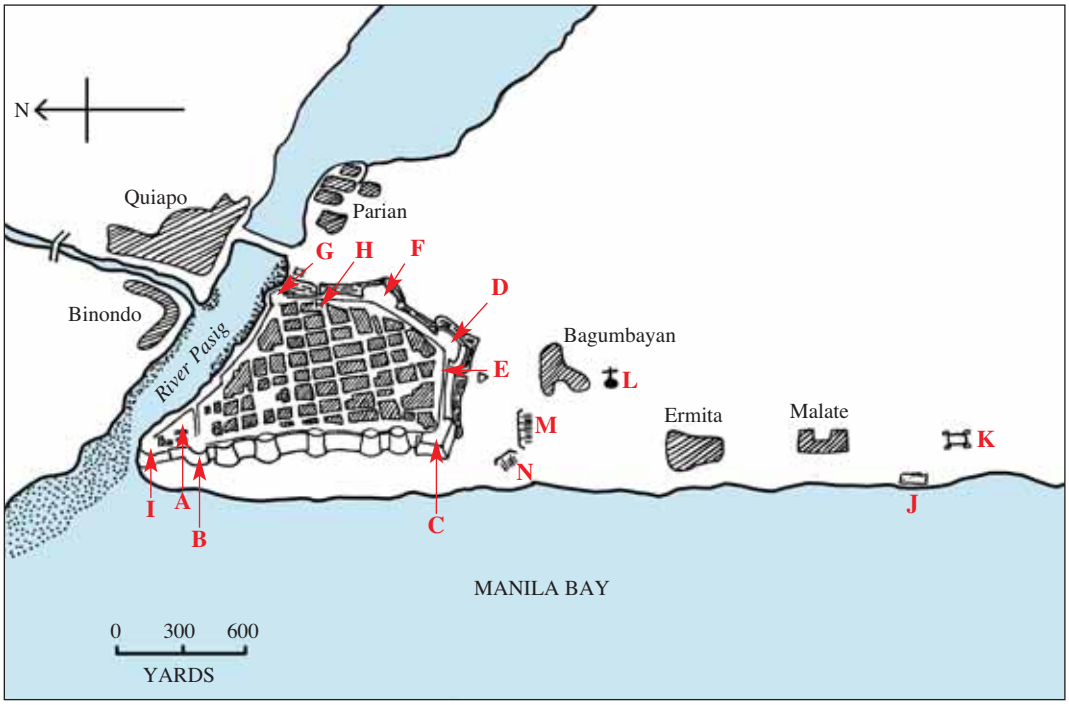
It was in the winter of 1761-62 that Lieutenant Colonel William Draper, an officer of the 79th Foot on leave in England, suggested an expedition against Manila to the First Lord of the Admiralty, Admiral Lord Anson, and the Commander-in-Chief of the Army, Field Marshal Lord Ligonier. Since Manila was the entrepôt of Spanish trade in the Far East, both officers were prepared to listen to Draper's proposal. Conquest was not an impossibility, for the available intelligence suggested that although the Spanish had built the fort of Cavite to protect the harbour and had enclosed the city's core within a bastioned wall, they clearly believed Manila's best source of security was its remoteness. The fact that the Philippines took six to eight months to reach from Europe only made the expedition more attractive to Ligonier and Anson, for Draper assured them that all the troops he would need were already in India, just six or eight weeks sail from the archipelago. Since Spain communicated with the colony via Mexico on the Manila galleon, there was good reason to hope that the invaders might arrive before the garrison even knew that Spain and Great Britain were at war.

Soon after Britain's declaration of war on Spain (4 January 1762), therefore, the Cabinet decided in favour of the venture. In February, Draper left Britain with a temporary commission as brigadier-general and authority to raise an expeditionary force of two King's regiments and 500 East India Company troops. By the end of June he had reached Madras. Once there, however, nothing went as planned, and the would-be conqueror of Manila found that, outside of his own 79th Foot and two companies of artillery, the only troops the local authorities could be prevailed upon to spare were a composite battalion of sepoys and two companies of deserters from the French forces, of whom he wrote, *"such a banditti were never assembled since the time of Spartacus"*. (Cushner, 1971, 34)

The expedition's engineering department consisted of Captain William Stevenson, Captain-Lieutenant Cosford and Ensign Barnard, all of the East India Company's service. Of the first two officers Draper wrote: *"They have served very well upon many occasions and will I am sure be of great service to me."* (Cushner, 1971, 34) At their disposal was a 71-strong detachment of European pioneers.

Most of the troops, with their supplies, were embarked on two large ships used in the China trade, and between 29 July and 4 August the little flotilla of some fifteen sail in all, under Rear-Admiral Samuel Cornish, set out in three divisions. After an agreeable passage of eight weeks, on the evening of 23 September all but two of Cornish's ships anchored in Manila Bay. Unfortunately, one of the missing vessels was the storeship *South Sea Castle*, on which had been loaded the fascines and entrenching tools needed for the siege.

The city of Manila, situated on the eastern shore of the bay of that name, was about two-



The Siege of Manila – 1762

and-a-half miles in circumference, with streets that crossed each other nearly at right angles. Owing to the frequency of earthquakes in the Philippines, the upper storeys of all the houses were built of wood, and only the lower storeys of stone. The only exceptions were some of the churches and convents, which were built entirely of stone, but with unusually thick walls.

To the north-west, the foot of the city walls was washed by the Pasig River, which, for small vessels, was navigable as far as a lake some thirty miles to the east. The north-western end of the city, cut off from the rest by a wall, ditch and drawbridge, formed a triangular citadel called Fort St Iago (marked A on the plan), which commanded the city, bay and river. The walls of the city were built of stone, the fortifications being largely of the conventional Vauban type. On the western face, between the bastion of St Michael (B), which formed part of the citadel, and the royal bastion of St Diego (C), which covered the sea front, were sited, from north to south, the small low bastions of St Francisco, St John, St Isabel, St Joseph and St Eugenio, with long low curtains between them. The walls on this face were from twelve to fourteen feet high, and the ramparts about eight feet broad. Sited in the walls were a sally port and the gate of St Lucia.

On the southern face, the royal bastions of St Diego and St Andrew (D), with the intermediate curtain, made a very formidable front. The bastions were provided with orillons and retired flanks and mounted a total of sixteen guns, with another sixteen on the curtain. In front of the wall on this face there was a water-filled ditch, a covered way, and a low glacis. On the western side of the bastion of St Andrew lay one of the principal gates of the city, the so-called Royal Gate (E), which was protected by a drawbridge and a small ravelin.

On the eastern face, next to the bastion of St Andrew, lay the royal bastion of St Lorenzo (F), which was very spacious, but in which all the cannon were mounted *en barbette*. The curtain between St Lorenzo and St Andrew was not more than eight feet broad, as was that between St Lorenzo and the bastion of St Gabriel (G). Between these two bastions ran the Parian Gate (H), which led to the Chinese town and the suburbs of Santa Cruz and Binondo, The projecting part of this gate formed a small flat bastion, with the gateway opening through the flank. There was a kind of double tenaille in front of the gate, but it was a very low defenceless work. The bastion of St Gabriel mounted seven guns in face and two in

flank, but they were so crowded that half of them were useless in action. Along the whole of the eastern face ran a broad morass, which served as a ditch and a very good defence at high water, but which was almost dry when the tide was out. From St Gabriel to Fort St Iago ran a low narrow curtain, only broad enough for musketry. This front had no cannon for its defence, except those on the flanks of St Iago and St Gabriel, but was very well secured by the Pasig River. In it were two gates, one called Magarine and the other St Domingo. At the extreme point of the citadel, under the bastion of St Barbara (I), were two semi-circular batteries that commanded the entrance to the river, and communicated with the bastion by a ramp.

The garrison of Manila in September 1762 consisted of 550 men of the King's Regiment and 80 Filipino artillerymen, with the Governor's Life Guard, some marines and a company each of cadets and Filipino irregulars bringing the total strength up to some 800 troops.

As Draper had hoped, the Spaniards had been caught quite unaware of the fact that a state of war existed between Spain and Great Britain. To take advantage of their surprise, it was decided to change the plan of attack, which had called for the capture, first of all, of the fort of Cavite at the entrance to Manila Bay, and to storm the city. While preparations for this were being rushed, however, a summons to surrender was sent to the city on the morning of the 24th. This was refused by the acting Governor of the Philippines, Archbishop Manuel Antonio Rojo. At 8 o'clock that evening, the greater part of the day having been spent in reconnaissance, the troops were landed, without opposition, not more than a mile-and-a-quarter from the city. From the landing place (J), they marched about a quarter-of-a-mile along the beach to the village of Malate, where they took post. That night, as the invaders slept on their arms, the Spaniards busied themselves burning part of the suburbs of the city.

At daybreak, Draper's QMG, Colonel George Monson, went with a company of marines and took possession of the Polvorista (K), a small stone redoubt where the Spaniards made their gunpowder, but which they had now abandoned. On his return, Monson advanced towards Manila with a company of the 79th Foot and took post at the Hermitage (L), a church about 600 or 700 yards from the city walls, where the General afterwards fixed his headquarters. At about noon, the rest of the 79th marched down to the Hermitage and were quartered there, a naval brigade of seamen and marines remaining at Malate to cover the landing of the stores. The sepoys and other East India Company troops were quartered between the two. In the afternoon, a detachment advanced within 300 yards of the city, to the Church of St Iago, behind which they took post, the engineers, for want of entrenching tools, being unable to make a proper lodgement for them.

On the 26th at about 10 am, a detachment under Colonel Monson drove the Spaniards from Bagumbayan Church, for the loss of only three or four men. The engineers found themselves *"in great distress"* on this day *"for want of the fascines and entrenching tools . . . not being able to strengthen any post or secure our communications from one to another."* (Cushner, 1971, 84) A party of 400 men was therefore put to work making gabions and fascines. In the evening, two 8-inch mortars were brought up behind St Iago Church, from where they opened up on the city's defences at midnight. Next day, the besieging force "not being able to get one of the natives to assist us (tho all means were used to encourage them to come in)," all the men that could be spared from other duties were employed in bringing up stores from the landing place and making fascines and gabions. A breastwork for a single field piece was thrown up to the left of, and after dark two more mortars opened up from behind, the Church of St Iago.

On the 29th, by the assistance of the ships employing all their smiths and armourers, the pioneers were issued with 120 entrenching tools, *"a small number to open trenches with against a regular fortification"*. (Cushner, 1971, 84) Draper, however, was determined to break ground without delay, for he was aware that the Marquis de Mediana, in direct command of the Spanish troops, was being reinforced by thousands of Filipino warriors, who were entering Manila by way of the more distant city gates. Accordingly, work began that night, at a distance of 300 yards from the walls, on a battery for eight naval 24-pounder guns (M), the object of which was to breach the southern face of the bastion of St Diego near the angle. This point was chosen for breaching because a reconnaissance had disclosed that the wet ditch terminated well to the east of it. An enfilading battery was proposed, but the General found his numbers too few to maintain the posts in front and supply parties for the different services, such as bringing up stores, making gabions and fascines, working in the trenches,

etc., *"all of which was to be done by 2,000 men without the least assistance from the country people who on the contrary kept us in continual alarms."* (Cushner, 1971, 85) Cornish promised that two of his ships-of-the-line should come in as near to the shore as possible, from where, although they could not do much damage to the walls, they would endeavour to rake the front attacked and answer, as far as possible, the purpose of a ricochet battery. But, in the evening, the ships' captains found it impossible to get into the position the General wanted. They therefore moored about a mile from the bastion of St Diego, and began firing into the town to harass the garrison as much as possible. The Spaniards returned their fire, but without effect. The *South Sea Castle* finally arrived in the bay, with the heavy mortars and entrenching tools on board, but the surf was too heavy to land anything. Next day, the ships again opened up on the town, being joined by four mortars ashore. The soldiers, sailors and marines continued to be employed in bringing up the stores and making fascines and gabions, and, after dark, as many men as there were tools for worked on the 24-pounder battery.

On the afternoon of 1 October work began on a battery for two 13 and two l0-inch mortars. Some of the entrenching tools having been got ashore, a strong working party was employed after dark on the 24-pounder battery, and in completing a place of arms for musketry. On the following day the platforms were laid in, and the guns brought into, the 24-pounder battery, which was completed that night. The mortar battery was likewise nearly finished, a l0-inch mortar being brought into it in the evening.

At daybreak on the 3rd the eight 24-pounders opened up on the left trace of the St Diego bastion, at the salient angle. At first the Spaniards returned the fire "very briskly;" but the parapets behind which they sheltered were made of stone, not of earth. So, as Captain Stevenson pointed out: *"instead of being a protection to the troops placed behind for their defence [they] make a greater destruction among them with their splinters than the enemy's shot which we had a convincing proof of on opening our battery, for notwithstanding they could oppose twice the quantity of cannon against our battery than we had in it, yet they were obliged to abandon them all in a few hours not being able to stand on their works for the splinters of the parapets"*. (Cushner, 1971, 47).

Consequently, the British guns *"had nothing to interrupt them in ruining the defences, which they had nearly done before night on the bastion St Diego."* (Cushner, 1971, 86) After dark a working party was employed in repairing the eight-gun battery and erecting another of three 24-pounders (N), one of which was to fire on the flank of the small bastion of St Joseph, and the other two to destroy the defences of the ravelin and the flank of the St Andrew bastion, which defended the breach. A constant fire of canister and musketry was kept up all night on the breach to prevent its being repaired, while the mortars dropped bombs on the gorge of the St Diego bastion to prevent the defenders from throwing up a retrenchment within.

At 3 am on the 4th, in the midst of incessant rain, 1,000 Filipinos, armed chiefly with bows, arrows and spears, surprised the cantonment of the Naval Brigade, killing or wounding a number of seamen and marines; but the alarm soon becoming general and the day breaking, the irregulars fled with great precipitation, losing more than 200 men in their retreat. A little before daybreak, through the negligence of the advanced sentinels, another party of Filipinos got possession of Bagumbayan Church, from where they were eventually dislodged by the 79th Foot and driven back into Manila with heavy loss.

With the morale of the natives shattered as a result of these two defeats, most of them now left the city and returned to their homes in the country. What was more, by the end of the day the eight-gun battery had reduced the face of the St Diego bastion to a *"very ruinous condition",* which the British prevented the defenders from repairing at night by keeping up a continual fire of canister and musketry. A working party was employed, meanwhile, in completing the three-gun battery.

On the morning of the 5th the platform was laid in, and the 24-pounders brought into, the three-gun battery, which then opened up on the orillon of the St Andrew bastion. This was soon abandoned by the enemy, who brought three guns on the curtain to bear obliquely on the British batteries; but it was not long before shot from the latter dismounted them. Later in the day the breach was examined and found to be: *"very practicable, on which the general determined attacking it at all events the next morning as our little army began to complain of their fatigue with great reason, being no sooner relieved from a guard than sent on a working party and that in a heavy rain which we seldom were without during the whole siege, it being the breaking of the monsoon."* (Cushner, 1971, 87)

About an hour before daybreak on the 6th the whole army marched down to the advanced posts, ready to sally out on the signal, which was two mortars fired directly one after the other, being given. The column of attack was led by a 60-strong party of volunteers, supported by the Grenadier Company of the 79th; the engineers and pioneers followed in order to clear the way, enlarge the breach and make lodgements in case of enemy resistance; behind them Colonel Monson and Major More led two grand divisions of the 79th; the Naval Brigade came next, sustained by the two other divisions of the 79th, with the sepoys and other East India Company troops closing the rear. Field pieces and parties of musketeers were posted all along the front attacked to provide covering fire while the troops advanced to the counterscarp, and an officer and thirty men were posted in the steeple of Bagumbayan Church to prevent the Spaniards firing from the flank of the St Andrew bastion, which the church overlooked.

On the signal being given, the troops rushed forward and, *"owing to the enemy's bad look out . . . were in possession of the breach before they were well alarmed."* (Cushner, 1971, 88) As the troops streamed into the city little resistance was offered, except at the Royal Gate, where a few men were lost and Major More shot by a Filipino arrow; and in the Grand Square, from the houses of which Spanish musketeers fired briskly and inflicted some loss. In the guardhouse above the Royal Gate 60-70 Spaniards and Filipinos, who refused to lay down their arms, were put to the sword. About thirty more shared the same fate at the Parian Gate, and an unknown number were drowned while endeavouring to escape over the River Pasig. The Governor, with his principal officers, had retired to Fort St Iago, and, since the place offered little defence against Draper's cannon, they wisely decided to capitulate.

Thus, for the loss of 26 officers and other ranks killed and 92 wounded, Britain gained booty worth more than £1,300,000 and, on 30 October, the cession of the whole Philippine archipelago.

The principal reason why Draper, with such a small force, was able to take Manila in less than two weeks was, as Captain Stevenson pointed out: *"The vicinity of the suburbs . . . as we experienced in attacking it, by taking possession of the churches of St Iago and Bagambaya that are not 300 yards from the walls the day after our landing behind which our troops were lodged in the greatest security and all the necessaries for carrying on the attack, collected with great facility whereas had there been an esplanade of seven or eight hundred yards we should have been obliged to open our trenches at that distance, the fatigues of carrying on which and relieving the guards of them would have been more than our handfull of men could have gone through with for we were obliged to employ our soldiers in bringing up our shot, shells, cannon, etc., from the landing place, the natives instead of assisting us being in arms against us."* (Cushner, 1971, 47)

The capture of Manila proved to be an empty triumph, for the Filipinos remained loyal to Spain, and, under the leadership of a Spanish official, Don Simón de Anda, fought a guerrilla war against the invaders. As a result, the East India Company, to which Draper turned over the task of governing in November 1762, was unable to establish control over any territory outside the immediate vicinity of Manila.

A report to the Madras Government (25 December 1762) notes that: *"The small garrison we have at present is but barely sufficient to secure us from attempts even within our own walls . . . until your honour can reinforce us we shall be little better than the nominal masters of these new possessions; we therefore most earnestly entreat you will be pleased to send us as soon as possible 2,000 sepoys, with whom and the Europeans we have, we do not despair of . . . settling the country in due time."* (Quoted in *Frontier and Overseas Expeditions,* 1911, VI, 312)

The Philippines were returned to Spain by the Treaty of Paris (10 February 1763), and British troops evacuated from Manila on 31 May 1764.

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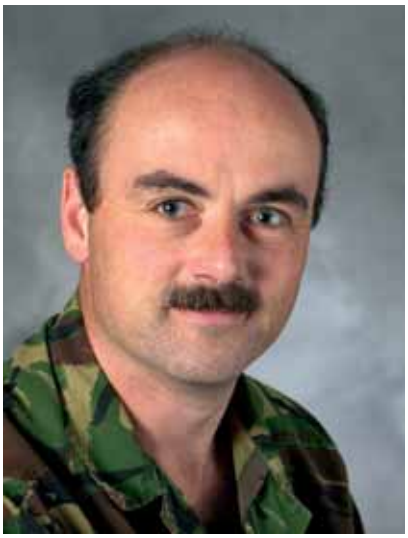
All Rank and No Pay
The Engineer and Logistic Staff Corps Royal Engineers (Volunteers), what is it and is it relevant to Defence in 2003

MAJOR J D SIMONDS BSc CEng MICE



Major James Simonds was commissioned into the Corps in 1983. After a troop commander tour with 39 Engineer Regiment and a posting to 3 Training Regiment as the Projects Officer he attended the PET(C) course with attachments to Tarmac on the M40 and Bullen and Partners in Darlington. Regimental and technical posts since the course have included Op Granby*, an exchange posting to Canada, Construction Engineer School, Mines Officer for the UN in Yugoslavia, TA Squadron Command, OC MES(Wks) Gibraltar and MWF as OC 523 STRE (Wks), with a further 13 months in the Balkans and only a few weeks in Belize. Having now completed his tour as SO2 Infra Engr (SP), he is happy to have secured another posting at Land Command as the SO2 UKSC(G) in the Army Estates Organisation.*

In 1860 Charles Manby, at the time Honorary Secretary of the Institution of Civil Engineers, proposed the formation of a "Volunteer Engineering Staff Corps for the arrangement of the transport of troops and stores, the construction of defensive works and the destruction of other works, in case of invasion". In July 1860 he wrote to all members of the Council of the Institution of Civil Engineers telling them what he had in mind. He invited them to attend a meeting, at which the project would be discussed, adding that the Government was anxious to take advantage of the services of the Institution. The following month he submitted his scheme to the War Office, which believed that the formation of such a Corps would be of great advantage to the Public Service and would recommend to Her Majesty to accept the service of the Corps. It was not until September 1864 however that Charles Manby was able to once again write to the War Office saying that he had the agreement of some twenty persons interested in forming the Corps. Her Majesty accepted the services of the Engineer and Railway Staff Corps on 4 January 1865 and 21 officers were commissioned on the 21 January 1865. Lt Col Charles Manby was appointed as Acting Adjutant.

One hundred and thirty eight years later this Volunteer Corps still exists as the Engineer and Logistic Staff Corps Royal Engineers (Volunteers), referred to colloquially as "The Staff Corps". It has an establishment of 60, all of whom are officers; 10 Colonels, 20 Lieutenant Colonels and 30 Majors. Its members are recruited from senior engineers and logisticians in British Industry, many of whom represent companies at Chief Executive or Director level with significant capability in these areas. Through this high level of representation the MOD can gain access to the expertise of over 100,000 personnel across the full spectrum of engineering and logistics. As an indication, Table 1 lists some of the companies represented and the appointment of the Staff Corps member, in addition to which there are a number of senior self employed consultants. Through this access to industry, the Staff Corps can also provide advice on; contract procurement, bench marking, public private partnerships, asset tracking, manpower management and a host of other commer-

Company	Level of Representation
Alfred McAlpine PLC	Chief Executive
Martin Lang Associates	Chairman
National Grid Transco, Powergen	Chief Executive, Technical director
Bullen & Partners, Ove Arup and Partners	Chairman, Deputy Chairman
Royal Mail	2 x Managing Directors
Faber Maunsell	2 x Directors
Office of Parliamentary Works	Director
FT Everard and Sons Ltd	Chairman
Serco	Senior Consultant
London Mining and Mineral Consultants Aggregate Industries UK Ltd	Director UK Director
Carillion Engineering and Construction	Group Operations Director
Mott MacDonald Ltd, Scott Wilson	Director
Network Rail, WS Atkins Rail	Chief Executive, Director
BAA	General Manager Transportation Policy
Aviance UK Ltd	Chief Executive
Thames Water , Severn Trent	Chief Executive, Director
Balfour Beatty Ltd, Costain plc, Jacobs	Chief Executive
Bullen Consultants, Geotechnical Developments (UK) Ltd	Chief Geotechnical Engineer, Managing Director
Crown Agents, Davies and Robson Logistics, TNT Logistics	Chief Operating Officer, Chairman, Director
Wessex Trains	Managing Director
British Waterways, Hutchinson Ports (UK) plc	Technical Director, Commercial Director
British Telecommunications	Director Group Engineering
Building Research Establishment	Chief Operating Officer

Table 1 – Examples of the level of representation of Engineer and Logistic Staff Corps members within major companies.

cial skills still under developed in the MOD. In return for this valuable service the Staff Corps members receive a TA commission, but no training, no uniform and no pay. In fact, in keeping with the true Volunteer tradition, they pay an enrolment fee and annual subscription for membership. The Staff Corps business is conducted through a council (the Council of Colonels), which meets three times a year at 1 Great George Street and it still has an Acting Adjutant as the administrator of the Corps. In order to make it more effective and get more officers involved in its affairs, it was decided in 1983 to set up two Liaison groups: an Engineering Liaison Group (ELG) and the Logistic Liaison Group (LLG), which meet when appropriate.

So what utility does a Corps originally formed to co-ordinate the activities of the railways have today and is it relevant to Defence in 2003?

The post of SO2 Infrastructure Engineer (Support) within HQRE Theatre Troops forms the focal point for contact with the Staff Corps on behalf of the Engineer in Chief (Army). As well as being the secretary for the Council of Colonels, the post provides the MS support to the Staff Corps members and provides the tasking liaison to the Engineering Liaison Group. As the incumbent of this post over the last two years I have had direct visibility of the activities of the Staff Corps and am therefore able to provide an answer to this question. I intend to illustrate the Staff Corps' utility today by covering their activities during my 24 months in post. As regards its relevance to Defence in 2003, the Joint Essential Task List (JETL) describes in broad terms the current and potential capabilities of the Armed Forces. Each JET has a number of linkages to policy and doctrine. This is a key element in establishing a requirements based, mission to task, systems approach to joint training. Every one of the 406 JETs is referenced to the Defence Strategic Plan (DSP) Defence Missions (DM) and Military Tasks (MT). Linking the Staff Corps' activities to specific JET demonstrates its relevance to current Defence doctrine and policy and these links are therefore shown in *italics* throughout the text.

Taking up post shortly after 11 September 2001,

operations in Afghanistan quickly became a focus of attention and my first instance to call upon the services of the Staff Corps. The initial request was for regional information. As representatives of international companies, Staff Corps members (or the companies they represent) are involved in projects world-wide and there are few parts of the globe where they do not have direct or indirect experience. As a result of an enquiry to all members, a number of responses were received offering a variety of information on countries in the region, although admittedly information on Afghanistan itself was limited. This information was passed on where appropriate and prompted an enquiry from the Defence Debriefing Team (DDT). This organisation interviews individuals who have visited countries of interest to Defence in order to gather intelligence on the region and therefore they were interested to learn of the Staff Corps and gain access to its members who may have information on such countries. Over the last 24 months a mechanism for providing a suitably managed link between the Staff Corps and the DDT has been established. *(MS3.2.2 Military Strategic Level Task 3 CIS & Intelligence, 2 Preparation of information for analysis, 2 Collate National information.)*

The next request from Afghanistan came from the Civil Affairs Group, who required assistance in developing two quick impact projects; the restoration of electrical power around Kabul and the regeneration of the quarry industry to enable reconstruction. The Chairman of the ELG arranged through Staff Corps members in these respective industries to deploy teams of two men each for 10 days to Afghanistan. During their deployment they were able to conduct an assessment of the existing industries and provide a report on what needed to be done in the immediate, short and long term to repair and then enhance these industries. These reports were provided to the ISAF Commander, Major General JC McColl CBE who, in his own words, "had no doubt that these visits and the subsequent reports acted as the catalysts for the recovery of these two key industries" *(MS2.3.1. MS2 Governmental and Alliance Relations, 3 Provide Support to Regional Governments, International Organisations or Groups, 1 Produce Policy For and Co-ordinate Security Assistance Activities and Assist Civil Affairs in Theatre)*. These projects also helped to promote a secure environment *(T4.8.6, Tactical Level Task 4 Conduct, 8 Conduct Protection, 6 Conduct Passive Defence Measures)* and provided power and construction materials for the sustainment of the force *(T5.1.1. T5 Sustain, 1 Logistic support in the JOA, 1 Sustain the Force Using National, Allied and Indigenous Assets)*.

It was not surprising that the Joint Professional Meeting with the Institution of Civil Engineers in March 2002 focussed on security engineering. The Staff Corps was asked to nominate a speaker from civil industry. Sir Nigel Thompson KCMG CBE, a member of the Staff Corps and Deputy Chairman of Ove Arup and Partners, a leading company in this field, volunteered and gave a very informative presentation on the subject *(OP6.4.1. Operational Level Task 6 Protect, 4 Co-ordinate Force Security, 1Define and Establish Force Security Measures)*.

To assist Defence Intelligence Staff (DIS) Infrastructure Analysts understanding of how infrastructure works, the Staff Corps had enabled a number of visits for analysts to various facilities to be shown the processes involved. Staffing was also in hand to develop an Infrastructure Foundation course to be run at the RSME, for these analysts. The Acting Adjutant of the Staff Corps attended the course planning meeting in June 2002. The Staff Corps would support the course by providing subject matter experts and enabling visits to facilities as required. The first two of these annual courses have now run with two of the eight infrastructure topics being covered by Staff Corps members *(MS3.1.1. MS3.1 Plan and Direct Intelligence Activities, 1 Contribute to the Development of the Strategic Intelligence Policy)*.

In September 2002 I attended a LLG study day at Abingdon. This was the last in a series that had been investigating the anatomy of a campaign and how civilian logistics could enhance the military logistic chain. *(This series of study days examined issues relevant to a host of JET across the full spectrum of logistics)*. The study day also focused on how the Staff Corps interfaced with not only the various elements of the MOD, but also whether links should be extended to other Government departments (*MS2.1.4. MS2.1 Co-ordinate Military Activities within the Governmental Process, 4 Establish Interdepartmental Co-operation Structures)*. Prior to the study day, and subsequent to it, the Staff Corps have been proactive in developing this through meetings with, DfID, DTI and other trade and industry bodies.

As preparations for operations in Iraq began in the run up to Christmas in 2002, I once again began to receive requests for information and support from the Staff Corps from the JTFHQ who were exercising in Qatar. The initial request was for advice on mitigating the consequences of water inundation resulting from the deliberate release of water from dams and reservoirs in Iraq and for advice on dealing with the hazards associated with oil and gas fires resulting from the destruction of petrochemical facilities. In discussion with the Chairman of the ELG, a number of Staff Corps members were put on standby to provide this advice at short notice. On return from Qatar, the Joint Force Engineer (JFEngr) SO1 Infrastructure and the JFEngr SO2 Geographic/Engineer Intelligence wished to address these issues in detail prior to re-deploying at the end of January. The Chairman of the ELG therefore set up a meeting at the ICE with subject matter experts from the Staff Corps to discuss these issues. The meeting was also attended by staff from DIS. The Staff Corps were able to provide considerable intelligence on both subjects to assist in the operational planning. As a result of the meeting, it was considered appropriate for the staff in Theatre to be briefed on the issues directly. It would also be beneficial if those who would be conducting any operations to secure the oil and gas infrastructure, in the event of hostilities, received some familiarisation training. The Staff Corps therefore enabled a 2-day workshop at the Coalition Headquarters in Kuwait for the operation planners and commanders. A member of the Staff Corps flew out from the UK and the Staff Corps arranged for subject matter experts in the region, including those with direct experience of clean up operations in 1991, to attend the workshop. Direct access was also arranged for OC 516 STRE(BP) to oil company offices in Kuwait should he require advice above his level of expertise. *(OP2.1.8 OP2 ISTAR, 1 Plan and Direct Intelligence Activities and Reports, 8 Provide Follow On Intelligence Support to the OA Planners and Decision Makers).* Our US coalition partners, who also attended the workshop, were somewhat envious of our ability to tap into this support from industry. The workshop was considered as having played a significant part in the success of the operations that eventually secured the oil and gas infrastructure in Southern Iraq in March 2003.

Reconnaissance of the Sea Port of Disembarkation at Shuaiba, in Kuwait in January 2003 had identified a major shortcoming in the only available berth. Lack of a Roll-on-Roll-off (RoRo) facility meant that the ships already loaded and en-route with the Force equipment and vehicles would only be able to unload at very limited states of the tide, which would impose an unacceptable delay to the inload programme. The engineering solution of a floating link-span RoRo was simple but having it in place in the 21 day deadline to meet the first ship was the challenge. Working through the LLG, the Staff Corps enabled a floating platform with appropriate ramps to be designed and constructed in the UAE and towed to Kuwait in time to off-load the ships. ACOS J1/J4 at PJHQ considered this to be a remarkable achievement and a significant contribution to the war effort. *(MS5.1.4 MS5 Deployment and Recovery, 1 Determine the Requirement for Deployment and Recovery Support, 4 Obtain Strategic Lift Assets).*

It was identified early in February 2003 that the restoration of infrastructure would be key to the success of Phase 4 operations. The ELG met at the beginning of March to consider how the Staff Corps would provide advice on; oil infrastructure, water and sanitation, power generation, transmission and distribution, ports and

Ferry docking with the RoRo Linkspan enabled through the Staff Corps in Kuwait.

Staff Corps advisor with Iraqui electrical engineers.

airfields, quarries and refuse and land fill. As a result of the meeting, a number of Staff Corps members representing companies with expertise in these areas were warned off by the Acting Adjutant and Chairman of the ELG that they may be required to provide this assistance at short notice. The first request for this assistance came from Theatre in April with a requirement for electrical power experts to conduct a survey of the power generation, transmission and distribution in southern Iraq. Within the week, four experts, two from the generating and two from the transmission and distribution industries had deployed to Theatre for 10 days to conduct the survey and produce a report. This was the third such deployment for one individual, who had conducted the previous survey in Afghanistan and another in Kosovo in 1999. *(OP5.3.4. OP5 Conduct, 3 Peace Support Operations, 4 Plan and Conduct Transition Assistance)*

Also in April, the Staff Corps was able to provide design details of two key facilities. Prompted by a request from the Americans for the designs of Baghdad International Airport, the design details of Basrah International Airport were offered up by a member of the Staff Corps. The full set of over 1000 drawings were provided to the CRE (Wks) in Theatre, greatly reducing the time taken to re-commission this facility. In preparation for re-opening the United Kingdom's embassy in Baghdad, Theatre requested any information on the design of the existing facility and the Foreign and Commonwealth Office (FCO) Plans for re-establishing a presence in Iraq. Through a Staff Corps member in the Office of Parliamentary Works, contact was made with the appropriate desk in the FCO to provide this information. *(OP2.1.8)*

The next request from Iraq came in May 2003 for hydrology expertise. The slow deployment of specialist teams of the Coalition Provisional Authority (CPA), resulted in the UK forces being required to address a range of professional needs. Specifically a hydrologist was required to enable agro-economic regeneration by conducting an assessment of water resources and irrigation systems within the UK controlled regions of Southern Iraq. The senior hydrologist with significant relevant expertise provided by the Staff Corps also spoke Arabic as his first language. During his 10-day visit to Theatre he carried out the assessment, briefed to the military staff in Theatre, and met with various departments of the interim government to discuss the way forward. *(MS2.3.1 and OP5.3.4)* Although not channelled through the Staff Corps route, a request for a battle damage assessment of the communications infrastructure in Iraq was received from the Royal Signals. A recently recruited Staff Corps member within the communications industry arranged for 2 experts to deploy to Iraq to conduct the assessment and also enabled the provision of staff to assist in the longer-term re-commissioning. *(OP2.1.8 & OP5.3.4)*

In June 2003 a request was received from 535 STRE (Wks) in Northern Ireland. They had produced a design for an anchorage block using resin fixed rock bolts, which required the review of a subject matter expert to confirm the design principles. Through the wonders of modern communication, the appropriate Staff Corps member was contacted on holiday in Sardinia, furnished with the design over the internet and was able to give OC 535 STRE(Wks) NI the confidence to proceed with his design. *(T4.4.7. T4.4 Conduct Military Operations Other Than War, 7 Conduct MACP Activities)*

In July 2003 a request was received via UK Support Command (Germany). The Current

GOC is due to take up an appointment with the MOD in Belgrade from November 2003. The MOD building in Belgrade is a multi-storey structure that was severely damaged by the NATO bombing campaign in 1999 and the re-provision of a suitable facility needs to be considered. The request was therefore for an expert in assessing bomb damaged high rise buildings to visit the site and advise on whether to demolish or salvage the building and the method by which to do it. Through the Staff Corps an engineer, originally from Belgrade and visiting the University of Belgrade in August, was identified to carry out an initial assessment of the building. *(MS2.2.1. MS2.2 Foster Alliance and Regional Relations and Security Arrangements, 1 Enhance Regional Politico-military Relations).*

As I come to the end of my tenure in HQRE Th Tps, the security situation in Iraq is being severely affected by the condition of the country's essential services and the assistance of the Staff Corps is once again being sought to provide advice on the way forward. The day following the request a member of the Staff Corps attended a meeting at PJHQ and enabled the provision of contracted support to deploy to Basrah and assist the Infrastructure staff in preparing a plan to put before ministers on 28 August 2003. *(OP5.3.4)*

Throughout my two years in post, the Staff Corps have arranged placements for Clerks of Works Courses and RE Officers on the Professional Engineer Training course, as well as providing guest lecturers, MSc reviewers and critiques on end of course papers. *(MS4.2.5. MS4 Force Generation, 2 Prepare the Joint Force, 5 Develop, Conduct and Evaluate Joint Training).* Staff Corps members have sat on or arranged for subject matter experts to contribute to working groups reviewing; Military Engineering Volumes X (Electricity in the Field) and XII (Fuel Installations), Contractors on Deployed Operations, Public Private Partnerships and Supply Chain Initiatives. *(MS4.1.2. MS4.1 Formulate Concepts, Doctrine, Requirements and Development, 2 Formulate new Joint Doctrine and Force Development)*

The tremendous value offered by this extremely powerful and influential resource is clearly demonstrated by the examples of its utility over a period of just short of two years. In addition, there has been similar assistance to the logistic chain, of which I have not had full visibility, such as postal support to Mill Hill during Op *Telic*. Therefore, in answer to the question, there can be no doubt that for a Corps of only 60 officers that come at virtually no expense to the MOD, the Engineer and Logistic Staff Corps RE(V) provides an extremely varied utility that is just as relevant to Defence in 2003 as it was when established in 1865. In the words of Brigadier JS Kerr CBE, ACOS J1/J4 at PJHQ, "We are very fortunate to have such a wide network of expertise available to us in times of crisis. The Engineer and Logistic Staff Corps has been used on numerous occasions to give us access to the best and most appropriate British engineering firms and their advice has always been timely, accurate and impartial…"

For more information on the Engineer and Logistic Staff Corps RE(V) visit the website at www.thestaffcorps.army.mod.uk or contact the SO2 Infra Engr Sp at HQRE Th Tps (telephone 01722 436989 or Mil 94331 2989)

How the BD Sergeant Proved He Was Loved

C R Elliott

Christopher Elliott is from an East Anglian family who were general and marine engineers for three generations. He entered local journalism as a teenager in 1948 and subsequently held a number of London magazine posts, including that of assistant to the editor of the RAF's then flight safety journal, Air Clues*, and that of deputy press officer/journal editor for the Royal British Legion. For five years he was editor of the country's leading fire protection and prevention monthly. Author in 1971 of the book* Aeronauts and Aviators*, telling the story of flight in the Eastern counties from 1785 to 1939, he has had many articles published on boyhood incidents he witnessed in the Second World War (1939-1945), the bomb disposal account now published being typical.*

"I SEE you by these billets almost every evening and most Saturdays all day", she said as she dismounted from her cycle. "Do you really think *their* language is *your* language?"

"Don't know, Miss. All I know is that, in their game, they're here today and gone tomorrow. Coming to think of it, Miss, I can hear the same language at the cattle market on Fridays. Ever been there on a Friday, Miss?"

Miss Davenport, remounting her cycle, replied that she was unfamiliar with the market.

"And who the 'ell is that chicken?", cried a Cockney soldier's voice.

"She's my mistress", I innocently responded.

And so did the soldiers at the window! For the full significance of my remark never registered with me at the time.

My friends at the billets in London Road, Beccles, Suffolk, belonged to a detachment of No. 4 Bomb Disposal Company, Royal Engineers, who were responsible for that area. Their risky occupation: dealing with unexploded bombs and the like by day and night and often in dangerous underground situations.

Although I did not get to know them until, I think, 1942, one of their number, Major H J L Barefoot, who had Ipswich connections, had been awarded the George Cross in early 1941 "for numerous incidents and for continuous investigation of many types of bombs and fuzes".

Here, I quickly realized, was a really exciting branch of the Army. The element of danger (dare?) attached to their work, which made the chance of survival touch and go, caught my fancy.

Their local headquarters was in a commandeered house adjoining a butcher's shop. Slowly, from pavement chats with the men, I graduated into the front room and into their strange world of fuzes and wires and puzzle gadgets. To this room, after a bombing incident, were brought the latest fuzes to be reported on to London.

My best friend was the sergeant – a quiet man who smoked a lot and who was, I believe, a butcher in civilian life. He must have touched death many times. I wonder if he survived the war?

I got to know nearly all the men in the detachment, except the officer in charge, who was sometimes present in the room when I was with the sergeant at the "laboratory" table. He never once acknowledged me but, on reflection, I concluded it meant that he was prepared to turn a blind eye.

"You are not doing enough field work", said the sergeant one day. "You had better come with us one Saturday – to the bomb cemetery".

The long-awaited Saturday dawned badly with low clouds and drizzle. An air raid alert at breakfast time heralded a day of sneak raids by

The "C" type parachute mine – this one failed to explode in a back garden – was 8ft 8in in length without the tail parachute cone. It was a powerful blast weapon

lone Dorniers and Heinkels which, on swooping low, sometimes machine-gunned civilian targets, including passenger trains.

"Very far to go?", I asked the sergeant as he helped me aboard the truck with BD (bomb disposal) signs front and back. "To the cemetery down Cucumber Lane", he replied.

Cucumber Lane, 60 years ago, had a working sandpit on the left-hand side going from Beccles towards Weston, and it was in this area during the war that German ironmongery of every description was deposited: high explosive bombs, unexploded incendiary bombs by the thousand, faulty parachute flares and so on. A 12ft high barbed wire fence surrounded the entire pit and the gates were padlocked. It was a dangerous place for the uninformed and wasn't, in fact, very well known to my school pals.

Our work that Saturday, made so miserable by the drizzle from the North Sea, was to burn up dozens of incendiary bombs. Care had to be taken however, to separate the explosive type from the ordinary ones – the type we were destroying. For easy handling purposes, the Germans hand-painted the nose caps of the explosive type with a red "A". Soon, with hundreds burning, it was impossible to approach the magnesium inferno.

"What about some tea?", suggested the sergeant.

"Corporal, take two 500 pounders, melt out the explosive, and brew a can of tea on the end product", ordered the sergeant.

Thus I was initiated, heart beating fast, into bomb disposal. The 500 pounders, their green fins and base plates removed, were then rolled into position and a fire kindled. Soon a yellow polish-like substance began to spread out on the ground around the fire. And over the flames our tea can swung on the bent rod from an incendiary bomb container. We were certainly the tinkers of Cucumber Lane!

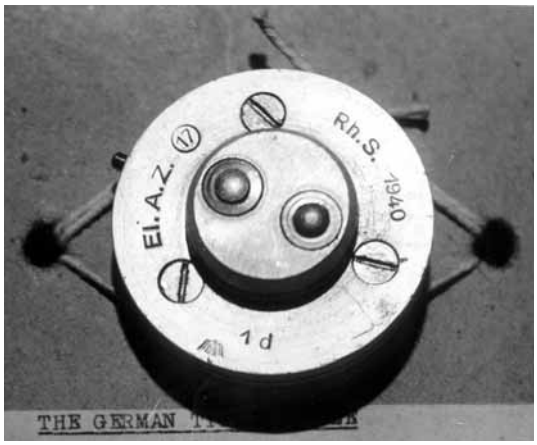
"Sergeant, I know the fuzes have been removed but – but just supposing they are fitted with hidden heat sensitive fuzes", I suggested with a look of terror in my eyes.

"Too bad", said the sergeant. "You won't know anything about it if this lot goes up. Besides, it's too cold to wonder. Huddle closer and enjoy the enemy's warmth".

"Tea was made and dished out in chipped enamel cups rather like those I had seen tramps carrying, then five steaming cups were placed on one of the warm bomb cases. I was terrified.

"When we've melted out the explosive", explained the sergeant, "the empty cases will go for

Brace of German 1kg incendiary bombs with the top example's tail exposed to reveal hidden explosive charge.



An inert German No 17 fuze in the writer's collection.

scrap – and then back to Hitler via RAF bombers".

Meanwhile the melting process went on. Drizzle continued to fall, as it had done since dawn, and down between the two 500 pounders on a groundsheet two of the squad snoozed at the enemy's expense!

Other members of the squad wandered out of the pit to talk to some girls on cycles. Then the sergeant disappeared into a disused pit across the water splash that ran in those days at the Weston end of Cucumber Lane.

Five minutes later there was a sharp explosion from the sergeant's direction, a piercing scream of pain, and high over the trees, flailing its arms, soared a body in a greatcoat – an unidentified body.

"Quick, it's the sergeant", the men cried as they dashed towards the spinney into which the body, as it looked to us, had crashed like a winged pheasant.

Then, suddenly, we became aware of the truth – the base truth. A voice from nowhere addressed us thus: "I know you all love me", it said. And there, standing on the green bank, arms outstretched and all smiles, was the sergeant pleased that his little prank had worked and that the body – a potato sack filled with wet cabbages and dressed in a scarecrow's wet greatcoat – had soared heavenwards as planned!

Thus, for better or for worse, I was initiated, against my English mistress's wishes, into the secrets – and the horseplay – of bomb disposal.

Memoirs of a Canadian Mapper

WARRANT OFFICER E STOREY CD CME

Following four years of reserve infantry service, Warrant Officer Ed Storey enrolled in the Mapping and Charting Establishment, Canadian Military Engineers in 1982. WO Storey is qualified as a Map Reproduction Technician, Terrain Analyst and as a Geomatics Technician. He has had several deployments, which include 12 months with UNPROFOR (1993-94), Central Africa (1996), Honduras (1998) and with SFOR in Bosnia (2000-2001). WO Storey is an "armchair historian" and an avid collector of Canadian Army Militaria and he is working on collating historical data on Canadian military geomatics. For the first six months of 2003 he was employed on the CME 2003 Centennial Committee, he currently has a seat on the Executive Committee of the Canadian War Museum and is a Board Member with the Friends of the Canadian War Museum. WO Storey resides in Ottawa and is married with two children.

Introduction

THE First of July 2003 marked the turning of the century for the Canadian Military Engineer Branch of the Canadian Forces – a multi-disciplinary team that prides itself in being highly professional and very technical. Canadian Military Engineers serve the Army, Navy and Air Force on land and at sea. The Branch consists of four primary functions: combat engineering, airfield engineering, fire-fighting and geomatics.

The bonds that bind Canada's military engineers with those of the United Kingdom are long established and everlasting. In tribute, the paragraphs that follow speak of this relationship through the memoirs of Gerry Andrews, a former Royal Canadian Engineer commanding 30 Air Survey Section in Britain during WW2.

Military Mapping, or Geomatics as it is now known, was established in 1903 as a component of the Intelligence Branch. The mappers "cut their teeth" while supporting the Canadian Corps in France and Flanders as part of the Royal Engineers 5th Field Survey Battalion during the Great War. During WW2 three Survey Companies, a Map Depot and a Training Depot were fielded. Mappers have always been at the forefront of cartographic and survey technology, embracing aerial photography to aid in map production during the Great War and further refining the mensuration of aerial imagery during the Second World War. One of these organizations was 30 Air Survey Section.

Gerry Andrews

GERRY Andrews was born in Winnipeg, Manitoba in 1903, coincidentally the year in which both the Engineer Branch and Geomatics were instituted in Canada. He went to High School in Calgary and following graduation in 1918 was looking towards a career in forestry. He started post-secondary education at the University of British Columbia in 1919 taking an Arts program and he graduated with a Teacher's Diploma at Vancouver Normal School in 1922. Four years of teaching in the remote Metis community of Kelly Lake, Manitoba saved him

Gerry Andrews, Fort Widley Hants, 1940.

30 Air Liaison Section, 1944.

enough money to start his forestry program in Toronto. He also attended summer school studying math and French at the University of Manitoba in order to confirm his admission to Forestry at the University of Toronto which had an established reputation in this field of study.

Four years of study at the University of Toronto as well as the summers spent working in the wilderness of Quebec and British Columbia not only earned him a Batchelor of Science in Forestry with first class honours for his studies, but also a love and appreciation of the forests of the British Columbia (BC) interior. After graduation, he took a job with the Surveys Division of British Columbia.

Vertical air photography was being experimented with in conjunction with the RCAF for forestry and hydrography during the early part of the 1930s. During this time, Gerry gained some valuable experience producing maps and timber summaries of the BC interior from vertical photography.

With his work completed in 1933, Gerry worked his passage on a Norwegian freighter from Victoria, British Columbia to London via Panama. Once in England he took up study of Air Survey at Oxford where the work involved interpreting soil types from air photographs. While at Oxford he arranged to study photogrammetric optics, mathematics and instrumentation for 10 weeks with the then famous Professor Dr R. Hugershoff in Tharandt bei Dresden. Much time was spent in the laboratory learning to operate the Zeiss Stereoplanigraph. The professor's English was poor, so it was during this time that Gerry learned German. Since employment in Canada was still bleak, he stayed for the post-graduate winter session where he went to Jenna for a 10-day course at the Zeiss Werke, all of which was in German. Other participants were army officers and engineers and at this time he got to see the prototype of the Zeiss Multiplex. His stay in Germany was very pleasant and he got to meet many of the top international experts in the field of photogrammetry. He also got to experience the early rise of the Nazi party in Germany.

He had to cut short his studies due primarily to a lack of funds and made his way back to Scotland via Berlin. A CL Pack Foundation bursary cheque of $500.00 allowed him the funds to return to Canada well armed with letters from various VIPs and organizations including the Air Survey Committee, GSGS and the War Office. Since he was a young student fresh with exposure to the latest German techniques he had no trouble visiting such North American institutions and personages as Fairchild and their camera works in Long Island, Colonel Birdseye of the USGS, Major Bagley and Captain MacDonald of the US Army Air Force, Paul Laframbroise of Canadian Airways and Major ELM Burns from GSGS in Ottawa. Gerry Andrews' time abroad was paying dividends, especially during the height of the Great Depression.

In May, 1934 Gerry was hired on again with the British Columbia Forest Survey Division as the air photography expert. With 50 lbs of photographs, he and Dr Schultz covered 1,400 miles of BC interior doing volume measurements and species identity.

In 1935, using 1926-31 vintage RCAF photography of Esquimault, near Victoria, all at various scales, Gerry wrote his Professor of Engineering thesis on his pioneer work on researching tree heights from air photographs by simple parallax measurements.

September 1936 saw the need to map over 500 square miles near Nanaimo, British Columbia of which there was no photography. Gerry hired the aircraft and borrowed the camera, in this case a Waco on floats and a camera from the Great War, all mounted over a hole in the floor. Over a smaller hole was installed a Zeiss Ikon plate camera. The photographs were reported poor, but proved that imagery could be flown when and where required and that with good camera equipment, good photographs could be taken.

An Eagle III 5x5 inch format camera with accessories was ordered from Williamsons in London in the spring of 1937. The 1937 air photo program was 2,400 miles of Sitka Spruce timber on the Queen Charlotte Islands. The resulting photographs plotted well giving scope for qualitative interpretation. The giant Spruce towered conspicuously above the surrounding Hemlock Cedar forest.

A steady supply of camera parts from Britain and a good pilot resulted in over 8,000 square miles of imagery being flown in 1938 and 1939. During the flights, a crude oxygen supply system was required over 16,000 ft and radio communication was used between the ground parties and the aircraft. It was at this time that Bill Hall became a member of Gerry's office staff and was to become his assistant.

Personal highlights were a marriage to Jean Bergtholdt in 1938 and a daughter, Mary, born in 1939.

Such was Gerry Andrews pre-Second War experience with air survey that it was only natural that he would be employed in the same line of work while in the military. Here are his written recollections of an Ordeal by Fire:

GERRY ANDREWS' OWN STORY

"On our return to Victoria from the North, late September 1939, I had to tidy up the usual aftermath of field operations. Bill Hall, a Lieutenant in the Militia, was assigned at once to a local Searchlight Battery, RCA. I never had time for peace time soldiering but had no doubts about Hitler whom photo intelligence could be vital in opposing. A young officer from Winnipeg who knew my family there was on staff at the local RCAF Command Post (Roy Slemon, later Air Marshal). Early October I found him, identified myself and offered my services. He gave me a polite brush off, affirming that the RAF was handling all air photo intelligence. I was now in a dilemma. Meanwhile, we were busy cataloguing, indexing and plotting our new air photo cover. Bill Hall, was sorely missed.

Bill Hall

I wrote to the Air Survey Committee, GSGS, War Office, London, reminded them of my visit in 1934 and outlined my activities since. They replied to come at once, offering a commission in the Royal Engineers and said to bring my assistant, Bill Hall. He was delighted, being bored with his local duties. Red tape delayed our departure till early April 1940. Shipmates ex St John, New Brunswick, included Gen PJ Montague, GOC, CMHQ London, from Winnipeg, who knew my lawyer uncles there. At CMHQ London, I met Col ELM Burns, ex GSGS Ottawa. He remembered my visit in 1934 and remarked that the Canadians could use my knowledge of air photo plotters. CMHQ referred us to the British War Office where Bill was TOS as a Lieutenant and I as Second Lieutenant, in RE Svy. He joked about him now being my senior in rank! We reported to the RE Survey Training Centre at Fort Widley near Portsmouth. We met fabulous survey officers from all parts of the Commonwealth, who like ourselves had rallied to the Cause. They became know as "Calder-Wood's Cavalry" due to their galloping promotions (well merited except in my case). Calder-Wood, on staff at GSGS, was alleged to have kept a list of likely survey officers having anticipated their value in War. I met him in 1934 and he had signed the letters which brought me to Britain now.

Initiated to soldiering, I hated orderly duty. They made me Mess Secretary, a crash course in "l-s-d". In May survivors from Dunkirk joined us. We had a grandstand view of the first air raids on Portsmouth. Mid June, Bill and I were alerted for North Africa with leave and money to get tropical kit. Bill went but I was detained for transfer wef 10 July, to 1 Canadian Corps Field Survey Company at Southampton, where a new stereoplotter based on ideas of HG Fourcade and EH Thompson, built by Barr & Stroud, was installed at the Ordnance Survey. Burns had arranged this. Hitler interfered by dropping bombs on the Ordnance Survey. Lt WK MacDonald and I were detailed to salvage bits and pieces of the plotter. The reason for my transfer to the Canadians was thus aborted and Burns was too preoccupied to bail me out. Officers of this Canadian unit were Major WJ Baird, Lts SG Gamble, TW Kelly, WK MacDonald, JM Robinson, CE Soutar and JT Wilson. S Pink was CSM. Some ORs got commissions later, plus the DLS and CLS.

I was SOS the RE paylist immediately, but was not TOS for Canadian pay till late October when my transfer appeared in Orders. My wife had to find a job and my brother officers staked me with loans. Soon we moved to Weybridge near London. I got fed up with housekeeping jobs so, late December, demanded an interview at Corps HQ. Within a week I was transferred there as Lt, Photo Int Offr, under command of Major the Lord Tweedsmuir, a fine gentleman with a Canadian background. Soon I was paraded before Gen AGL McNaughton who shared my views on small air cameras. I learned later that he was born at Moosomin, North West Territory (now Saskatchewan) where his parents must have known my missionary grandfather, the Rev Alfred Andrews and my uncles who homesteaded near there in the 1880s. The General authorized me to consult with the Ross Optical Co, Adam Hilger, Eastman Kodak and Williamson Mfg Co in London, Chance Bros Glass Works in Birmingham and the RAF Research Establishment, Farnborough, re improved optics, mechanics and photochemistry, for a super small size air camera. I met wonderful scientists and craftsmen. In promotions to Capt, GSO 3 and Major GSO 2, with widened responsibilities under Lt Col HL "Jerry" Meuser, a fine career officer, I also continued the small size camera project. Meanwhile I won the friendship of AR Hinks, CBE FRS at the RGS in London, who asked me to give a paper to their meeting, on the 2 March 1942. All survived and my paper was published in July, beautifully edited and illustrated. In October 1942 I was elected Fellow of the RGS, nominated I'm sure by Mr Hinks.

In June 1943, McNaughton assigned me to mobilize and command a Cdn Air Svy Liaison Sect to finalize specs, coordinate and monitor production of 25 Eagle V Air Camera units especially for the Canadian Army Ordnance Survey. I chose Harry Luscombe as Capt GSO 3 on condition that he do the housekeeping. Harry wore First War ribbons and had worked for Fairchild in Los Angles. For closer contacts we moved to central London with personnel billeted out. On fire watch duties above our premises we witnessed spectacular displays of searchlights, ack-ack fire and incendiary bombs. In August 1943 McNaughton sent me to Ottawa to consult with the NRC about a tricamera mount for the Eagle Vs. This took about a month, including a spot of leave with my family in Victoria. A little brother for Mary did not accrue. On the flight back to Britain, Gen Burns was aboard. He seemed preoccupied. I visited the De Havilland factory in Britain to check Eagle V camera installations in the new Mosquito long range aircraft. A low priority project was a mock up of my simple stereo plotter, which Williamson put together. When I discussed it with Brig Hotine, he showed no interest. McNaughton's recall to Ottawa, December 1943, was a grievous blow, but did not halt our Eagle V camera production, now well advanced.

His Majesty's New Year's Honours List, 1944, included my name as a "Additional Member, Military Division of his Most Excellent Order of the British Empire". The Investiture followed at Buckingham Palace on 15 February. My batman, Cpl Goddard, a lovable rogue, turned me out immaculately. I think His Majesty envied the sharp creases in my pants and the shine of my buttons and shoes. He was indeed gracious. I have been a Royalist ever since. I still do not know whom to thank for this, which is just as well. I share the honor with my loyal and efficient crew and with several sponsors, who have been mentioned. After McNaughton's recall, my unit was transferred to CMHQ for administration etc. We had an inspection by Gen Montague with his retinue. He remembered our Atlantic voyage early in 1940 and teased me about my soldiering but noticed my lone MBE ribbon. They were interested in the new Eagle V cameras and my plotter with which the uninitiated could easily see the 3-D model and move the floating mark over and on it. I realize now that we were being appraised for a new and vital role.

For Operation *Overlord*, a desperate need was detailed hydrography of approaches to the invasion beaches. Due to enemy occupation this could be obtained only by stealth. Major W W Williams RE, a Cambridge professor, proposed use of a classic hydrodynamic equation correlating velocity of waves approaching the beach with depth of water below. The velocities could be measured on timed overlapping air photos. Tests at Bideford, Devon were good enough for High Command to order operational trial. This involved 140 Photo Recce Sqn RAF and an Air Survey Liaison Section RE, based at Benson to get the right photos and my Unit was selected to do measurements, comps and compilation of profiles. When we received the first operational pho-

tographs on 8 Feb 1944, I was dismayed that they were from an obsolete narrow-angle 7x9 inch format US camera modified to record precise time and altitude for each frame. Had McNaughton or I been consulted, they could have used our superb Eagle V cameras. We started with the Bideford procedure but soon contrived improvements, especially to approximate and correct for tilt. I organized my crew according to observing, computing and plotting skills. For speed and simplicity, graphics were favored and equipment had to be simple due to shortages.

Security was paramount. We plotted our work on detail charts of the actual beaches. I tried to bluff my crew, each of whom had been fully vetted, that our work might be just a decoy for Hitler. Mid March we moved to commodius quarters near Pyrford Heath West of London and did our own housekeeping. Liaison with SHAEF at Bushey Park was by Lt Col WE Browne, MBE, a fine New Zealander. The avidity with which he whisked our profiles to SHAEF suggested the importance of our work. Morale was excellent. On D-Day when the radio announced the exact location, my crew shouted in unison "*OUR BEACHES*!" We had filed more than 100 profiles, covering some 20 miles of beach, centred on Arromanches. Hopefully our efforts had saved precious lives.

The pressure ended abruptly. We stayed in situ, tidying uptidying up and resumed monitoring the Eagle V cameras. I wrote a full report on our wave velocity program for discreet distribution. Late October 1944 I went to Arromanches to check the photo profiles against echo soundings, with Port Hydrographic Officer, Lt Comd WM Passmore in HMS *Gulnare*. Bad weather, submerged hazards and uncertainty of exact location allowed only 21 checks, of which seven were good, nine fair and five poor.

In December 1944 I made short visits to Canadian Survey and Intelligence units in NW Europe. At Pyrford we had a stream of visitors, including Sqn Ldr TH Bell, Photo Officer, RCAF. I was involved with Professor JD Bernal's Beach Intelligence Committee of Combined Operations in London. Plans to send us to the Far East did not gel. I prepared a report about the optical features of the Eagle V camera. Williamsons in London completed a prototype of my plotter. Lt Ottis W Rechard of the US Army arranged air tests of our Eagle V cameras by the USAAF and helped me with some occult perspective geometry.

Lt Ottis W Rechard

Early May 1945, as Lt Col, GSO 1, I was sent on a solo mission, eastbound, to various war theatres to report on Military Survey, Air Photo Intelligence, and plans for post war rehabilitation. Before leaving I arranged for shipment of all 25 Eagle V Air Camera units and accessories to Ottawa for ultimate disposal. My itinerary included Italy, Egypt, the Sudan, East and South Africa, Palestine, Bagdad, Karachi, Delhi, Dehra Dun, Ceylon, Australia, New Guinea, the Philippines, and Oahu. I left Britain 12 May and arrived San Francisco 9 Sept. I witnessed VJ Day in Guam and again in Oahu, having crossed the Date Line. For fun I claimed pay for the extra day which was denied. I knew why but doubt if the Pay Office did.

Most moves were by air, but welcome interludes by rail were in Egypt, East and South Africa, Rhodesia, India, Ceylon, and Australia. Air travel is fast but so superficial. I enjoyed meeting old RE friends from Fort Widley (Calder-Wood's Cavalry).

My host at Dehra Dun was Sir Oliver Wheeler, then Surveyor General of India. I learned that his famous father, AO Wheeler, OLS, DLS, BCLS, had died 20 March 1945. I think it was in Pretoria, when introduced, someone exclaimed, "You must be Tree Height Andrews!" Fame or notoriety.

Late 1945, after leave and some overdue surgery in Victoria, I spent January and February in Ottawa finalizing my official report. I was sent to Washington DC for a week in January to visit

the US Army Map Service and to attend the AGM of the ASP. I was demobbed in Vancouver, March 1946.

My six years in uniform, like the five years between high school and university were not lost time. After the initial frustration, my war service was a veritable post-graduate program. Providence caused many wonderful people, both civilian and military, to inspire, enlighten and help me".

POSTSCRIPT

BY way of a postscript, upon his return to Canada, Gerry Andrews served as Chief Air Survey Engineer for British Columbia; and as British Columbia Surveyor General and also as the Director of Mapping and Provincial Boundaries Commissioner.

He was a consultant to several countries and was involved with the Mekong River Study. A keen historian, he authored some 50 publications, and continues to write articles for the British Columbia Historical Society.

Gerry is the recipient of the Meritorious Achievement Award from the Association of Professional Engineers of British Columbia, and an Honorary Doctorate in Engineering from the University of Victoria. As a personal recognition, the author wishes to acknowledge the assistance of Gerry Andrews' daughter Mary.

Journal Awards

The Budget, Investments, Membership, Scholarship, Memorial and Publications Committee announces the following awards for articles of special merit published in the August 2003 issue:

EXPEDITIONARY AIR SUPPORT – OPERATION *FINGAL*, AFGHANISTAN
Maj J V White – £100

ENGINEERS ON THE HOOK, KOREA, NOVEMBER 1952 – JULY 1953
Col V H S Hannay OBE MC – £100

EMERGING NATO JOINT ENGINEER DOCTRINE AND THE EMPLOYMENT OF ENGINEERS AT CORPS LEVEL
Lt Col D G Bowyer – £100

THE DEFENCE – DO WE THINK WE CAN STILL DO IT?
Maj S A M Fawcett – £75

WHERE DOES ALL THE S**T GO?
Maj M P Walton-Knight – £50

OPERATION TELIC

Editorial Comment

The articles that follow have not been edited. In the first part they are the reports from the various desk officers that made up the main Royal Engineer Headquarters supporting the deployment of the equivalent of six engineer regiments on Operation *Telic*. These officers were not part of a permanent Headquarters but were brought together to form this particular role. Most of them had not served or worked as a team before they met up in Qatar. Their articles were written at the end of major hostilities whilst the individuals were still in theatre.

The second group of Operation *Telic* articles are based on the demands placed on 36 Engineer Regiment before, during and after the conflict. The Regiment deployed as a formed body.

Whilst I welcome any interesting individual articles on specific events, either pre or post conflict, I do not intend to publish more Operation *Telic* material based on unit contributions.

Operation Telic

COLONEL N M FAIRCLOUGH OBE BA CGIA

Colonel Neil Fairclough was commissioned into the Corps in 1978, completing tours at 1 RSME Regt, 35 Engineer Regiment, Defence NBC Centre and 32 Armoured Engineer Regiment before ASC Division II at Shrivenham and Camberley; a staff tour in the MOD followed. Command of 29 Field Squadron and 35 Engineer Regiment were separated by a tour as SO1(DS) Countermobility at Shrivenham. After a tour as Chief of Exercise and Training Branch LANDCENT, in Heidelberg, he assumed the post of Col Engr Ops in HQRE Th Tps and was nominated to be the Joint Force Engineer for Op Telic. *He has recently taken up a new appointment as DACOS Int/Sy in HQ LAND. He has operational experience of Northern Ireland, Croatia, Bosnia and Kosovo.*

Background

TELIC is the name for the UK operation in support of US Operation *Iraqi Freedom*. The UK provided Maritime, Land, Air and Special Forces Contingents to the US Maritime, Land, Air and Special Forces Components, and a national Joint Force Logistics Component. Air Marshal Brian Burridge, Deputy Commander-in-Chief Strike, was the designated UK National Contingent Commander in Qatar. The UK National Contingent HQ was based upon the UK Joint Force HQ, commanded by Brigadier (Major General) Peter Wall who filled the role of COS until he was relieved in order to take leave prior to returning to Basrah as COMBRITFOR (as GOC 1 (UK) Armd Div) in May. Within the UKNCHQ a Joint Force Engineer Branch was established under Colonel Neil Fairclough, bringing together all engineer staff functions and assuming command of Engineer Force Troops.

Four thousand regular, reserve and TA Royal Engineers deployed to the Middle East Theatre of Operations *(see Map 1)* to support the UK contingents/component. Map 2 shows the 1 (UK) Armd Div AO.

The command and control structure for 15 March 2003 is shown in Figure 1.

JOINT FORCE ENGINEERING IN PRACTICE – OPERATION TELIC

Introduction

In the immediate aftermath of an operation the coordinated record or history produced is usually restricted to classified lessons identified and post-operational reports. And, of course, these have been written and submitted. Over a number of years following an operation, personal accounts will be written for Corps, and other, journals and many of them will be both interesting and stimulating. I have read many of those written after other operations and they have formed part of my military education. In many respects the passage of time allows the author to reflect and, perhaps, produce a more thoughtful product than one written "in the heat" of the action. However, they are generally stand-alone articles; many will lack some of the context that can be provided best by a more complete record, and they will have lost some immediacy. To my mind, there is a particular value to a contemporary record; a collection of the immediate reflections of individuals involved in the operation, from which initial conclusions are drawn. I acknowledge that there is the potential for significant differences of opinion among the writers and also the risk of losing the benefit of hindsight and reflection but this should be more than compensated for by the freshness of the views.

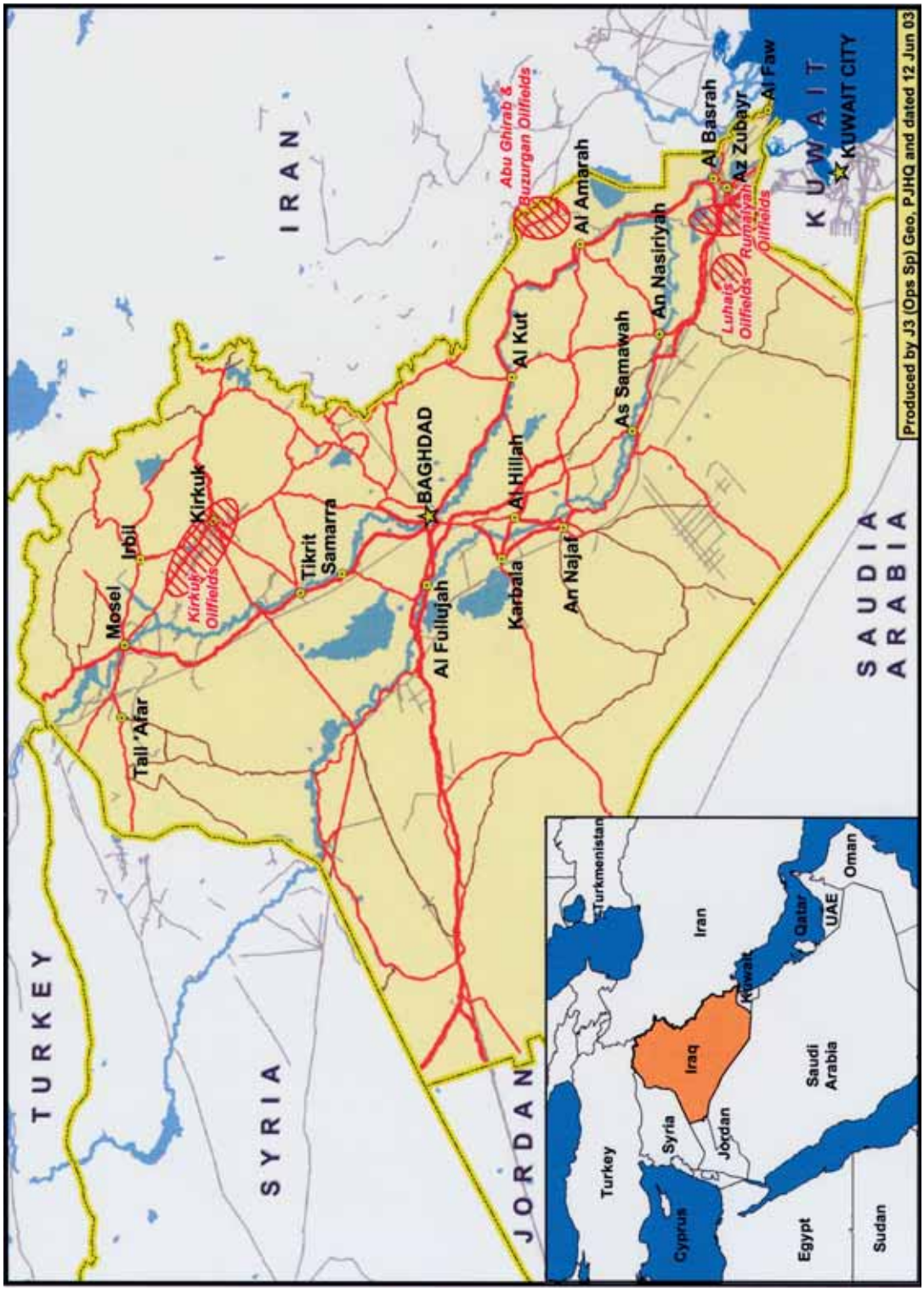
To provide this contemporary record, I asked all of the Joint Force Engineer staff in the United Kingdom National Contingent Headquarters (UKNCHQ) and each of the contingent/component CsRE and engineer commanders to write their initial thoughts on their experience of Op *Telic* in the format of an article for the *RE Journal*. I have exercised no editorial control of any sort and will concentrate, as I promised to them so to

JF ENGR C2 STRUCTURE – OP TELIC AS AT 05 MAY 03			
JF ENGR	**UKLC**	**UKAC**	**JFLogC**
OPCON	**OPCON**	**OPCON**	**OPCON**
64 CRE (Wks)	**23 Engr Regt**	**39 Engr Regt**	70 (Gurkha) Fd Sp Sqn
507 STRE (Rlwy) (V) (-)	9 Para Sqn (Air Asslt)	34 Air Sp Sqn	
516 STRE (BP)	12 HQ Sqn (Air Asslt)	53 Air Sp Sqn (-)	
517 STRE (BP) (-)	51 Fd Sqn (Air Asslt)	60 HQ & Sp Sqn	
521 STRE (WD) (-)	61 Fd Sp Sqn (Air Asslt)	529 STRE (AS)	
524 STRE (Wks) (-)	**28 Engr Regt**	532 STRE (AS) (-)	
527 STRE (Wks)	23 Amph Engr Sqn	533 STRE (AS) (-)	
528 STRE (Util) (-)	29 Armd Engr Sqn		
JFEOD Gp	64 HQ Sqn		
BD teams	65 Fd Sp Sqn		
14 Geo Sqn	**32 Engr Regt**		
	2 HQ Sqn		
	25 Armd Engr Sqn		
	26 Armd Engr Sqn		
	31 Armd Engr Sqn		
	39 Armd Engr Sqn		
	59 Indep Cdo Sqn		
	131 Indep Cdo Sqn (V) (-)		
	36 Engr Regt (-)		
	50 HQ Sqn		
	69 (Gurkha) Fd Sqn		
	TACOM (UFN)		
	BD teams		
	14 Geo Sqn		
	53 Air Sp Sqn (-)		
	64 CRE (Wks) (-)		
	507 STRE (Rlwy) (V) (-)		
	521 STRE (WD) (-)		
	524 STRE (Wks)		
	527 STRE (Wks)		
	528 STRE (Util)		

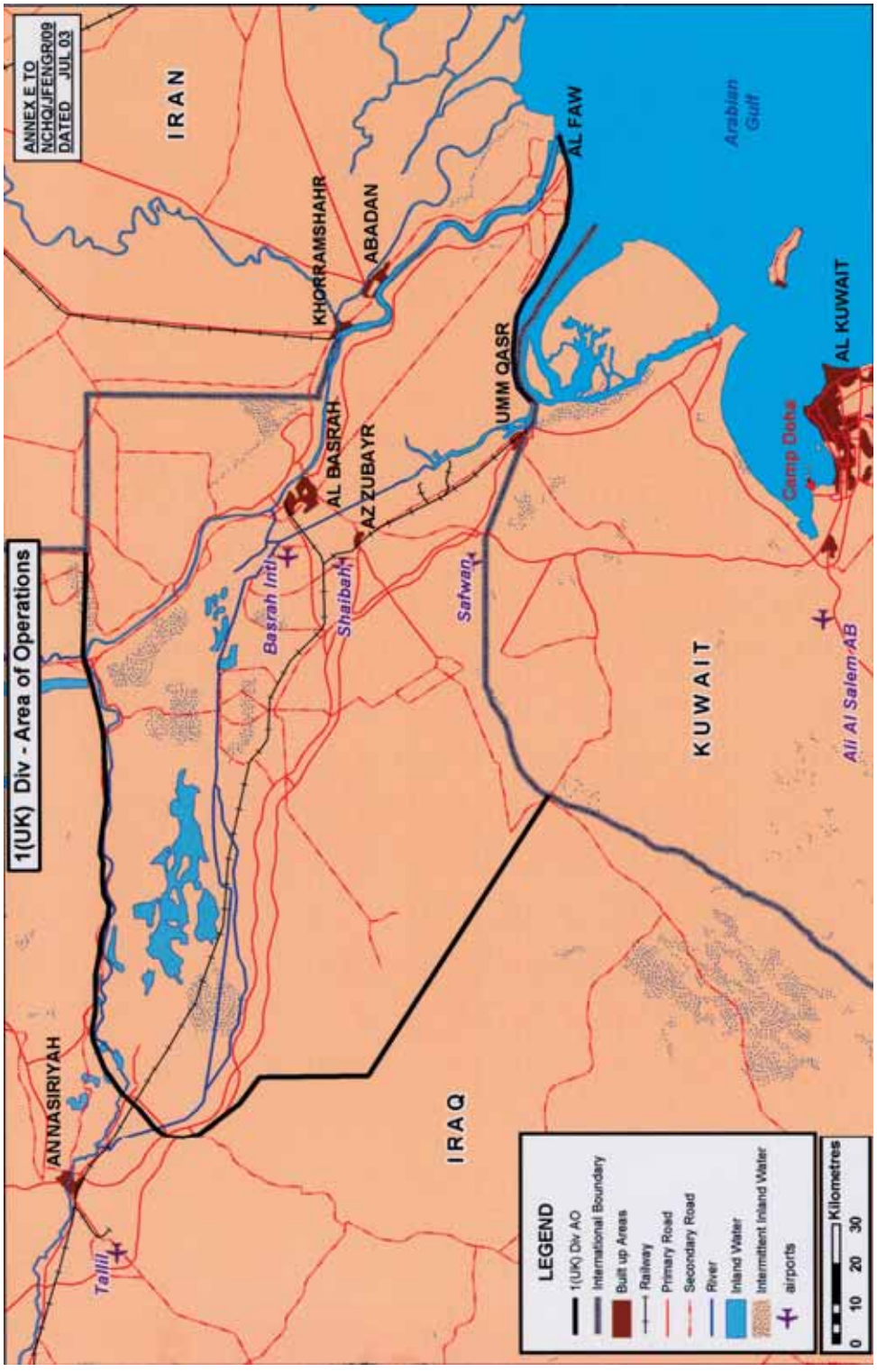
Issues:

1. FRAGO 1. Retrospective order for resubordination of 36 Engr Regt assets to UK LCC. TACOM UFN Recce Tp / Shielder Det 50 HQ Sqn to 1 Div.
2. FRAGO 2. Retrospective order for specialist BP support to operations to secure the Rumaylah Oilfields 516/517 STREs (BP)
3. FRAGO 3. Immediate support to Iraqi Infrastructure TACOM elements 64 CRE (Wks) as Recce Gp TACOM 1 Div UFN
4. FRAGO 4. Resubordination of JFLogC assets to UKLCC in support of Phase IV operations. TACOM 20 Fd Sqn Gp (incl 1 Tp 69 (Ghurkha) Fd Sqn) to 1 Div LD-3 to LD+4 (or UFN).
5. FRAGO 5. Resubordination of UKAC assets to JFLogC to support infrastructure in Kuwait. TACOM Elements STRE Air Sp to JFLogC.
6. EOD Resubordination to be issued by JFEOD Comd.
7. FRAGO 6. Resubordination of JFLogC assets to 1(UK) Armd Div in support of Phase 3B ops. 14 Geo Sqn TACOM to UK LCC.
8. FRAGO 7. UKAC Engineer Support to 102 Log Bde for Phase 3 Tasks. Resubordination of 48 Fd Sqn (AS) from 39 Engr Regt / elms of 529 STRE (AS) TACON to 102 Log Bde.
9. FRAGO 8. Generation of EOD Support Capability to Sensitive Site Exploitation (SSE).
10. FRAGO 9. Resubordination of 516/517 STRE (BP) assets to OPCON CRE 64.
11. FRAGO 10. Resubordination of JFLogC / 102 Bde / UKAC assets. Resubordination of 20 Sqn Gp back to 36 Engr Regt (less BGE (Recce) party).
12. 36 Engr Regt TACOM to 102 Log Bde. 102 Log Bde TACOM to UKLCC.
13. FRAGO 11 (NCHQ FRAGO 022). UKAC Engr support to UKLC Engrs. 48 Air Sp Sqn, previously OPCON UKAC resubordinated TACOM to UKLC.
14. FRAGO 12. 64 CRE (Wks) Support to ORHA Southern Region.
15. NCHQ FRAGO 027. UKAC Sp (53 Fd Sqn (Air Sp)) to 1 (UK) Armd Div – Rear Area Sy.
16. NCHQ FRAGO 030. 48 Fd Sqn (Air Sp) Redeployment to UK.
17. FRAGO 14. UKLC / 64 CRE (Wks) / JFEOD Gp / JFLogC Sp to British Embassy Reestablishment Recce.
18. NCHQ FRAGO 037. Resubordination of 53 Fd Sqn (Air Sp) Gp in sp of UKLC.
19. FRAGO 15 (NCHQ FRAGO 038). Resubordination of 64 CRE (Wks) to UKLC.
20. NCHQ FRAGO 039. Resubordination of 14 Geo Sqn TACOM to UKLC.
21. NCHQ FRAGO 043. Change of Command Status of 64 CRE (Wks) to UKLC.
22. NCHQ FRAGO 044. Resubordination of 53 Fd Sqn (Air Sp) Gp in sp of UKAC.
23. NCHQ FRAGO 045. Change of Command Status of 14 Geo Sqn to UKLC.
24. NCHQ FRAGO 046. Resubordination of 36 Engr Regt to UKLC.
25. NCHQ FRAGO 047. Drawdown of JFLogC Engr Staff.

Figure 1 – Command and Control Structure 15 March 2003



Map 1 – Middle East Theatre of Operations.



Map 2 – 1 (UK) Armd Div AO.

do, on bringing out common themes and differing viewpoints. Of course, I will offer my opinion but as my personal view only, not the prescriptive or prevailing view. I am grateful that they contributed their articles at a busy time for them all.

For my part, I also want to highlight what to me are the key issues for the Corps going forward. At the UNCLASSIFIED level I will comment on doctrine, the Royal Engineers "family", RE command and control, force generation, Coalition operations, communications and staff planning. Equipment and force structure issues are addressed more completely within the post-operational reports.

Doctrine

MANY readers will have read the article by Brigadier Mans on Joint Force Engineering[1]. As Chief Engineer ARRC, Brigadier Melvin initiated a parallel, NATO, approach with 'AJP 3-12 Joint Engineering'. As the US had adopted the NATO doctrine, albeit in draft form, we adopted the NATO Draft AJP 3-12 as the base doctrine rather than pursue what were essentially minor national preferences. The UK National Contingent Commander, Air Marshal Brian Burridge, the NCHQ staff and PJHQ all recognized the value of the Joint Force Engineer concept and I do not believe that we will ever have to fight to establish the joint engineer staff; just battle to resource it appropriately!

The key doctrine question is – On lessons from Op *Telic* is there anything in the doctrine to take serious issue with? I might be a little less prescriptive in the use of the terms combat and force engineering; I might offer a slightly different view on some of the command and control issues and I would stress that we have to find workarounds if the "ideal" is not possible. But, in sum, probably not. If you need a "starter for 10" on joint engineering, Brigadier Mark's article is the most readily available, and reading it will aid understanding of the following articles.

The Royal Engineers

TO readers of the *RE Journal* it may seem surprising to see a section headed "The Royal Engineers". But I think I need to do so because I believe few members of the Corps really understand what contribution we make to operations – from planning support, through the execution of the operations themselves to post-operational activities.

Read John Kedar's article "Ubique", cut through some of the "geotechnospeak" and understand that they are a Defence asset, under an "intelligence" 3-star with an "Agency" Chief Executive; individuals who are not Sappers and who view "their" Geo in very different terms than we do. Ian McDougall's article gives us an idea of some of the things we must do if the Corps is to make the most of the Geo (engineer intelligence) assets and make sure that we retain our lead in this area. To add weight, Iain James highlights the weakness of engineer intelligence "across the Corps". Read Guy Wilmshurst-Smith's article on specialist engineers and see not only the infrastructure and technical competence of our specialists, which everyone understands – at least in general terms, but also note the integration of their specialist skills within combat operations; for example, the seizure and making safe of the oil infrastructure (along with joint EOD, of which more later) and then look at the scale of engineering challenges which had to be addressed. Yes, we've "done" power stations before; for example, Kosovo but we shouldn't kid ourselves that we are well placed to do them well; unless we get our future training right. Read John Shanahan's article on the development of the Joint EOD Group, a major success no doubt but one which needs, to quote John, *"significant investment if it is to fulfill its' potential"*. And I haven't even mentioned air support engineering, and close and general support engineering to the land, logistic and maritime contingents/components with which most of the Corps is most comfortable, or the use of reserve specialists and the Engineer and Logistic Staff Corps (E&LSC(V)).

In my view, the sooner we all start to see the overall capabilities, including niche, specialist and reserve engineering capabilities, as part and parcel of mainstream Corps business the better. The Corps is intrinsically joint; it needs to 'think' joint, it needs to 'influence' joint, it needs to 'act' joint and it needs to do it with as much vigour as it can muster: now.

Command and Control

FIRST, a general point, and one not directed at RE commanders particularly. Not everyone understands "mission command". It has been used as a term to justify giving no details (coordinating instructions) on the one hand – because the mission

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[1] *RE Journal* Vol 166 No 1 (April 2002)

says it all! – and an excuse not to balance resources on the other. The allocation of resources and the coordination of essential details are part of what makes mission command possible. A lack of understanding of the tenets of mission command by some commanders presented unnecessary difficulties to some of our engineer commanders. "I 'want' this by 'then'" is not mission command; it is unforgivable arrogance. Iain James, Tony Carruth, Peter Davies, Guy Wilmshurst-Smith, John Shanahan and John Kedar, all commanders of Royal Engineers on Op *Telic*, and Rob Rider, the SO1 Ops/Coord in the JF Engr staff in the NCHQ, all comment on RE command and control and the staffing/liaison functions which are needed to support these activities. I don't want to cover all of the same ground but we do need to look at the following questions, to which I suggest possible answers. What levels of HQ require what levels of RE command and staff? The divisions and the Air Component/Contingent probably have the right level of RE commander available (whether they have the appropriate staff is another matter and will, in any event, be case dependant) but the PJHQ, the Joint Force Command level (in whatever guise it takes), the Commando Brigade, the Joint Helicopter Force and the Logistic Component all need to be examined. Where might these *'ad hoc'* staffs be drawn from and how can they be given the appropriate training to carry out their roles? HQRE, HQ MWF, EinC(A) may provide suitable staff augmentees and there is a strong case for greater involvement in the PJHQ/JFHQ exercise programme. Does the Joint Force Engineer have a "command" function? The doctrine says no, but the reality is that OPCON of force assets needs to be assigned to the Force Engineer so that cross contingent/component requirements are resourced in the most efficient way even if TACOM is best exercised at contingent/component/or even lower level. Pragmatism must reign supreme and flexible command arrangements, uncomfortable though they might be (see what Tony Carruth has to say on this), can be made to work.

Force Generation

As an ex Col Engr Ops in HQRE Th Tps I know better than most the tortuous process called force generation. It can never be tidy because the world isn't perfect; as Iain James says, *"no operation ever has a painless force generation process"*. But we can do something to help ourselves. We must be realistic. Warfighting Establishments (WE) and Unit Establishments (UE) are a set of numbers with little meaning if; there are too many commitments for the available forces (which is the usual case given aspirations for sensible inter-tour intervals), the people do not exist (the likely case until at least 2006) and the generation of reserve and TA augmentation takes too long (as it currently does). "Best effort" is the reality of today and the next few years. Though occasionally we may be able to generate additional resources, we need to concentrate our augmentation on those capabilities that suffer most from "hollowing out", namely field support squadrons and general support units/sub units. This means taking more risks in close support though without undermining the viability of a sub unit to deploy, particularly for peacekeeping operations (the most common if not the most demanding situation), or relinquishing the squadron level command and control focus for individual battlegroups/commandos/DOBs.

Coalition Operations

Much will be written about the way in which UK forces integrated into the Coalition, after all Operation Iraqi Freedom was a great success! and there is no doubt that the UK influenced Coalition thinking in the build up to the war. Though the US and the UK are both members of NATO, with standardised agreements (STANAGs) on many tactical and procedural issues, there are significant differences in military philosophy. The best way to engage with such a powerful ally is to be involved, simultaneously, at as many levels as possible in as many subject areas as possible. Given scarce resources there will always be a limit to how far this can go but not having a single SO2/SO1 Engr within the various liaison staffs was an unnecessary risk. We made it work but only just. In the UK all RE are considered to be Army (ask Comd 12 (Air Sp) Bde how easy it is to get LAND and Strike Command to agree on the mounting of air support engineers!) and RE lead on Geo, EOD and infrastructure for all components. In the US forces, the Geo is Int/Engr (both branches believe they have primacy but the Geo staff usually work from the Int Branch), EOD is an Ordnance lead in the Army (their engineers have similar capabilities to our combat engineers) and the US Army, US Navy ("Seabees"), Marines and Air Force all have construction engineers. Understanding this type of fundamental difference is key to successful coalition operations and the way to this level of understanding is to integrate at

an early stage and, as far as future operations in a US led Coalition is concerned, early is now. The US engineers are envious of our (RE) joint responsibilities and capabilities; particularly our Geo, EOD, specialist, air support and combat engineer capabilities; they believe we punch well above our weight and they are open to our getting alongside them. So let's do it, within resources. We would benefit enormously.

Communications

NEARLY every article in this series addresses communications in one form or another. In some cases it is parochial; engineer communication resources are not good, there is a perception that RE needs are not being addressed seriously enough and those systems introduced to furnish the RE need would benefit from further work. Each of the writers has had to suffer the frustration of the reality of the shortcomings of our communications today and acknowledge that some/a bit/a lot (of) work is being done to address the situation. To those involved in this work "it needs doing urgently" and it needs to be a success.

Some comments are specific to a functional area, for example Ian McDougall's discussion on access to the intelligence systems STONEGHOST and Intelligence Messaging Network (IMN). But there is a much more fundamental point, which is not an RE lead but so key to joint operations that I believe the Corps must get involved, and that is an overarching communications infrastructure for, at least, joint, if not, coalition operations. Most of the Joint Force Engineer staff comment on the inadequacies of the current systems. Notwithstanding valiant efforts by the Joint Force CIS Commander and his staff, Peter Davies, in Saudi Arabia in the Air Contingent HQ, suffered more than most from the single service nature of communications facilities with ad hoc and insubstantial connectivity, and the Land forces also felt very poorly served throughout the operation.

I believe it is essential that the RE Statement of Requirement (SOR) for communications capability, across all contingents and all functional areas, be articulated urgently, whilst the experience is fresh in our minds, and pursued vigorously; the US have proved what a "force multiplier" robust communications can be. It will take very significant resources but it is vital ground.

Staff Planning Tools

MISSION analysis, the estimate process, and synchronisation matrices work as well for engineer planning as they do for any other form of operational planning. They were key to the decision-making process, to resource allocation and to forward planning. It is not just staff college graduates who need to know how to use these tools; if this is a training gap, and I don't know that it is, it needs to be filled. Engineer operating procedures (EOPs) were revised before the operation and will be amended again (by HQRE Th Tps) to take into account the lessons of Op *Telic*. They are important, but equally so, the principle of standardising only that which needs to be standardised must be followed. There were few interoperability problems between the commando engineers and land engineers, for example, because EOPs existed for those activities likely to be common to both. Engr staff officers also need to be aware of other planning tools. A case in point is the Commander's Critical Information Requirements (CCIR). For my forward planning I identified what I needed to know, and by when, in order to make timely decisions, adapting the intelligence led process to meet my requirements. The Infrastructure Development Plan (IDP) is the key planning tool for infrastructure at theatre, contingent and site specific level; it is not PQE mumbo jumbo.

Now Read On

I HOPE that every reader will read the complete series of articles. They are a unique collection; representing the initial thoughts of all the RE commanders in theatre[2] and all members of the Joint Force Engineer staff in the UKNCHQ. Most have previous operational experience and have therefore been able to temper their experience on Op *Telic* with what they have learned before. I was fascinated reading them, and though I don't agree with every thing they have written, I respect their right to see things their way and to record them in print. I hope that they stimulate both thought and action, both are needed to translate lessons identified into lessons learned. I have written a short concluding article to follow the last of the submissions by my staff, the JF Engr watchkeepers.

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[2] CsRE of the Land and Air Contingents and the Joint Logistic Component and COs of 42 Engineer Regiment (Geographic), the Joint EOD Group and 64 CRE(Wks) have submitted articles.

HQ JFLOGC: One War, Four Headquarters

COLONEL A P CARRUTH CEng BTech MIMechE

Col Tony Carruth joined the Corps in 1976 having graduated from Loughborough University of Technology with a degree in Automotive Engineering. After tours in 10 Fd Sqn, 22 Engr Regt and 53 Fd Sqn (Const) he decided that the prospect of overseas PQE appointments was a better certainty than a Bde Comd appointment and joined the long E&M course. Following an attachment to the US Corps of Engineers he attended Staff College and was posted to HQ E-in-C in London. This was followed by PQE appointments in Hong Kong and Naples. As CO 62 CRE (Wks) 95-97 he squeezed in a tour with HQ ARRC in Sarajevo before being posted to the International Military Staff at NATO HQ in Bruxelles. He is about to hand over command of Military Works Force and is due to take up a post at SHAPE. He is married to Viviane with two daughters at university.

On 14 November 2002, I received a phone call from CRE LAND, Brigadier Dodds, "Tony, if a JFLogC deploys to Iraq, you'll be the CRE." The Joint Force Engineer Concept was about to go operational and a Commander of the Military Works Force was about to deploy. Thus, on the 16 Jan 2003, I stood in a flat featureless piece of the Kuwaiti desert with Major Tim Underwood, my SO2 Infrastructure, thinking "20,500 bed spaces, with kitchens, dining tents and shower blocks in six weeks – no way!" Millions of dollars and nearly four months later, we are still using some of the camps to re-deploy, whilst others have been packed up and are being used for the bed down of the UK Force in Iraq. But, I am getting ahead of myself.

Background

In late 2002, a decision was made to form and train a Headquarters Joint Force Logistic Component (HQ JFLogC) in order to support UK joint across the Joint Operational Area (JOA). The HQ formed up in December 2002 at PJHQ. It was formed entirely from augmentees under a 2-Star commander with full colonels COS and DCOS. Initially, the plan assumed that UK forces would enter Iraq from Turkey and the role of HQ JFLogC would be to:

- Act as the UK National command element in Turkey.
- Take under command 101 and 102 Logistic Brigades for the Reception, Staging and Onward Movement (RSOM) of UK forces.

Returning to work after Christmas leave, it became apparent that the political situation would not permit the northern option through Turkey and it that UK forces were to deploy through Kuwait. It was considered that a 2* HQ was no longer required and that a single, reinforced Logistic Brigade HQ would form the basis of HQ JFLogC.

Work before Christmas had identified the outline engineer establishment required for the HQ and it was determined that this establishment was still appropriate, despite the change in organization of the HQ. In outline the organization is shown in Figure 1.

Pre-Deployment

Inevitably, there was considerable confusion over deployment timings and responsibilities. Briefings were hastily organised by Engineers at HQ LAND and proved to be particularly useful in setting the scene. The intelligence briefing by Major Ian MacDougall was particularly valuable. Visits were also arranged to various engineer logistic establishments and to the ESS IPT in order to ensure that a common baseline was set for engineer staff.

There was reluctance on the part of PJHQ to authorise early deployment of staff, it took considerable effort to arrange the deployment of CRE and SO2 Infra in mid January. This reluctance was to cause significant problems and the branch staff trickled into Theatre over a four week period, the arrival of SO2 Engineer Logistics being delayed until 10 February. Problems were also experienced deploying lead elements of 64 CRE (Wks) to manage contracts

Operational Phases

Operation *Telic* was conducted in four phases:

- Phase I – Receipt Staging and Onward Movement (RSOM).

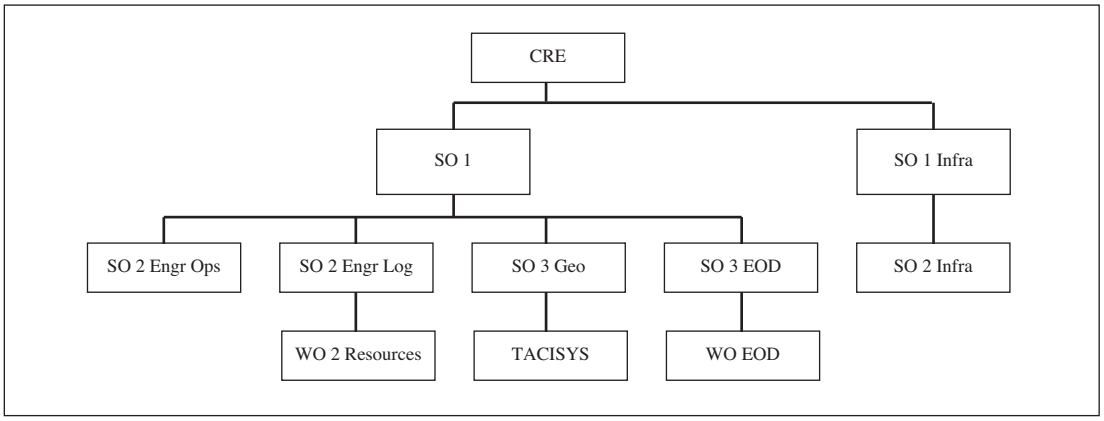


Figure 1 – Initial Engineer Branch Organization.

- Phase II – Preparation of the battlefield.
- Phase III – Decisive operations and transition to stabilization.
- Phase IV – Stabilization, recovery and transition.

A full range of engineering work spanned the different phases, Figure 2 gives some idea of our changing focus throughout the operation. The largest element of Phase 1 was the construction of tented camps, 20,500 bed-spaces in the Land Component concentration area and just short of 7,000 spaces elsewhere. Construction of ranges, design of air-conditioning installations, route maintenance, vehicle off-loading ramps and construction of a field hospital were among the tasks undertaken. The ability to direct design, procurement and construction by Military Construction Force (MCF) or contractors within the same HQ resulted in rapid solutions to most requirements. As the RSOM process progressed and we were able to accommodate all the troops in tented camps, attention was turned to preparation for Phases II and III. Future tasks included another hospital build, prisoner of war cages and the possibility of looking after displaced civilians as well as supporting operations

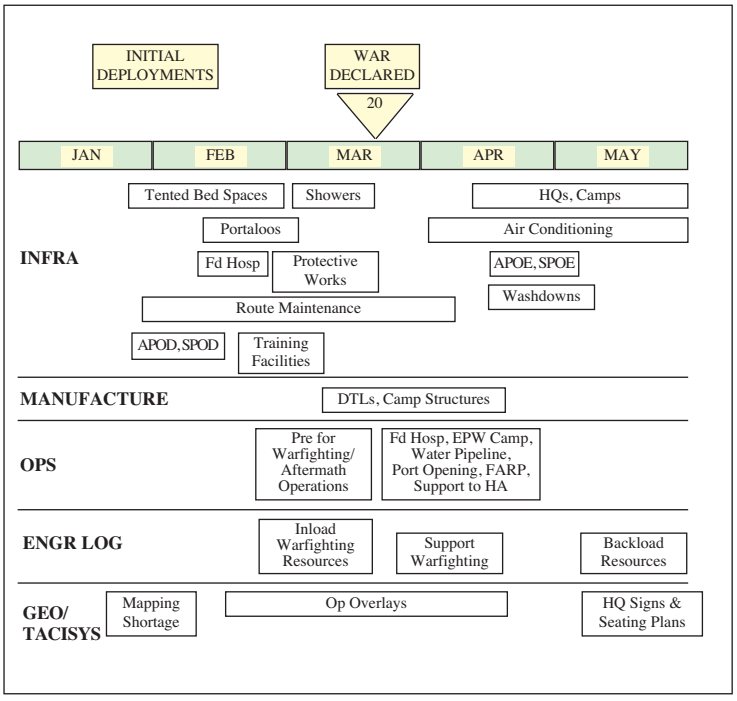


Figure 2 – Engineer "Crisis Chart"

Bums on seats. Manufacture of deep trench latrines in anticipation of Force bed-down in Iraq.

Happy Iraqis avail themselves of free water from "Albert's Pipe".

in the port of Umm Qasr. Task groups were formed for Safwan, looking after the hospital, and the FARP, Umm Qasr Port, and the enemy prisoner of war (EPW) compound.

Phase II and Phase III were virtually simultaneous. Preparation for Phases IIIb and IV continued and the Safwan, EPW and port task groups deployed. The C2 arrangements for this phase were confusing as JFLogC assets worked within the Division's area of operations. The Umm Qasr port task group reported to 3 Commando Brigade. The Safwan group reported to 102 Log Bde, which had extracted itself from JFLogC by this stage, and to the Joint Helicopter Force. The EPW group, which was initially supported by a troop from 29 Field Squadron and then 69 Gurkha Field Squadron, reported to 102 Log Bde. 48 (Air Sp) Field Squadron was re-subordinated to JFLogC for specific tasks, including "Albert's Pipe", which brought Kuwaiti water to a tanker dispense point in Umm Qasr. 48 Sqn was specifically under command of JFLogC, rather than 102 Log Bde or 36 Engr Regt. 36 Engr Regt remained Opcon of JFLogC, while 36 Tac was placed Tacon to102 Log Bde. Confused? So were we! The varied command arrangements worked, but with considerable risk. Ownership of the EPW task, for example, caused some difficulty in defining requirements and standards and time was lost trying to establish what the precise requirement was. This was a divisional task, carried out by divisional troops, but under command of 102 Log Bde.

Phase IIIb was the transition from war fighting to stabilisation operations in Phase IV. As we moved into Phase IIIb, emphasis changed to humanitarian aid and restoration of the port facilities. This too, was confused as the RE technical assets were Tacon Division, but supporting JFLogC in the port. Phase IV operations focused on humanitarian aid and Force bed-down, including the refurbishment of JFLogC's fourth HQ in as many months. Significantly, Phase IV was marked by the re-subordination of RE units to the Divisional Engineer Group and the bed-down of the Force.

Procurement

THE US offered life support to deploying UK forces including use of its considerable contracting power. Under the Allied Cross Servicing Agreement (ACSA), services could be provided by US contracting offices on repayment. With less than two months to provide the tented accommodation, ACSA was the only option with a realistic chance of meeting requirements. It was therefore a take it or leave it offer. US camps were already being constructed and assurances were given by both contracting staff and the contractor that a camp could be constructed in a 3-week period. Some items, such as the shower trailers were going to take longer, but would nevertheless be available in a reasonable time. Critically, there would be enough capacity to keep ahead of the UK deployment. Some time was lost waiting for high level financial clearance placing further pressure to complete on time. In the end, only some delayed flights allowed us to stay ahead of the flood of arrivals.

The US operated supply contracts for camp construction and these were to prove problematic on a number of grounds. No contract documents were released to UK forces. Pricing information was

given for generic services, but no technical or performance specifications have yet been seen. Once orders for the tented camps had been let, it became apparent that timelines were going to slip. Only after great pressure and assistance from 64 CRE(Wks) was the contractor able to devise a works programme. In fact, the team Garrison Engineer "Mac" McGuinness had drawn it up. However it remained impossible to get any reliable indication of completion times and consequently the availability of bed spaces was on the RSOM critical path for weeks. If it wasn't bed-spaces, the crisis focused on toilets, (see crisis chart at figure 2). 64 CRE(Wks) personnel ended up carrying out the detailed management of the sub-contractors as the main contractor was unable to cope.

Compounding the difficulty of managing the contract, US comptrollers paid contractors without verifying their accuracy and subsequently billed UK. An enormous effort was required to verify bills to reduce overcharging. Control of requests for services through ASCA became increasingly difficult as more work was ordered and it was only when a senior resources specialist was co-located with the US contracting office that we were able to get timely responses.

The practicality of the ACSA principle is sound, but we must be able to control our own contracts and at least have sight of the contract conditions. Without performance specifications, we were unable to control the quality and were provided with a poor service. Much of the electrical installation was unsafe and did not comply with UK regulations. While this was a necessary risk in the immediate run up to operations, it became increasingly unacceptable during Phase IV and re-deployment/roulement. Further risk had to be taken to balance residual usage during this latter phase with the cost of upgrading to safe systems. The shower trailers, while providing welcome hot showers for troops, were of poor quality and are unlikely to remain useable without considerable maintenance. As ever, a rushed solution tends to produce a more expensive, less durable result.

SORs

REQUESTS for RE assistance were submitted using Statements of Requirement (SORs). Between January and early May a total of 265 SORs were processed within Engineer Branch HQ JFLogC. At one end of the scale they were to provide 8000 man camps, at the other to provide power for some unsupported equipment. One thing most SORs had in common was the inability of units or HQs to decide what they actually required. Many expected engineer staff or units to define their requirement and, in many cases, this was the simplest and quickest solution. Others took a view that just talking to the Engineer Branch staff was as good as an SOR and expected instant results. Few appreciated the time required for recce, design, procurement and construction. Different SOR formats were used for engineer-sourced solutions and local procurement section provision and 1 (UK) Armd Div used a separate format again. HQ staff officers were unfamiliar with the procedures and much time was wasted as SORs sat on the wrong desk for days before reaching the Branch. A standardised format and procedure, agreed between branches and formations, would greatly assist the process.

Engineer procurement was by local purchase through resources specialists, works services contracting or CivSec contract staff as appropriate. Financial and contract delegations were generally appropriate and the different procurement methods worked well. However, CivSec staff and local purchase section staff were extremely busy and were constantly under pressure. This had implications on support to the engineer branch and a better solution would have been to have a dedicated CivSec contracts officer for the engineer branches in JFLogC and later in the Division. Without dedicated support, engineer work priorities will continue to vie for priority with photocopiers and printer ink. It is also important that RE branches and units are able to deploy with the full range of contracting ability. Although CivSec contracting staff were deployed early in the operation, it is important that military personnel are given supply contract training and delegations.

LESSONS LEARNT

- It hardly needs to be mentioned that the biggest Achilles heel of the whole operation was insufficient and inadequate communications. Engineer staff were frustrated by the inability to communicate effectively between JFLogC and Division. Communications with JFLogC units were also strained and a particular failure was the lack of data link communications with the engineer support squadrons. A vast amount of information needs to be co-ordinated and this capability gap greatly hampered control and monitoring of engineer resources. Heavy reliance was placed on locally procured mobile phones, particularly for resources personnel working in Kuwait. Had we been operating outside

mobile phone coverage, even this form of communications would have been denied.

- RSOM and subsequent operations required a significant route matrix in both CA Ripper and the logistic area Fox. Conditions in Coyote were near perfect and minimum preparation was required before the routes could be used. Area Fox was more sandy and required more work to open and maintain routes. Additionally, a cross-country route linking CA Ripper to one of the MSRs was constructed and required maintenance. 36 Engr Regt's integral plant was insufficient to cope with all the tasks and lacked adequate heavy dozers, water bowsers and heavy rollers. It was also heavily involved on other tasks. The solution was to contract out route maintenance and construction of most of the earth bunds that were used to protect the camps. This was possible in Kuwait but we should be aware of the risk of operating from countries where the contracting capacity is poor. We were extremely lucky with the space available in North Kuwait and the almost ideal ground conditions. Operating in less desirable ground and weather conditions would have caused delays throughout the operation. The availability of the tippers in the RLC engineer and water unit could not be guaranteed and the tippers' usefulness was limited by their small capacity. For future operations better vehicles should be available and placed under engineer command.
- Provision of power and power distribution systems to units was a major headache throughout the operation. Many appeared in theatre and expected power to be provided instantly. Power requirements also developed over time and initial solutions needed to be revisited as operations progressed. Every unit now has a significant power and power distribution requirement. The absence of in-service equipment or instantly available solutions lead to delay and, in some cases, unsafe installations. Generators were procured from different suppliers and were either purchased or leased. Not all agreements included maintenance arrangements and some of those that did specifically excluded Iraq. It took considerable time and effort to set up a maintenance contract to cater for the 50 odd large generators that have been procured in theatre. As I write in early May, this contract has still not been finalised. A complete review of power requirements must be conducted as a matter of urgency and a coherent plan to meet them must be made. At the very least, units must be equipped with sufficient electrical distribution equipment to power and light their HQs and essential equipment. Provision must be made for operation in hot climates for critical communications and IT equipment. Communications and IT equipment failures were frequent, partly due to heat and partly to the dusty conditions. It was evident that units had no idea of their power requirements prior to deployment. We should consider an equivalent of the US Prime Power units to support deployed operations with power. This is also and an area that might suit CONLOG, drawing on industry, but without holding vastly expensive generator stocks.
- Linked to the need for a coherent electrical generation and distribution policy is the critical requirement for qualified electricians. Units such as the medical supply squadron have significant power requirements and must have qualified electricians to install and maintain their equipment. A decision not to replace RE electricians in these units will be counter productive and place additional strain on unit electricians unless suitable alternatives are available. A review of electrician posts is vital to ensure we are not over-faced in future. This needs to be conducted in conjunction with the power review, as greater availability of equipment solutions will permit more efficient use of RE tradesmen.
- The sheer scale of the engineer logistics piece surprised most people that have not been directly involved. VITAL, the logistic assets tracking nodes were deployed too late into theatre by both RLC and the Sappers. The result was a lack of visibility of assets moving into theatre, especially on the shipping flow. Whilst 70 Fd Sp Sqn should be complimented in establishing both its VITAL asset tracking system and its inventory management system GLOBAL as soon it arrived in theatre, their visibility of equipment in the flow improved only marginally as VITAL proved unable to drill down into the contents of containers. The task lists produced by ERMC proved essential especially during the ROSM process when we were constantly being pressed to predict capability by dates. Further frustration was caused by Log Sp as all containers arriving in theatre went through 62 Supply Sqn where they were supposed to be booked into theatre, however due to the volume of material arriving many were untraceable, in some cases for up to three weeks. Some work is still required on the single logistic chain.
- Expeditionary Tented Camps required significant local purchase of stores before they could be completed. In the base depots, ECI items are stored by commodity group and the containers are not configured (tac-loaded) to facilitate a smooth build programme. Camps must be configured in the base area and the containers clearly marked in such a way that a phased build or container in-load can be achieved. A squadron was diverted to attempt to configure ECI camps in an attempt to ready them for use. The support squadrons deployed at UE manning and this was inadequate to manage the engineer resource piece without assistance. Unfortunately attempts to secure pioneer support were generally unsuccessful.
- Some additional plant was received, but arrived in a worse than anticipated condition and without docu-

mentation. Whilst the plant was a welcomed addition, it highlighted that 70 Fd Sp Sqn was not able to maintain this additional load adequately at UE.

- Fifteen containers of Rubb shelters were despatched directly from Kosovo. Unfortunately they were those that disappeared into the black hole of 62 Sup Sqn. When they did reappear, they were virtually useless due to the poor condition of the shelters, which appeared to have been stuffed into the containers with little care or checking. This was hugely disappointing, as they would have been invaluable had they been serviceable. They should have gone straight from Kosovo back to the UK for refurbishment and confirmed that the movement of stores from theatre to theatre without IER inspection is inadvisable.
- The Rough Terrain Container Handling vehicles (RTCH) were indispensable but more are required. Whilst 62 Sup Sqn held 600 – 900 containers and three RTCH, 70 Fd Sp Sqn had up to 1500 containers in its yard and only one RTCH. The RTCH is on the critical path for convoy loop times and having only one machine to off-load the 90 containers in an ECI camp significantly delayed transport movement on occasions.
- From 5 May, 36 Engr Regt (-) and 64 CRE (Wks) were re-subordinated to 1 (UK) Armd Div. This left JFLogC with 70 Fd Sp Sqn and property management teams in Kuwait and Umm Qasr. 70 Fd Sp Sqn was effectively not available for tasking for new work as it concentrated on the back-loading of engineer materiel. Although existing 69 Gurkha Fd Sqn tasks continued there was a sense within 101 Log Bde that they had been left without RE support. While this was an understandable sentiment, grouping RE capabilities under the Divisional Engineer Group was essential to permit theatre-wide prioritisation of limited resources. However, some retained MCF capability within JFLogC would have been desirable.

Joint Engineer Concept

THE Joint Engineer Concept draws together all engineer capabilities under a single, hierarchical structure that overlays the general C2 structure. It ensures that appropriate engineer capability and C2 is in place to maximise the engineer support to the force. For me, the concept was successful. This may be a reflection on the relationship between the Joint Force Engineer and his CREs. Re-subordination was carried out on several occasions and worked well to release assets to assist across components. The Air Component was less busy than might have been expected and the ability to assist JFLogC and the Land Component was welcomed on all sides. How different might this have been if all components had been under pressure simultaneously? The Joint Force Engineer concept must work within the chain of command. RE units can be re-subordinated as required, but then become an integral part of the formation to which they report. A separate, engineer chain of command cannot work outside the normal command arrangements and the Joint Engineer Concept must, I feel, stop short of a separate component command. However, the Joint Force Engineer staff, drawn from HQ RE Land was able to draw together and direct engineering support theatre wide. It was able to influence every aspect of engineering support prior to deployment and subsequently. Had the Joint Force Engineer been drawn from somewhere other than HQ RE I wonder if an operation of this scale could have been pulled together as quickly and as efficiently. If one accepts this view, we should consider tying certain posts to operational

UK Air Contingent Operation Telic

COLONEL P M DAVIES MBE BSc(H)

Colonel Davies joined the Royal Engineers in 1977 having graduated from the University of Hull. On completion of the Royal Engineers Young Officers Course he was posted to 1st Field Squadron in Nienburg, West Germany and during this tour he completed a four month attachment with Royal Australian Engineers in Brisbane. A tour as a Troop Commander in the Army Apprentice College at Chepstow was followed by tours with 39 Engineer Regiment and 28 Amphibious Engineer Regiment. In 1984 he was posted as the Adjutant of 33 Engineer Regiment (Explosive Ordnance Disposal). Following the Army Staff Course and tour in the Ministry of Defence Colonel Davies returned to Nienburg to command of 4 Field Squadron. The Squadron deployed to Saudi Arabia in October 1990 and supported 7 Armoured Brigade throughout the Gulf Campaign. He was awarded the MBE in March 1991.

Following a second tour in the Ministry of Defence and a tour at the Royal School of Military Engineering he was promoted to Lieutenant Colonel and posted to 12 (Air Support) Engineer Brigade. In 1995 he took command of 33 Engineer Regiment (Explosive Ordnance Disposal). Following two years with Headquarters ACE Rapid Reaction Corps as SO1 Trg & EPS, which included six months with the NATO force which deployed into Kosovo Colonel Davies was the SO1 Engr Operations in HQRE Theatre Troops. He was promoted Colonel and assumed command of 12 (Air Support) Engineer Brigade in August 2002.

THIS article is limited to the interaction with and support provided by 12 (Air Sp) Engr Bde, the UK Air Contingent RE, to the Joint Force Engineer, LAND Contingent and UK JFLogC during the preparation for and deployment on Operations *Telic*. The detailed air support tasks carried out by the Brigade including the technical detail will be the subject of later articles. 12 (Air Sp) Engr Bde was experienced and well trained, at all levels, in the project management and construction tasks it faced in the JOA as a result of 12 years of supporting RAF operations in the Middle East and commanding and controlling the enabling works for Exercise *Saif Sareea*. Op *Telic* came at the end of an especially busy two years for the Bde starting with Ex *Saif Sareea* from May to Oct 01. 34 and 48 Fd Sqns (Air Sp) had deployed to Afghanistan in 02 and 53 Fd Sqn (Air Sp) completed a NI tour in Mar 02. Throughout the period 39 Engr Regt provided the Lead Air Support Squadron in support of STC operations and exercises. While 529 STRE had controlled and managed the infrastructure works on the Op *Resinate* Deployed Operating Bases (DOBs).

That 39 Engr Regt required significant reinforcement to be brought up to Unit Establishment was a feature of the Corps under-manning policy as part of the ramp-up to the SDR establishments and the shortage of tradesmen in some key areas, notably Electricians, Fitters and Signallers. The shortfall was exacerbated by the constraints imposed, quite correctly, on deploying Soldiers Awaiting Training. A diagram of the Bde Op *Telic* ORBAT is at Figure 1.

The mission statement drafted in late Sep 02 included the requirement to support other components in advance of any formal order from PJHQ, STC or LAND. **"12 (Air Sp) Engr Bde is to provide military engr sp to the UKAC and be prepared to sp other components in order to ensure the success of Op *Telic*"**. This specified task inculcated the right frame of mind across the Air Contingent during the early planning phases in HQ STC, within the Bde and JF Engr. It was

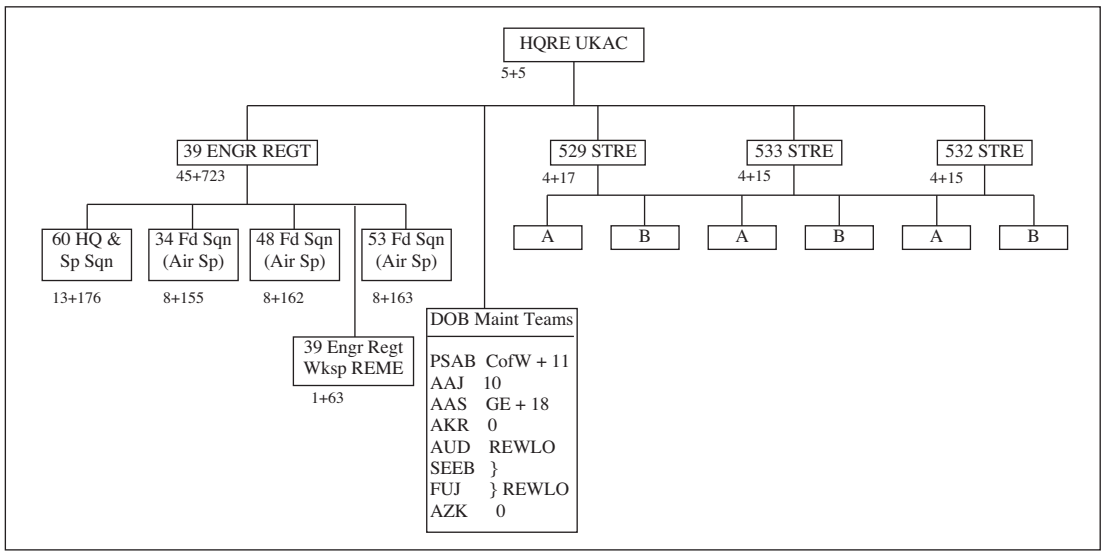


Figure 1 – Op *Telic* ORBAT

well understood that once the RAF DOBs, always likely to precede the deployment of the Army not least because of the RAF higher JRRF readiness, were enabled there would be spare engineer capacity available. The air support field squadrons have considerable utility for General Support Engineer tasks given their numbers of experienced tradesmen, Plant holdings and the strength of the Construction Supervision Cells.

From early Sep 02 I was included in the detailed close hold planning taking place in HQ STC. This was to prove invaluable as it meant I was able to focus work being undertaken under the auspices of Op *Resinate*. The close links with HQ STC also allowed detailed force structure work to be completed in good time to inform the force generation process. One key result of this was the early recognition and agreement by LAND that 12 (Air Sp) Engr Bde would be placed OPCOM CinC STC. The maintenance of close links with HQRE Th Tps was essential to address specific RE force generation issues, the continuance of close links with the other Contingent CREs and importantly the links into the RE Resources chain. Perhaps the first lesson re-learned was "he who plans early plans often" – but it was worth it. Exercise *International Look* was invaluable in understanding the strategic context which allowed anticipation of the requirement for RE support, identifying the likely requirements of JFLogC, the LAND component and establishing links with USAF Engrs.

The work of the Joint Force Engineer started well before deployment with two areas being key force generation and the bringing forward Exercise *Thirsty Flamingo*. The efficacy of HQRE Th Tps having direct input into effective control, the LAND G3 Cts RE force ORBAT cannot be over-stated in its importance. The *Granby* "veterans" created a forum for sharing lessons from the tactical to operational level but more importantly strengthened the close personal ties between CREs. Given that we were building on existing friendships and high level of trust there is perhaps an argument for the REYC and RERFC receiving Public Funding. Had we not deployed under cover of Op *Resinate* or exercises we would not have been able to complete, in time, the RE works required to support Air Contingent achievement of IOC across the JOA.

The concept of engineers being controlled at the highest level and being committed to any task in theatre was proven to the Air Contingent Commander on Exercise *Saif Sareea* when he was double-hatted COMBRITFOR and JFACC. DOB commanders were also comfortable with the concept but the lack of joint training and exposure amongst the staff did create some friction which needed too much of commanders time to address. Once the concept was proven, in practise, to present no risk or degradation to the support provided to the Air Component it was accepted by the staff. However, the process was hindered by the risk adverse culture inculcated into RAF staff officers. It is only amongst the A3 aircrew that one finds the necessary degree of acceptance of responsibility to enable a quick response to a burgeoning requirement to anything like the same extent we are used to in the Army. That said RAF Collective Training is doing much to address the issue.

The bringing forward of Exercise *Thirsty Flamingo* from Apr 03 to Nov 02 allowed the enhancement of the RAF AKROTIRI fuels installation but equally important decreased the competition for the scarce STRE (BP) assets in early 03. The Bde was able to provide a single command node for the task including the preparation and transport of war stock from DLO to Cyprus and the deployment the Military Construction Force, 39 RHQ Tac, 34 Fd Sqn (Air Sp) and 516 (BP) STRE, from UK. On Island support from CSSU and 62 Cyprus Sp Sqn RE worked well despite the failure of PJHQ to issue an Op Order. The completion of an operational task to tight-timelines was not helped by having to work around the constraints that accompany exercise deployments. The failure of DLO to maintain the TFHE at Readiness meant that 60 HQ & Sp Sqn had to be used to prepare and outload the equipment to meet the required time-frame.

My perception is that the callout of the TA and Reservists went well producing excellent quality and quantity across the rank structure. I had primed the system by briefing all TA soldiers, during my initial visits in Autumn 02, that I would be looking to them as individual reinforcements for 39 Engr Regt should we be called upon to deploy on operations. In early Jan I briefed the two TA COs on the operational situation and in effect initiated "Intelligent Mobilization". This was not well received by the Regional Chain of Command who were still awaiting direction. The appointment of a 'Corps Champion" worked well and should become standard practise. The inability of APC to apply

more than a single filter to the vacancies identified meant that trade posts were filled by SNCOs which, had we not had a requirement to man a large number of Maintenance Teams would have created structural problems within 39 Engr Regt. The failure to provide the correct scaling of clothing, including IPE, and the switch from Deployment to Sustainment flights before the Air Sp TA were deployed was unhelpful and resulted in the reinforcements being held in UK for three weeks.

The great utility of the specialist equipment, artisan capability and Construction Supervision Cells of Air Sp Engrs was demonstrated by wide-range support given to the other Contingents. The mechanism for organising cross-component support was that once a shortfall of RE capacity was quantified within a component it was discussed and agreed by Component CREs and the JF Engr. I then sought authority from ACC for the release of the assets. A FRAGO was then produced by JF Engineer formalising not only the task but more importantly command relationships and the responsibility for the provision of logistic support including engineer resources. During Feb and Mar the Bde provided support to JHF who were co-located at the Ali Al Salem DOB. Local contractors under RE supervision constructed two large asphalt helipads designed by 529 STRE. The overfacing of the Kuwaiti contractors led to a squadron building shelters and completing the domestic accommodation, including a kitchen in order to allow JHF to deploy. From D-8 a heavy plant section was attached to 20 Fd Sqn to provide the capability to clear SAFWAN airfield as soon as possible after capture on D+1 to construct a JHF for FARP and provided protection for a Patriot Missile Bty. A FARP for 3 Cdo Bde SH was constructed using Harrier Tin in CA VIKING to facilitate operations on D-Day. On 24 Mar 48 Fd Sqn plus elements of 529 STRE deployed in support of 102 Log Bde to construct a water pipeline to provide water to Al Basra Province. The 4 km long pipe which became know as "Albert's Pipe" after a former EinC (A), who was running the HOC, ran from the UN Compound in Kuwait to the UN Compound in UMM QASR. 48 Fd Sqn (Air Sp) continued TACOM 1 (UK) Armd Div from 3 – 12 Apr completing a number of GS Engr tasks before redeploying to UK on 27 Apr 03. 53 Fd Sqn (Air Sp) conducted a relief in place with QDG on 14 Apr as the PWGF at Camp FREDDIE, the Theatre Internment Facility. Tasks here included the collection and transporting of EPW from sites across Iraq and the internal administration and processing of over 6000 EPW, a novel task much enjoyed by the Sappers. These two deployments helped bridge the gap in the Land Component transition between Close Support and General Support. Between 21 and 23 Apr 53 Fd Sqn (Air Sp) took a Plant and Resources Section under command and formed 53 Fd Sqn Gp before moving TACOM to CRE UKLC/COMBRITFOR for tasks in the vicinity of Basra, the APOD, and Shaibah, the Divisional Support Group, location.

The three key Lessons Identified were;

- The operational benefits of Sappers training as Artisans and Combat Engineers coupled with the control of RE at the highest level were clearly demonstrated. Considerable kudos was gained with the USAF who were impressed with the Sapper multi-skill capability and sense of urgency. The US forces were in awe of our ability to produce the goods on time whatever the conditions.
- JHF requires dedicated task organised RE support on operations. A tri-service working group should be established to define the support requirements of the JHF. Given our experience in support of expeditionary air operations 12 (Air Sp) Engr Bde is well placed to provide the focus for the development of RE support to JHF.
- The use of local contractors, notwithstanding the security risk, was a success and acted as a force multiplier releasing RE manpower for priority tasks although close supervision of technical standards is vital.

In order to maintain the JF Engr in Joint environment and educate JFLogC on the requirements of the Air Component in the long-term consideration should be given to running RAF Collective Training and GOC Th Tps Autumn exercise concurrently. Linked to the JOINT VENTURE series of exercises this would provide an ideal forum for Joint Force Engineer training. Conjoining the exercises would also provide a test-bed for improving CIS which was appalling and only improved to dismal by Apr.

The standing of the Corps has never been higher in HQ STC and the wider RAF community and I must say it as appreciated, if embarrassing, to be on the receiving end of some effusive praise. However, it is only by continuing with technically demanding training in challenging conditions over long lines of communication that we will maintain the operational edge required by the Joint commander.

COLONEL I S JAMES OBE BSc(H) MSc

Colonel Iain James was commissioned into the Corps in 1979. Some 21 years later, after a career dominated by service with airborne forces and Northern Ireland based units he assumed command of 38 Engr Regt having never previously served anywhere with armoured vehicles. He assumed the appointment of CRE 1 (UK) Armd Div in June 2002, having never previously served in Germany. He looks forward to the Military Secretary's next cunning plan. Along the way he has served three sentences on the MOD staff, two in DMO and one as an MA, and enjoyed operations in the Falkland Islands, Northern Ireland, Rwanda, Bosnia, Kosovo, and Iraq.

Introduction

This is not intended to be a full exposition of 1 (UK) Armd Div's operations in Iraq, or a definitive lessons identified piece. It represents some initial overarching observations from the Land Component engineer perspective of working within a Joint Engineer framework. Readers should bear in mind that it is written less than three weeks after the end of significant UK ground manouevre operations in Iraq, and with the Division still fully committed to post conflict operations. A fuller Divisional article will appear in due course on completion of Op *Telic 1*.

Background

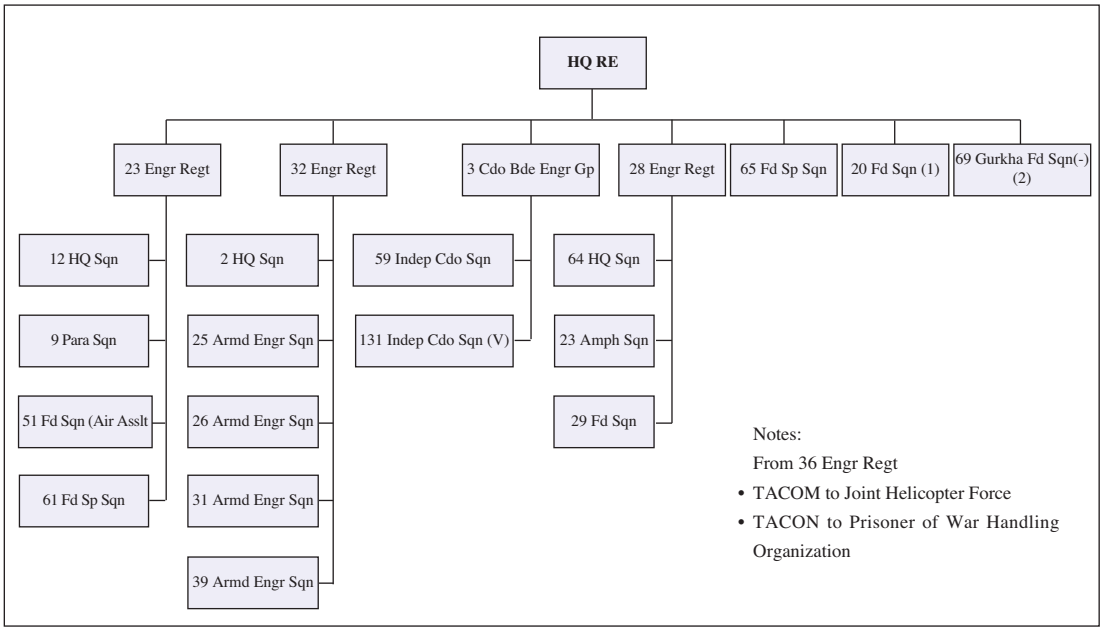
To set the operation in context 1 (UK) Armd Div was placed as a subordinate formation to US 1st Marine Expeditionary Force (1 MEF). The Division totalled some 22,000 personnel, with 3 Cdo Bde, 7 Armd Bde, 16 Air Asslt Bde, and a Joint Helicopter Force, all coming under command of GOC 1 Div as the Land Component Commander. The Divisional Engineer Group was configured to support this formation with close support regiment each supporting 7 and 16 Air Asslt Bde (32 and 23 Engr Regts), a Cdo Engr Gp of 59 and 131 Sqns supporting 3 Cdo Bde, 28 Regt as the Div GS Regt, and 65 Fd Sp Sqn providing second line engineer logistics. The initial Divisional Engineer Group mission was *"….To provide close and general engr sp to 1 (UK) Armd Div to defeat en forces, secure key oil infrastructure and control the AO in order to enable 1 MEF operations to continue North without interference..."*. Since GOC 1 Div was the UK Land Component Commander (LCC), subordinate to one MEF as one of two principal US manouevre corps, the UK's contribution to the operational manouevre campaign was planned in direct concert with the US, with NCHQ/JFEngr input being required only when the Division was proposing to operate outside COS endorsed "limits of exploitation".

Force Generation

No operation ever has a painless force generation process, and *Telic* was certainly no exception. Against a backdrop of some highly mobile goalposts, a massive and fundamental change to the UK's contribution to the US scheme of manouevre only three weeks prior to deployment, and the need to continue to run Op *Fresco*, we sought to create a Sapper orbat that struck a balance between what the Division needed, and what was actually deliverable. In a somewhat bloody process with units and subunits coming in and out of the frame in various configurations, the DEG (which ended up as the *de facto* Sapper lead in the creation of the FET) ended up with a particularly robust orbat. This was a major success, as a result of countless burning of midnight oil by the Divisional SO2 G2/G3 HQRE (Maj (now Lt Col) Chris Wilman) and G3 O&D staffs. Probably the most significant success in the Force Generation process was the inclusion of two General Support Regiments – one in support of the JFLogC (36 Engr Regt), and the other in support of the Division (28 Engr Regt). This allowed the 36 Regt to focus on enabling the RSOI of the Division, and subsequently to provide 3rd line support, while 28 Regt concentrated on support to the manouevre. The subsequent operation more than validated this approach, and perhaps we can strike off one of those hardy annuals that appears on countless Sapper Study Days examining how the Corps provides support both to a Logistic Brigade and a manouevre formation in a warfighting context.

Successes

This is not a blow by blow account of "our part in



Op Telic 1 (UK) Armd Division Divisional Engineer Group 20 March 2003.

the Sapper support to manouevre operations was a success, thoroughly reinforcing the majority of our close and general support structures and doctrine. It is, however, worth highlighting a number of headline issues. The speed of this deployment and subsequent committal to operations should not be underestimated. Unlike the first Gulf War where there was the time, and space, to conduct extensive bed down and preparatory training, this operation was to a large extent conducted as "come as you are". Significant elements of 7 Armd Bde, the core of the Division's combat power, had been in theatre only a matter of days before operations commenced. This says much for our enduring level of individual and collective warfighting skills, very much the end result of both our Corps training and the Formation Readiness Cycle.

In support to manouevre an immediate observation was the total validation of the level of close support that a squadron brings to its supported battlegroup, and the operation again reinforced the old lesson that an armoured or armoured infantry battlegroup needs a dedicated CS squadron, and the supported brigade an RHQ. Our close support combat engineer capability, despite being mounted on 40 year old hulls, was looked on with envy by our US colleagues. In particular we can (and often did) operate under armour in the direct fire zone, a capability that have an AVRE or CET equivalent.

Our bridging is world class, and again looked on with much envy, particularly the reach of the No 10 and General Support Bridges, and the outstanding capability of the M3 amphibian (who ever thought we would see rigs in a desert?). 28 Regt deployed with the capability to operate as a full regimental group to conduct formation level crossing operations, a number of which were planned although the eventual conduct of the campaign precluded their execution. The rigs were very successfully used, however, in troop

M3 Rigs from 412 Tp (V) ferry CR2 onto the Al Faw Peninsular in support of 3 Cde Bde. The first operational use of the M3.

23 Engr Regt recce vehicles crossing a berm breach.

sized packages in support of sub-unit and battle-group operations, coming under command variously of Air Assault, Armoured and Commando engineers. This more than proved the utility of this capability as a divisional asset under command of the CRE.

Finally our multi skilled soldiers, and in particular our dual combat/artisan training again came to the fore. The versatility of sappers switching rapidly from combat to artisan projects had a massive impact not only in creating the conditions in which 1 Div were genuinely seen as liberators and not invaders by the vast majority of the people of Iraq, but also in providing early life support infrastructure improvements for our own soldiers.

Weaknesses

The most dominating downside of the operation was a pervasive feeling of logistic despondency that spanned from the most junior ranks to the most senior commanders. While our in-theatre logisticians undoubtedly did their best, the reality is that if you hollow out your logistic base and seek constantly to rely on "just in time" you need to be able to draw on guaranteed sources that can meet the demand when that time comes. In many cases "just in time failed", and failed badly. Some of the more high profile shortcomings are well documented, and were quickly picked up by the media, such as soldiers deploying into battle without desert combat clothing, desert boots or body armour plates, and the lack of ammunition for training. Away from the media spotlight the supply of spares, DFI, and oils and lubricants was extremely poor for some variants, with vehicles such as CET seeing availability hovering around 15 per cent due to lack of spares.

Engineer Intelligence is a weakness across the Corps. While there is much talk and TD notes on what we should know, the lacuna is where is information actually comes from, as this is more than just a process of submitting and collating RFIs upwards from unit recce. In the early planning process for Iraq it was obvious that there is a paucity of staff dedicated to collation and analysis of all forms of engineer intelligence at the military strategic and operational levels. HQRE Th Tps, for example, has a single SO2 Engr Geo/Int who thankfully was focused early on in the planning towards engineer intelligence. At divisional level engineer intelligence is a shared function with SO3 Geo, who during a fast moving warfighting operation of this complexity is totally focused on the production of geographic products and ground evaluation, and a single Combat Engineer Sergeant. As an observation, our equivalent MEF engineer branch had a lieutenant colonel solely dedicated to engineer collation and analysis. The reality

Combat Engineers from 32 Engr Regt destroying an Iraqi artillery piece.

was that the much of our product was "borrowed" from our US colleagues, rather than coming down national chains. Decent infrastructure intelligence was woefully short, and in many cases proved to be significantly inaccurate. Our best infrastructure information was gained direct in theatre from NGOs/IOs that had previously operated in Iraq, or from local sources. Similarly technical intelligence on Iraqi engineer and weapon capabilities, and particularly their effects against our equipments, was also worryingly scant. There was a marked difference between, for example, the intelligence on Iraqi counter-mobility capability from UK sources which in some cases predated the last Gulf War, and came as classified as SECRET UK EYES LIMITED DISTRIBUTION, and the US equivalent which contained current information and was liberally distributed in glossy unclassified pamphlets on hard copy and CDROM, or pulled from US DOD websites. We need to do better here, and this is an area where the Corps would do well to introduce dedicated staff, particularly on the analysis and dissemination of engineer focused assessments of our opponents weapon capabilities, the converse effects of our weapon systems on enemy equipments, and "intelligent customer" analysis of infrastructure in future operational areas.

JOINTERY

THE Joint EOD Group is covered elsewhere, but suffice to say it worked well, although it needed a senior post-command lieutenant colonel to drive it through in theatre. Gentlemen's agreements brokered in UK staff branches counted for little in the run up to operations, since underlying Service and cap badge allegiances and working practices die hard. On warfighting operations it is easy to set a hard line on how operations will be conducted, however as the operation transitions to its softer post conflict phase this will be less easy. Originally intended to be based in the UAE as part of the JFEngr staff, it became obvious that this dislocation was unnecessary, and CO Jt EOD Gp quickly moved forward into Div Main as part of HQRE, where it was better placed to conduct planning, coordinate assets, and generate policy, as well as directly command and control other service and capbadge teams. EOD, needless to say, was always in short supply, and there was widespread use of combat engineers both in mine breaching, and subsequently in the destruction of the huge volume of explosive ordnance and battlefield debris. After a decade of Balkanisation this is a skill that our combat engineers have largely lost, and took to with relish. It needs well defined parameters in which to operate, and careful supervision, but it was a real force multiplier in the immediate post conflict period.

The Joint Helicopter Force (JHF) deployed without any allocated RE support, and without any concept of from where this support was going to come. The robust sapper FET again came to the rescue, and support was provided on an *ad hoc* basis by task organising from across the Force. Support was variously provided by Commando sappers, GS assets from the JFLogC regiment (36 Engr Regt), Air Support assets from the Air Component, and even the Amphibious squadron. The Corps has a well tried and tested capability in support of fixed wing air operations, but this operation has brought home the urgent need to examine how we will support JHF operations in the future.

Finally *Telic* highlighted the ability of the Corps rapidly to re-subordinate assets across components. During the manouevre operation sub-units of 36 Regt carried out GS tasks in support of 1 Div, such as the construction of a major PW handling and internment facility, support to the JHF, and support to medical facilities. Air component engineers with their strong artisan capability were used in infrastructure construction early in the post conflict phase. STREs from 64 CRE Wks were re-subordinated to carry out recce and early restoration of services, and in one notable case direct combat support when employed in closing down a number of strategic oil production facilities. We were fortunate as there was never a serious clash of asset priority for these re-subordinations, and deals were normally brokered bilaterally between component CREs before being passed by the JFEngr staff in NCHQ for "approval".

THOUGHTS FOR THE FUTURE

Structures.

None of the 1 (UK) Armd Div engineer units deployed at WFE, indeed the majority were at best effort and well below even UE. This was a manifestation not only of FET rate capping, but the simple realism of generating the necessary people. We must consider taking a hard look at our "warfighting establishments", which must be

considered an anachronism if we have no hope of ever generating them. This is particularly the case with singleton or specialist sub-units where there is no source of backfill anywhere in the Corps. A case in point is 23 Amph Sqn, which on endless CPXs since SDR we have consistently declared with a WFE capability of 32 rigs. For Op *Telic* the Corps struggled to scrape together 24 crewed rigs, which included the complete mobilization of 412 Tp (V) which provided seven of these crews.

The concept of a close support regiment per brigade is now well established, well proven, and fully reinforced on this operation. The only area where this is not the case is support to the Commando Brigade, which badly needs as a bare minimum, a massively up-gunned command and control focus in the brigade HQ, even before consideration is given to forming a Commando Engineer Regiment, in order that OC 59 and OC 131 can concentrate on commanding their squadrons rather than providing the engineer staff function in a formation HQ.

Counter Mobility.

THIS was an offensive manouevre operation, in which there was little need for conventional counter-mobility support. The few times that Iraqi armour attempted manouevre it was massively outgunned in terms of range, accuracy and stopping power of coalition deep and direct fire weapons. In this respect we must also be cognizant of the "New World Order" in the use of mines for counter mobility, particularly when operating in a US coalition. US CENTCOM ROE specifically forbade the laying of "dumb" mines, which therefore precluded the use of Barmine in any form. While the US had air delivered GATOR and ground launched VOLCANO mines available to counter unexpected enemy manouevre, this was seen very much as a weapon of last resort. On the UK side SHIELDER was deployed with 7 and 16 Brigades, but the total dominance of coalition air, aviation and deep battle assets, resulted in it never coming even close to being fired, and one suspects that our senior commanders would have used every other means at their disposal before authorizing its release.

The Development of the Joint EOD Group Pre-Deployment Preparations

COLONEL J W SHANAHAN MBE MBA

John Shanahan was commissioned into the Corps in December 1982 and has completed tours as a Troop Commander with the Gurkhas and in Germany, a stint in Northern Ireland, Squadron 2IC in Maidstone and a tour as a Platoon Commander at RMAS. As a "grown up", tours at Staff College, 69 Gurkha Independent Field Squadron, DS at the Army Junior Division and the Army Presentation Team, preceded RE MCM Division (He still keeps to lighted streets on dark nights!), J5 Plans in Kosovo and Commanding Officer 33 Engr Regt (EOD). Married with twin boys aged six years, he commenced an arduous posting as the Senior British Liaison Officer in USA this summer

BACKGROUND

PRIOR to Op *Telic*, all recent Post Operational Reports had highlighted the requirement for a "joined up" EOD organisation under a single and unified chain of command. I had been harping on about this consistently (and unsuccessfully) to HQRE during my tenure in command, however I was stunned when I was told to "put your money where your mouth is" and form the Joint EOD Group in December 2002. The Joint EOD Group included EOD teams from Fleet Diving Group, the Armament Support Unit (ASU), RHQ Tac 33 Engr Regt (EOD), 21 and 49 Fd Sqns (EOD), 22 HQ & Sp Sqn (EOD), 101 (London) Engr Regiment (EOD) (V), 5131 (BD) Sqn RAF and IEDD teams from the RLC. In addition, we were reinforced by a sizeable number of mobilized TA Augmentees. The organization is shown in Figure 1.

PLANNING

INITIAL negotiations started in December 2002 and from the outset I was delighted with the

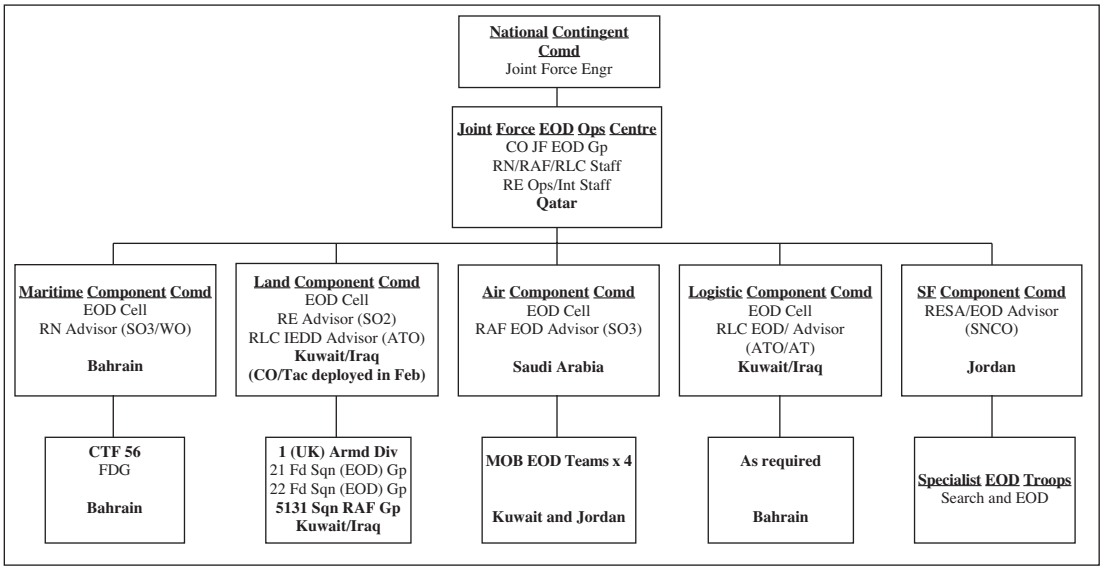


Figure 1 – UK Joint EOD Group Orbat.

response from all the Arms and Services; it was not quite what I had expected and everyone was keen to help establish the organization. Even if Op *Telic* had not subsequently happened, we had gone forward years in terms of reducing suspicion and misunderstanding. In essence, people could not have been more helpful and I seemed to get everything that I asked for (not something I was familiar with). Planning now began in earnest and we were integrated into the Joint Force Engineer Group working to Colonel Neil Fairclough.

Reference Points

HAVING prepared and deployed large elements of the Regiment for operations in the Balkans, Macedonia and Afghanistan, I was content with the scope of the requirement, although it was clear that OP *Telic* was going to be at the high intensity end of the spectrum. In addition, we had conducted Regimental FTXs to prepare for a major Divisional deployment and we were therefore very well prepared for what was about to unfold. Despite this, there was a large amount of pre-deployment training and integration to be completed in a very short period of time, as well as the basics of getting to know our counterparts from the other Services. We have very different ideas, working practices and experiences and bringing all this together in time to cross the Line of Departure was a real challenge.

Early Lessons and Group Cohesion

THE initial focus was the generation of the Force Element Table (FET). The euphoria of actually getting the Group approved and on the FET soon faded and we had to work furiously to get an organization that had never worked or fought together, out into the desert with the right kit and personnel. There were a variety of equipments ranging from ancient CVR(T)s to brand new Mine Protected Vehicles (MPVs). Ensuring that adequate 1st and 2nd line REME and fitter support was in place from the outset was a key lesson.

The Threat

THE EOD threat from Saddam's arsenal was huge and varied and there was a particular focus on NBC, but we had to be prepared for all types of munitions. The years of paying lip service to NBC training were firmly behind us and we even deployed people down to Porton Down for live agent training. Communications, living in the field and battlefield survivability were new lessons for the RAF and RLC, however they brought their own unique skills to the organization and a new way of looking at things; no bad thing.

In-Theatre Training - Arrival

THE vehicles and equipment were sent to Marchwood at the detailed timings, however there was so much equipment being sent to the Gulf that everything was simply crammed into

Commanders RE and some of their COs.

the nearest available space and the ships allocated changed on a daily basis. The RLC Port and Maritime team were working extremely hard, however this meant that we had joys of arriving in a strange country in a completely haphazard manner and all our plans for a Desired Order of Arrival (DOA) vanished; we were running around the docks and airfield to reclaim our equipment and personnel like lunatics. In addition, our camp had not been completed and I am indebted to 28 Engr Regt for their forbearance and assistance as we built the tented accommodation. On top of that, the TA arrived from all over the place, largely lacking the skill sets that we had requested, however they were keen as mustard and soon pitched in, bringing some really excellent operators with them; a more focused mobilization plan for the TA is definitely required in the future. In addition, the EOD Group did not officially exist and therefore getting real estate, stores and equipment was a nightmare!

Training

With all elements now in theatre, integration and battlefield training started, which produced some minor refinements to our procedures. A key element was embedding the SO2 EOD and SO3s EOD in the Divisional and Brigade Headquarters, which had never been done before. This resulted in numerous teething problems, but it paid dividends later in the operation, as they were able to give effective advice to the commanders and deploy assets forward to where they were most needed. Group cohesion began to develop and people became rapidly aware of our respective strengths and abilities.

Final Preparations

Many things had to be reappraised as we developed our training and procedures, whilst acclimatisation and equipment preparation was essential; a very high priority was placed on equipment care, as the distances were considerable and the extremes of temperature were going to be huge. A very focused training plan was required, which was not easy when the operational plan was, for good reasons, constantly changing and not all our stores had arrived. Updates and back briefs were key to this and did much to alleviate the air of uncertainty that always pervades prior to an operation.

Jointery

All EOD elements were placed OPCON to the Group, which was a major step forward. Previous deployments had been marred by cap badge politics and hidden agendas. On this occasion, all elements had signed up to the concept and I was given very clear riding instructions by the Joint Force Engineer. Despite this, we were all in uncharted waters and forming a cohesive team was my key initial objective and I am grateful to everyone involved for all their support in getting this off the ground.

The Unexpected

I am a firm believer in the principle that "no plan survives initial contact with the enemy and be prepared for the unexpected", however I was surprised to find myself planning an operation to help secure the southern Iraqi oilfields, ahead of the main British deployment with a bunch of "fuellies" from 516 STRE for company. This was the initial strategic target for the Coalition and we deployed EOD teams with US Marines from 5 and 7 Regimental Combat Teams from the Marine Expeditionary Force (MEF). The aim was to clear a route into the oil installations to enable the MEF to secure the infrastructure and the STRE operators to switch them off to "Safe Mode 1" i.e. closed down and safe. For one of the first times in my career, I was given a blank piece of paper to work from and we all pitched in, developing SOPs, tactics and techniques that we hoped would work against a determined enemy, on the ground of his choosing, with time and a stated intention to prepare the targets for demolition.

Contact - Command and Communications

As the operation unfolded, it rapidly became clear that the EOD Main Effort was going to be

in the Land Component in Iraq and this was where the Tac element of the JFEOD Operations Centre would have to deploy, if I was to be able to influence the EOD battle; fortunately, Colonel Fairclough agreed. Communications were going to be the key to the successful achievement of our initial mission and I had to personally brief CJO on the "high tech" communications plan that we had for the operation, which included secure satellite communications. It will therefore come as no surprise that the plan did not survive moving into the FUP, let alone contact, indeed the lightweight recce net (weighing 75 kilograms and taking up virtually the whole of the back of a vehicle!) arrived after we were in the FUP and we had to send people back at night, to collect a new piece of equipment that they had never seen before and which immediately broke down! The lesson from this is to ensure a robust, secure communications system is in place and tested well in advance. We had a back up plan using HF and Regimental nets that was sorely tested, but worked effectively.

The Oil Installations and Assault EOD Teams

To seize the oil installations intact, our security would have to be provided by speed and surprise and to achieve this, we developed the concept of Assault EOD teams. The Assault EOD teams supported the American RCTs and carried out rapid route clearance up to the targets, marking an access route to the Inlet Manifolds and Pumping Stations. On completion of the clearance of the manifolds, the STRE operator was called forward to shut it down, whilst the EOD No1 continued to clear up to the Pumping Station, marking a second safe lane. The STRE operator would then move forward and shut down the Pumping Station. Once these had been successfully turned off, the GOSP was in Safe Mode 1.

Strategic Success

The securing of the oil installations was phenomenally successful. The MEF had captured the majority of the oil infrastructure intact and our teams were on a real high. I had not envisaged being stood on the oil installations on Day 2 having successfully captured them; prior to the assault, I had visions of burning oil wells as per the Gulf War in 1991. It was a terrific moment, but there was no rest for the wicked and we now moved into the more traditional Close EOD support to the manoeuvre formations.

Scope of EOD Encountered

We were well prepared for the variety of munitions that we encountered, however the sheer quantity came as a surprise; the country was swarming with munitions! There were missiles, ammunition, armoured vehicles and equipments of every type and everywhere, whilst everyone seemed to own at least a brace of Rocket Propelled Grenades (RPGs) that were generously lobbed in our direction. Afghanistan had been full of ordnance, but we moved into a new territory here. In addition it varied in quality from extremely old and more of a hazard to the firer than the target, to some very "high tech" missile systems.

Tragedy and Repatriation

The contact zone was extremely fluid and very hazardous and it was here that our first tragedy and casualties were inflicted. SSgt Simon Cullingworth and Spr Luke Allsopp had been providing Close EOD support to 7 Armoured Brigade and had been tasked to an EOD incident in the town of Az Zubayr, near Basrah when they were ambushed by the enemy and killed.

This was soon followed by another blow, when SSgt Chris Muir was killed disposing of munitions in a bomblet field. The fledging Group had taken a major hit and we felt this very keenly, as they were highly popular and respected, professional operators. It was a very dark period and there was some real soul searching by all of us, however the corner was soon turned and "normal service was resumed". I shall never forget the moving repatriation parades and our thoughts are with the families who had to deal with the tragedy in the harsh light of the media, especially after the Prime Minister's unfortunate announcement.

The Joint EOD Concept – Did It Work?

The Group consisted of RN Clearance Diving Teams who subsequently came ashore, RE Search, IEDD and Conventional Munition Disposal (CMD) teams, RLC IEDD teams who were employed on both CMD and IEDD and the RAF teams who had to adapt to the Land Component. This produced an organisation with different aspirations and levels of experience and co-ordinating this cocktail was a real was no mean feat. In addition, there were new equip-

ments and fundamental changes to Service modus operandi, as many people were working "outside the box" and well outside their "comfort zones".

One major advantage the RAF had, notwithstanding the high maintenance problems that ensued, was deploying with CVR(T)s, as it enabled them to move around the battlefield without armoured escorts and gave them protection against small arms fire. EOD will be conducted right in the contact zone in the future and light armoured vehicles, preferably wheeled, are a real necessity.

Training Needs

THE three services are all trained by DEODS and the Army School of Ammunition and therefore there is a common basic standard. However, all three services operate in fundamentally different ways, which meant that the RAF and RLC had a particularly steep learning curve when it came to operating in the combat zone and faced some real problems, however all three cap badges were technically extremely proficient, with little or no difference in standards.

Pre-deployment training was completed, but the timeframes were very short and the same was the case for In-Theatre training. Despite this, I was confident that we would be ready when we had to cross the Line of Departure and this proved to be the case.

The key lesson is that considerably more routine cross-training must be conducted by all elements of the EOD community.

Equipment Issues

AS stated earlier, from an establishment point of view, the unit did not exist. In addition there were mixed fleets, armoured vehicles that belonged to other units and new vehicles that were brought into service early (the RLC Duro for the IEDD teams proved to be extremely effective and the RE Mine Protected Vehicle (MPV) was also drafted in early). The G4 team was working flat out to ensure that equipment was dispatched, collected and sent to the right place at the right time. The key lesson is to take a robust G4 team with the Group to ensure that the G4 plan fully supports the G3 plan and my TQM, (Steve Rock), was phenomenal in what he achieved in this area.

Organizational Issues

THE Group deployed extremely lightly manned and there had been no time for the headquarters to work up at all. The embedding of the SO2 EOD and SO3s EOD was a real achievement and was very well received by the Formation headquarters they supported. There were some inevitable frustrations, however problems were quickly worked through, largely as a result of hard work by everyone in the Group. There were major problems with communications and this must be resolved as a priority, if we are to be able to operate at the tactical level.

Conclusions

THE formation of the Joint EOD Group was a significant step forward in the development of EOD. The Group was employed within all Components and all areas of the battlefield, it was one of the first units to deploy into Iraq and it was one of the later ones to be replaced in theatre. Many questions were asked of the Group and we faced three major tragedies. Command of EOD assets needs to be forward and robust, if these scarce assets are to be utilised to best effect. In addition the differences between the Arms and Services were surprisingly large, although the delivery of technical EOD capability was generally the same. The Joint EOD Group enabled EOD assets to be utilized where they were most needed and, by working across all Components, it delivered a far more flexible and effective response than we have ever had before.

We suffered numerous growing pains and frustrations, however it is definitely the way ahead. Many valuable lessons were learnt, particularly concerning communications, equipment and routine training, that will enable us to do this again, and we gained a lot from working with each other in a truly Joint environment. Close EOD support is clearly a requirement for the future, and the RAF, RLC and RN bring major benefits, as well as challenges (as no doubt we do). The Joint EOD Group concept will require significant investment if it is to fulfill its potential, however it was undoubtedly a real success and it was a privilege to have commanded it.

Infrastructure

LIEUTENANT COLONEL S P W BOYD BSc CEng MIMechE

Steven Boyd was lifted from his post at HQRE Theatre Troops to act as the SO1 Infrastructure in the Op Telic *National Contingent HQ. Having previously been 2IC of 527 STRE (Works) leading on infrastructure support on Op* Resolute 1 *in Bosnia; OC of 60 HQ & Sp Sqn providing engineer logistic support to 39 Engr Regt in their work with the RAF including a tour in the Falkland Islands commanding a composite air support field squadron; OC of 516 STRE (Bulk Petroleum) supporting the Royal Marines and the Joint Helicopter Force on a range of operations and exercises; and having been the Secretary of the Committee charged with writing infrastructure doctrine, he should have been well placed to carry out the role……..*

Introduction

Many of you may be aware of the argument in recent years over the best way to control specialist engineer assets and to manage infrastructure on operations. Those of you who have read even this far in an article entitled "Infrastructure'" probably have a view. This article will tell how it was done on Op *Telic*. Some will agree, some will not, but the weight of evidence is clear.

Doctrine

In my day job, as SO2 Infra (Plans) at HQ RE Theatre Troops, doctrine was the bane of my life. In fact, I sometimes felt that my post would be better titled SO2 Thick Documents! A large part of my work was developing the 7 sub-ordinate documents in support of JWP 4-05 Infrastructure Management on Joint on Operations. Some of these texts, such as Works Services Contracts and Lands Procedures, were relatively straight-forward. Others, particularly JWP 4 – 05.1 Command and Control, were more difficult. The problem I encountered with this text can be summarised as the choice between two contradictory ways ahead:

- **Option 1.** The staff responsible for infrastructure management should be part of the J4 Branch and report to DCOS as described in JWP 4-05. Not stated in the JWP, but a widely held supporting view was that the SO1 Infra should also be double-hatted as the CO of the CRE (Wks) [an inappropriate name: more of this later].
- **Option 2.** The Infra Staff should be an integral part of the Engr Staff in all contingents. Staff and command functions should be separated, and the CO of the CRE (Wks) should be allowed to command his unit in the same way as other unit commanders. This view point is set out in the proposed UK Joint Force Engineering doctrine and in Allied Joint Publication (AJP) 3.12 Joint Engineering, which is now in final draft.

After much discussion on which of these options to select, a make or break meeting was held in Summer 02 at Wilton by Col Engineer Services involving all Land Command interested parties and the RAF. The unanimous option of this meeting was that Option 2 should be selected. Concerns were expressed by some that the importance of infrastructure planning would be diluted outside J4, that it would be difficult to influence DCOS and Civ Sec, and that specialist engineers would not be managed well by "combat" engineers. Despite these concerns, when planning for Op *Telic* began in the autumn, it was quickly decided that, since the Operation would be a coalition effort, the draft AJP 3.12 would be adopted as a guide to structures and procedures.

Role As Part of the Engineer Staff

The whole point of Joint Engineering doctrine is that all "engineer[1]" effort and staff activity is co-ordinated to achieve best effect. Value is added through the inter-relationship of functional areas. My experience during Op *Telic* was that the Infra Staff as part of the Engr Staff, can not only play an effective role as part of the Sapper effort, but can also influence others across the HQ.

Engineer Intelligence. I worked closely with the

[1] Not necessarily RE: could be RAF, or indeed RN, with the appropriate skills.

Real Estate	Transportation	Utilities	In-Country Resources
Government	Airfields	Oil	Quarries
Security	Ports	Water	Building Materiel
Medial	Roads	Wastewater	Specialist Suppliers
Law Enforcement	Rail	Power	Works Contractors
Sensitive Sites	Inland Waterways	Refuse	Haulage
Potential Own Use		Communications	Opportunity Resources

Table 1 – Infra Recce EOP.

SO2 Engr Int, Ian McDougall, to gather potentially useful intelligence on Iraqi infrastructure. Our main source of intelligence was the Infrastructure Branch of the Defence Intelligence Service (DIS). This organization provided much useful information. However, being very biased to targeting support, it was good at providing accurate grid references and aiming points for bridges and power stations, but not so good at identifying their utility and the management structures of the authorities that run them. The Corps would do well to nurture its relationship with DIS to improve the service it provides.

Of course, satellite imagery and agency sources can only tell you so much. The Mark II Eyeball is often the best means of gathering information. To assist in this, an Engineer Operating Procedure (EOP) was developed to formalize the collection of engineer intelligence related to infrastructure. An Access database was also constructed and distributed in short order to help manage the information gathered by troops on the ground. At the time of writing, it is not clear whether the EOP and supporting database were found to be useful. However, this utility may be appropriate for the RE digitisation project, *Makefast*.

Engineer Ops. As the lead function in the Joint Force Engineer (JFEngr) Branch, Rob Rider, SO1 Engr Ops, co-ordinated the "engineer" effort across the whole of the JFEngr's remit. Quite rightly, in my view, Engr Ops, not the Infra Staff, gave direction to CRE (Wks) / STREs, having taken advice on capability as necessary. This is not heresy, and indeed worked well. It can be expected to work better in future as the bulk of the Corps becomes better educated on the capabilities and *modus operandi* of specialist engineers.

Engineer Plans. Infrastructure management is by its nature a significant planning task: it is planning with a long-term perspective. I found myself working both with NCHQ J5 and the SO2 Engr Plans, Sid Lawrence, on planning for infrastructure for own troops and for support to Iraqi infrastructure.

- **Intent for Own Infrastructure.** An intent for infrastructure was developed early in the deployment in order to guide future development:
  - Short-term pain was to be accepted for long-term gain. This might mean, for example, occupying a less than ideal location temporarily to allow the long-term solution to be provided in the favoured location.
  - Large hub locations, with higher standards, and small spokes, with basic standards, were to be established.
  - The numbers of RE required in theatre were to be reduced as soon as possible through the use of contracts and locally employed civilians.
- **Development of Own Infrastructure.** The provision of facilities for the Force was planned and controlled by the Infrastructure Development Plan (IDP). The IDP was the key planning tool for infrastructure, was reviewed approximately every month, and existed on three levels: theatre, contingent and site-specific. At each of these levels, the requirement was set out and justified for the deployment stage of the Operation, the transition stage after war fighting, and finally consolidation. The development of infrastructure largely followed three distinct steps. It would have been ideal to use unit held equipment, such as wash stands and shower bags, in the first instance. However, these essential, and relatively inexpensive, equipments are not (yet) widely available. PJHQ quickly discounted the option of living out of vehicles without them. In Kuwait, accommodation was initially provided on a basic scale by leasing large tents through US contract arrangements. After the move into Iraq, a limited stock of temporary camp[2] systems were planned for use as it became available. And finally, the need for semi-permanent[3] accommodation was identified and justified. It was planned to meet this requirement through a balance of refurbished existing infrastructure, limited new build, and modular buildings. The latter were provided from surplus modular camps in Kosovo, which began to be stripped in April 03 for delivery to theatre in June and July.
- **Support to Iraqi Infrastructure.** The provision of immediate support to Iraqi infrastructure was an

[2] Tier 1 – tented.
[3] Tier 2 – hard-walled.

TDA.

important part of the Op *Telic* mission as part of the intent to create a safe and secure environment in Iraq. Part of the UK effort was to help provide humanitarian assistance and to create the conditions for economic development of the country. Whilst these aims are not central to the military mission, the Forces can faciliate them. The Corps in particular, can help with the provision of clean water, and with the immediate repair of infrastructure. Indeed, the Land Contingent was able to do much good work in this area. International Organisations (IOs), such as the UN, and Non Government Organisations (NGO), such as Oxfam, are the main providers of humanitarian aid including some low level infrastructure work[4]. However, in the period immediately after conflict, there is considerable overlap between their aims and the military stabilisation aims. It was felt to be important, therefore, to prepare to co-ordinate military and NGO efforts. This was done through the Humanitarian Operations Centre, which was a military organisation of the passage of information between the Coalition and the aid agencies. In the case of Iraq, a further body was also created in advance of the conflict to help make the transfer of authority for the military occupying forces to a new civilian administration. It was planned that this body, the Office of Reconstruction and Humanitarian Affairs (ORHA), would have temporary authority for aid, regeneration of national infrastructure, and for facilitating civil governance. JFEngrs spent some time with ORHA influencing its approach towards a more inclusive way of dealing with the Iraqis, identifying common goals and mutually supporting resources for dealing with larger infrastructure, and trying to ensure that the military had some influence over reconstruction priorities, in the UK area of operations at least. At the time of writing, it is not clear whether these efforts have been successful. However, UK specialist military engineers have established a presence in the southern office of ORHA, presently in Umm Qasr. Hopefully, this presence will help focus ORHA expenditure (there is no shortage of funds!), and, through early influence on ORHA practice, facilitate rapid draw down of military engineers.

Engineer Logistics. The development of infrastructure, other than by contract, is not possible without engineer materiel. The relationship between Infra and Engr Log functions is therefore very close (not that close!). Indeed, AJP 3-12 identifies Infra and Engr Log as forming one of the pillars of the JFEngr structure. This is exactly how we organised ourselves in Qatar, and it worked extremely well. Tim Chapman, SO2 Engr Log, and I worked together to ensure that engineer materiel flowed into theatre in the appropriate priority. We tried to anticipate demands from contingents, and to manage those items in short supply to ensure that scarce equipment was conserved. Tim and I took particular care to manage Tier 1 accommodation: provi-

Umm Qasr Power Station.

[4] Only a handful of NGOs, including ICRC, CARE international and Mercy Corps, are capable of larger scale infrastructure works.

sional allocations were made in the IDP, but like all critical assets, it was not issued by the 3rd Line Engr Log Sqn until released by us.

Other NCHQ Branches. As the J4 lead within the JFEngr Branch, I attended the daily J1/4/8 meeting and as such was able to pick up on logistic issues and influence the DCOS on infrastructure issues. This arrangement worked extremely well. Further, as well as having links to J5 Plans, regular contact was maintained with the Policy Advisor (POLAD) on the co-ordination of the military effort with other government departments, such as the Department for International Development (DfID). Latterly, engineer advice was also provided to FCO on support to re-establishing the British Embassy in Baghdad. Last, but not least, infrastructure advice was provided to J3 Targets on types of construction, industrial processes, and the collateral damage likely to be caused by air-dropped munitions. Unfortunately, as the pre-planned target list was run by the US, my input was restricted to opportunity targets. Despite this, the UK Targets Staff seemed to value infrastructure advice, and I managed to save at least one water treatment plant!

Working with US Central Command. Working with US Forces was a new and frustrating experience for me. We tried to influence CENTCOM planning, and in some respects had success. We managed to soften the US approach to post-conflict operations encouraging greater use of the existing Iraqi workforce. We influenced the division of tasks between its subordinate commands. And, perhaps, most usefully managed to persuade them to not bomb some of the critical infrastructure – notably the railway line from Umm Qasr to Al Basrah.

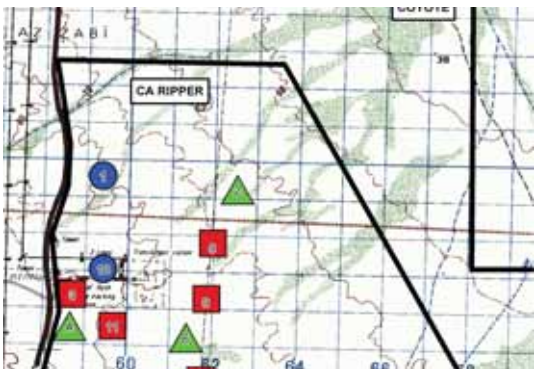
Effect in the Contingents

Maj Gen Peter Wall, COS National Contingent HQ, described the role of its staff as "to influence, support, and report; to build confidence up and down; and to interpose ourselves between PJHQ and the contingents". JFEngrs certainly tried to do this; whether we succeeded or not is for others to judge.

UK Air Contingent. Air Contingent engineers were first to deploy. Their initial task was to prepare significantly extended fuel facilities in Cyprus in late 02. This work was in addition to major contract works to provide more aircraft parking space undertaken by British Forces Cyprus. Deployed again early in the new year, aircraft and personnel bed down were carried out in a number of locations: in some cases, existing footprints were expended as at Ali al Salem, in others completely new sites were developed. The Contingent HQ Infra Staff and property managers out on Deployed Operating Bases (DOB) were found from the RAF Infrastructure Organisation. Experienced in operational infrastructure planning, these officers carried out a very useful planning and control function. They worked best when fully integrated into the 'engineer' chain of command in accordance with developing doctrine. As Royal Engineer and RAF Infra Staff gain experience of working together on operations and exercises, this relationship is bound to improve.

Forward planning for, and within, the Air Contingent is a very political task. National UK relations with a range of host nations need to be managed, whilst at the same time bases for a variety of different airframe types need to be provided. During the course of the operation, there was a continuous dialogue between UKAC Infra Staff, JFEngrs and PJHQ on the likely duration of stay at bases in seven different countries. By the middle of April, reasonably firm guidance had been squeezed out of the system and detailed planning could proceed.

Joint Force Logistic Component. In the deployment stage, the JFLogC Infra Staff led on the provision of accommodation in Kuwait. This allowed the Land Contingent to concentrate on close support to forward units and on playing a full role in integration training. The vast bulk of accommodation, to quite basic standards, was leased through the Acquisition and Cost Servicing Agreement



Accommodation Leased through the ACSA.

(ACSA) with the US. The ACSA provided ready access to contracts through US Contracting Officers (generalists not engineers), but subsequently led to considerable difficulties in identifying the exact contract provisions: identifying the date of lease expiry proved a problem in some cases. With hindsight, both JFEngrs and JFLogC should have pushed PJHQ harder to accept the need to embed UK staff into the US contract branch. Indeed, it was not until a senior Resources Specialist, WO1 Gates, went to work alongside the US that difficulties began to be resolved.

> "Production of DTLs at 70 Sqn continues. An increase in the requirement is anticipated, as it has been reported that a number of portaloos were stolen last night from Umm Qasr. RMP/SIB are investigating, but currently have nothing to go on."
>
> JFLogC Engr Sitrep 12 Apr 03

Before, during and after war fighting, JFLogC continued to be involved in a wide range of infrastructure tasks from main supply route maintenance and preparation of hard standings, through water supply, to property management and planning for post-conflict accommodation. In accordance with doctrine, the JFLogC provided infrastructure planning and support to the Land Contingent in the early stages of the conflict. However, as the war fighting phase drew towards its end, preparations were made for a move to the organization typical of a peace support operation. After much pushing, JFEngrs was able to prise an Infra Staff out of the system. On deployment, this Staff immediately began to plan the move into more static locations in the UK area of operations in Iraq.

UK Land Contingent. Much of my time in the first few weeks of February was spent working on the need and procedure for making safe the critical facilities in the southern Iraqi oilfields. Clearly, the practical details of this work were dealt with by 1 UK Armd Div, but JFEngrs worked to persuade London that this task was within the Corps' capability, with CENTCOM on the integration of UK explosive ordnance disposal and Specialist Team Royal Engineers personnel into US units, and on the pros and cons of the possible timing of assaults. Perhaps, our strong advice, in respect of this key task, that an air war before the ground assault would be unwise, had some little effect on the late decision to delete the planned five day precursory air operation.

As an asset with wide utility, 64 Commander Royal Engineers (Works) was commanded directly by the JFEngr as force troops. Initially, to support the bed-down in Kuwait, 64 CRE was given to the CRE of the Logistic Component to control. [The fact that the CRE was commanded by the CRE illustrates the unsuitability of the unit title. Not only is the existing title likely to cause confusion, it does not convey the unit's nature. A better title is required. Perhaps, 64 Engr Regt (Wks) would be more suitable.] At the start of war fighting, 64 CRE formed a substantial infrastructure reconnaissance and immediate repair organisation to support the Division. In this way, direct support was provided where it was most needed and considerable early successes were achieved. Successes included the restoration of power supply to Umm Qasr and water supply in Al Basrah.

> "My main effort is now focussed on the restoration of water and power in the key towns, which is now foremost as one of the Land Contingent Commander's battle winning effects. CO 64 CRE and his STRE recce / repair teams are absolutely pivotal to this mission, and I am grateful that they continue to be task organized to the Divisional Engineer Group."
>
> CRE's Assessment UKLC Engr Sitrep 12 Apr 03

Contractors as a Force Multiplier

Over 50 per cent of the Corps has been deployed on OP *Telic*, and roulement strength will be much less. Indeed, the Corps can only raise a maximum of 1,000 for a follow on force. This is likely to be much below the 15 per cent typical RE share of the total on recent peace support operations. This gap can be filled partially by the use of locally employed civilians supervised by NCOs, but significant use of contractors will also be required. It is planned to use contractors to support engineer logistics, to construct accommodation and to maintain infrastructure.

Some fear that the use of contractors, and in particular the forthcoming Contractorized Logistics (CONLOG) Contract, is a threat to RE establishments. I do not believe that this is the case. Op *Telic* has demonstrated that the Corps needs more general support capability in uniform to work in non-benign environments and not less. But it has also demonstrated that we also need to be able to control and

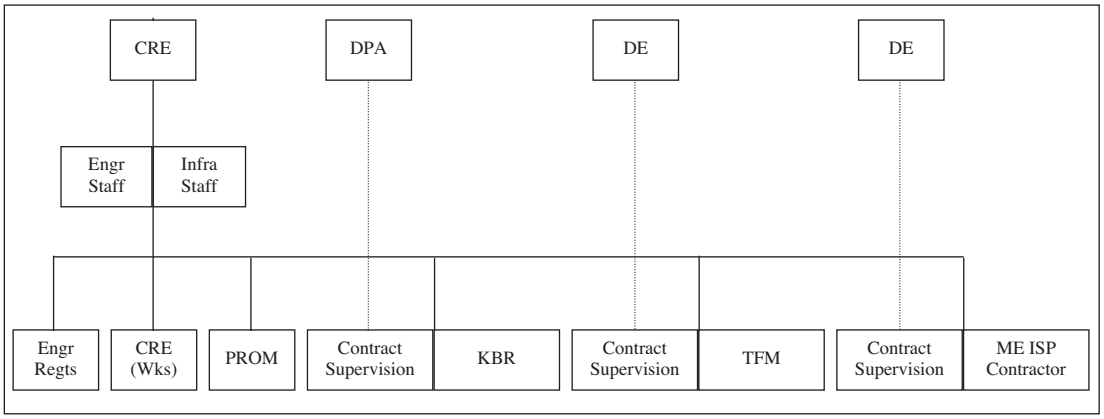


Figure 1 – Contract Management Structure.

manage contracts to our advantage. We need not fear the increased use of contractors in benign environments. Rather, we should embrace the opportunity. Contractors, effectively used, should be seen as a force multiplier for the Corps and part of the capability we bring to deployed operations, not as a competitor. This is partly presentational, but it is also a mind set. It is a truism to say there are never enough engineers. But is also true that if the Corps can learn to utilise contractors, and sell itself as the Defence lead on infrastructure support contracts, it will be able to draw on a ready supply of contract support either through CONLOG or through local contracts. The US Army Corps of Engineers (USACE) has done this very effectively. No-one sees the US version of CONLOG (the Logistic Civil Augmentation Programme (LOGCAP)), as a competitor to USACE: it is seen as another string to the Corps' bow.

For Iraq, it is planned to make use of local contractors for minor works such as the refurbishment of buildings, but to use UK-based contractors for the provision of temporary and semi-permanent accommodation. The Defence Procurement Agency (DPA) contract for the supply of Tier 1 accommodation with Kellog, Brown and Root (KBR) is being extended to also include for delivery to theatre, construction and maintenance: strip and recovery will be held as contract options. Secondly, the Defence Estates (DE) contract for infrastructure support to the semi-permanent, modular buildings in Kosovo is being amended. Turner Facilities Management (TFM) will strip these surplus buildings, ship to theatre and construct on new sites. Finally, a new contract will be let competitively for a Middle East Infrastructure Support Provider (ME ISP) to operate and maintain the theatre infrastructure and carry out new works as they come to light. The management of these contractors will be important and a simple system, which is clear to all, is required. The agreed approach is as follows:

- The CRE will be the focus for all engineer works including that carried out by contract.
- The Infra Staff will advise the CRE as part of his Staff, plan infrastructure requirements, and be responsible for the financial aspects of all contracts.
- Each contract will have a small, dedicated contract supervision team, which will work collaboratively with the contractor, report to the CRE on progress and for co-ordination, and liaise with the UK on purely contractual matters.
- The CRE (Wks) will provide a concept design and construction supervision service to field squadrons and to the contract supervision teams as directed by the CRE [confusing, isn't it].
- A single property management staff will look after all the whole military estate (temporary and semi-permanent) monitoring all maintenance and new works.

Conclusions and Lessons

- Infra Staff can be highly effective working within the Engr Staff and the necessary coordination with J4 need not be affected. Op *Telic* confirmed that the decision to amend JWP 4-05 in this respect to bring it in line with AJP 3.12 was correct.
- The DIS Infra Branch can provide very useful engineer intelligence, but it is currently too focussed on targeting. The Corps could usefully work with DIS to improve the service it provides.
- *Makefast* could usefully include a format for the collection of engineer intelligence on infrastructure.
- Further education of the bulk of the Corps is required on the capabilities of specialist engineers.

- The Infrastructure Development Plan is an important planning tool for engineers.
- Infrastructure and engineer logistics functions are intimately inter-related and must work closely together.
- RAF Infra Staff have much to offer, but for best effect must work within, rather than alongside, the Engr Staff.
- The Corps should learn to see contractor support as part of its capability and sell itself as the Defence lead on

Ubique!

LIEUTENANT COLONEL J D KEDAR BSc(Eng) FRGS

Lieutenant Colonel John Kedar was appointed the first ever Commanding Officer of 42 Engineer Regiment (Geographic) in March 2001. His deployment as the Op Telic *Force Chief Geographic Officer resulted from this appointment. Previously he has held posts in the Defence Geographic and Imagery Intelligence Agency, The Defence Intelligence Service and as SO2 J3 Land in Cyprus after Staff College. He also saw service in Bosnia in 1996 whilst commanding 14 Independent Topographic Squadron, now no longer independent but part of the Regiment. Tours as a troop commander in Punta Gorda and as a loan service officer in Muscat remain his most memorable posts*

Op *Telic* has shown that the Joint Force Engineer concept is a success with force geographic support being a significant part of that concept. This article is not just about geographic support to Op *Telic* but is designed to give an understanding on this small part of your Corps, and why it is in increasing demand.

All US Army engineer officers undertake some geo training. Sadly this is not replicated in the Royal Engineers and thus on the one hand the Corps has MSc trained experts, on the other, squadron commanders receive a 40-minute briefing. It is hoped that this article helps wider education.

As background, the Geographic Engineer Group (GEG) comprises a Headquarters, responsible for the development of deployable geographic support to Defence, the Royal School of Military Survey responsible for training geographic technicians and conducting some Defence courses, and 42 Engineer Regiment (Geographic) to deliver capability. All Army formations have organic geo staffs, augmented by the Regiment on operations.

Planning

Planning started in August 2002 with the geographic staff at PJHQ working on Intelligence Preparation of the Environment (IPE). It was not long before reinforcement was required to meet PJHQ requirements, and 42 Engr Regt provided this. In September the Regiment took the unilateral decision to obtain and prepare geographic data for Iraq, a time consuming process. In retrospect this was a wise decision without which 1 (UK) Armd Div would not have been able to plan effectively a month later.

In October map supply planning ramped up, with Defence Geographic Centre (DGC) printing significant quantities of mapping in conjunction with US partners and the Regiment itself. This was another unilateral decision taken at financial risk as it would take six to eight weeks to build up the stocks necessary for the northern option. Simultaneously, a one terabyte server, loaded with data ready to use, was passed to HQ 1 (UK) Armd Div by the Regiment, again a first which set the tone for initial data distribution, which had previously been by CD.

At the end of October the Defence Geographic and Imagery Intelligence Agency (DGIA) was planning and working towards an operation without formal PJHQ direction. If this action had not been taken then the Services would not have had the mapping in place to go to war. This was later proved very vividly when the operational area changed to South Iraq in January and the six-week map production process started again. As a result Brigade commanders were screaming for mapping that was still being printed.

Lesson: *Mapping is unique to every operation and preparation of geographic information and mapping is on the critical path. Without the active involvement of DGIA from Day One the risks to the operation increase.*

Into November and CO 42 Engr Regt visited CENTCOM at his own expense (in travel budget terms) to agree how geographic support in this coalition operation was to be provided. The UK concept, enshrined in the ABCA Coalition Engineer Handbook, sees a single officer being

made responsible for geographic support in an operational theatre. This support includes policy and planning, map supply, intimate support to all headquarters, the Force Geographic Support Group (GSG), advice to the commander, liaison with coalition partners, liaison with production agencies and a single reporting point to PJHQ. Not so in a US headquarters where three staff branches typically share responsibility. Without this visit UK would not have even featured in CENTCOM geo planning.

***Lesson**: Geo is an international business and is delivered on a coalition basis not single nation stovepipes. Coalition operations therefore require joint geo planning.*

Ex *Internal Look* was a mission rehearsal. More importantly it was an opportunity to plan Op *Telic* geographic support from National Contingent Headquarters (NCHQ). Meanwhile in HQ 1 (UK) Armd Div Capt Bell and her reinforced geo staff worked flat out to support the GOC's planning.

Into January 2003, a New Year and New Plan. The plan changed so significantly that detailed preparation and map production started almost from scratch. However, the concept remained unchanged: augmentation to all formations and contingent headquarters; liaison staff to US map depots; 14 Geo Sqn to be the GSG and CO 42 Engr Regt (Geo) as the UK Force Chief Geographic Officer (CGO).

At the same time everyone wanted mapping of the Gulf – from Pte Smith of the Blankshires to General (Retired) Blenkinsop preparing for TV interviews. There were only limited planning copies available and these were allocated to those formations and units deploying. It did not help when many of these HQs left their planning stocks in UK and then complained of a lack of mapping in Theatre! Also in January the sailing of *HMS Ark Royal* and the deployment of JFLogC saw two firsts, with geographic teams deploying with both.

HQ 1 (UK) Armd Div utilized terrain visualization to assist planning

February loomed and the deployment matured. Herein the first hiccup. It was fully understood that map production was now playing catch-up, and so a belt and braces approach to supply was taken. The belt was to move 14 Geo Sqn to theatre at the earliest opportunity with large stocks for units that had not brought their mapping. This was recognized by DOA planners, although a misunderstanding on the peacetime location of 14 Geo Sqn led to some delay. The braces was to have UK soldiers in the US Kuwait Map Depot to do the same – except the promised depot did not exist and was never built throughout the operation. The early establishment of a SO3 Geo in JFLogC was a lifesaver in sorting out these problems. Those in the know now realise the value of maps – Capt Nathan Arnison exchanged a box of them for a Landrover Discovery!

***Lesson:** The GSG is an enabler and must be moved quickly into Theatre.*

February also saw the deployment of capability to the Air Contingent, another first. By D-day there were geographic staff in seven countries and with 18 different organisations. The relationships between baseplant and theatre and between CGO, GSG contingents and formations had all been established and everyone had their maps! March and April are history, although the next section of this article will highlight some of the capabilities utilised during this Phase of the operation.

Capabilities

Provision of geospatial advice and, where necessary, training. Specialist geospatial advice must be available to commanders to ensure that best use is made of geospatial data, products and capabilities. For example it became apparent that NIMA produced mapping contained glaring errors on the position of Iraq's international borders. Revision was not an option in the timeframes available and so promulgation of the errors was made through quickly printing a product from which maps could be corrected. In the meantime CGO liased with US and UK pro-

duction agencies seeking revised mapping.

A second example necessitated advice on the impact of Iraqi GPS jamming on coalition operations. This is more significant than navigation alone; many precision weapons are GPS guided and Iraq placed its jammers around Baghdad to counter the accuracy of these weapons. Advice took other forms as well, for example advising the National Contingent Commander on potential collateral damage during the targeting process, something often required in minutes.

Geospatial units maintain the capability to conduct specialist training such as desert navigation and the use of GPS. Despite GEG offers to provide pre-deployment training, response from formations was poor. A Royal School of Military Survey training team did conduct pre-deployment 'train the trainer' cadres at 16 AAB and the Regiment's detachment in 3 Cdo Bde provided some training there. Others were over confident; it is suspected that the troop commander who almost led his Challenger 2s into Iraq at D-8 could use some remedial training.

Geospatial data acquisition from all available sources. Deployed geospatial personnel are able to acquire additional source data and imagery in the field. This may include sources such as satellite imagery, air reconnaissance imagery from manned and unmanned platforms, local datasets and geodetic point positioning data.

This acquisition is enhanced by wide-band communications, thereby enabling data obtained in the UK to be quickly sent to Theatre. Pilot Digital Broadcast System (PDBS) provided this capability and its allocation had taken account of geo requirements. However, the system is basically one way, and so courier was the only option for moving data within the JOA.

Lesson: *Operational and tactical level communications are not adequate for geographic purposes.*

Most data was US produced and whilst much was obtained prior to deployment, much was obtained in Theatre through cajoling US geo staffs and through embedded geo personnel. Of the datasets obtained in Theatre the Vector Interim Terrain Dataset and Digital Globe Quickbird imagery probably top the list. The former is an example of a growing range of vector datasets that allow each vector (line, point or area) to have data attribution, for example road width, surface type, bridge length and width. This thereby enables questions to be asked, for example "list all wells within 1000m of tarmac roads". The latter is satellite imagery at 0.65 metre resolution, rectified so that it is positionally accurate. At this resolution individual cars and buildings are easily identified, although the imagery is weeks old at procurement and is very expensive.

PDBS provided rapid dissemination of imagery and geographic data from UK to Theatre, but not within Theatre.

Geospatial data extraction and exploitation. Once acquired, geospatial data can be exploited to create more detailed datasets. In classical terms this includes utilising satellite imagery to extract new terrain features – this was done to help determine road-widths and tree density along the Shat al Arab for the Marines. It also included establishing control for the gunners and for the RAF at Basrah Airport.

Opportunities to cross-environmental boundaries were taken, and the Combat Chart combining land and maritime information on the Al Faw Peninsula, produced by the Hydrographic Office and the DGC, was very well received.

Geospatial data management. The quantity of data available for Op *Telic* swamped geographic staffs, particularly when Joint Air Reconnaissance and Intelligence Centre imagery was pulled into Theatre over PDBS to support the Force. This imagery had real potential to support the warfighter and was utilised for production of Imagemaps to aid planning and briefing by the Division, although volumes often swamped geographic staffs at Brigade level.

One of the key tasks of the GSG on Op *Telic*

A combination of vector data and imagery provides an alternative map.

was to manage the plethora of data, ensuring that all users received the best information for their purposes, and keeping it current. This did not work particularly well early in the operation, as communications were appalling, GSG late arrival and poor direct access to US capabilities.

Lesson: *The GSG must have reliable communications and large bandwidth with CGO and his team and must be located close to a communications hub and most importantly to US sources.*

Release of data and maps creates many problems. Nations acquire geospatial information through bilateral arrangements, which normally prevent release to 3rd parties. Thus, for example, UK cannot release US produced mapping to NGOs without US authority. It must not be forgotten that many nations still regard military mapping as state secrets, indeed Iraq's military mapping scales (1:50,000 – 1:250,000) were for military use only and the Iraq Survey Commission, responsibility for civilian mapping, had no access.

Lesson: *Procedures for in-theatre management of geographical information must be validated ahead of Digitisation Stage 2, when demands will increase.*

Terrain analysis and visualisation. Terrain analysis to support IPB occurred right through the planning phases and at all levels. Some ignored the advice to their peril, especially in the soft-ground areas around Al Basrah, bringing a wry smile to the lips of 7 Armd Bde's geo sergeant. However, the operation also highlighted the confluence in terrain analysis and engineer intelligence responsibilities, with more work now required to determine how the two can become more supportive of each other. To expand on Major McDougall's point elsewhere in this journal, geo staffs have assisted in locating quarries on many operations but could now look in more detail for other engineer resources.

Visualisation entered a new era on Op *Telic*, with the procurement of 3D digital models of Al Basrah and Baghdad from Harris Corp. These enable the user to move around digital 3D models of the cities on computer and with minimal training. These were successfully employed at brigade level and on several occasions forward with battalions prior to the attack on Al Basrah. More traditional visualisation played a major part in the plan for the northern option, vividly bringing home to senior officers the difficulties posed by the terrain.

Geospatial product generation. Geospatial information can be produced or reproduced as digital or paper-based geographic products in large or small quantity. 14 Geo Sqn was producing from arrival and to a far greater extent than on a peace support operation. Initially products supported the deployment, changing to products to fill gaps in the standard mapping inventory, for example 1:10,000 imagemaps of airfields such as SHAIBAH. In fact, against conventional thinking, the squadron's presses were barely idle and, once the warfighting was over, switched to mines mapping and releasable products for NGOs and Iraq.

Collocation with other "information providers", namely 15 Psychological Operations Group and the Operational Intelligence Support Group, also reaped dividends. A plethora of other tasks were not all geographic in nature, but with often-tight deadlines and limited air transport the GSG is well placed to support.

Geospatial information and product dissemination. Initial supply was a UK responsibility and comprised issue of a planning pack to all units on the FET followed by supply of an Operational Map Pack (OMP), either prior to departure or on arrival in theatre. This was enhanced through the deployment of map supply vehicles (MAPSP) to each brigade on arrival to make up shortfalls. 2nd line supply was from the Forward Map

Distribution Point at the GSG and at 3rd line the UK relied on US resupply and thus jointly ran the Marine Logistic Corps Map Depot in Kuwait.

It is worth comparing the UK system, which sees maps being available from geo specialists at formation level, to the US system. US units order directly over the US computer networks but if advice is not available users end up with the wrong maps. For example one only has to look to Baghdad, where US Military Police were operating with 1:100,000 mapping when 1:25,000 street maps are available. It once again validates the need for map supply to be a geo responsibility.

What Can GEO Do For You?

READERS will be Sappers, and naturally want to know what the geographic community can do to directly support its Corps. Some of the following examples illustrate the range of activity:

- Remote airfield site reconnaissance, in this case of the Silopi Plain, to enable ground reconnaissance to concentrate on defined locations and thus increase tempo.
- Provision of database expertise. The 1 (UK) Armoured Division infrastructure database, directed by Joint Force Engineers, was established and managed by a geographic SNCO.
- Allied to this the Coalition Mines/UXO database was a US design, although US engineers could not operate it. Without the attachment of UK geographic staff in the Land Component Headquarters this database would not have crossed the start point.
- Production of Routes and Bridges mapping from the data collected in the Infrastructure database.
- Providing much data to engineer intelligence, from engineer resource information to gap crossings.

Lesson: *The data available to geographic staffs now enables much closer geographic/engineer intelligence working. This relationship must be developed.*

Phase 4

THIS article is being written before the start of Phase 4 started, although much work to support the stabilisation and reconstruction of Iraq is currently being planned.

Geographic support to the military forces in Iraq is taking a very similar role to that of IFOR in Bosnia in 1996, with geographic support geared towards force protection and support to J2. This includes traditional work on mines/UXO map production, imagemaps, map and data supply, IPE for discreet operations, international border advice, support to relief agencies and information operations, routes/locations products and maintenance of the "geographic database". Unfortunately support is being conducted by nations within sectors, despite the efforts of the UK Joint Force Engineer and Chief Geographic Officer to seek a Force solution in accordance with ABCA doctrine.

The Iraqi Survey Commission used old equipment, all of which was looted or destroyed by arson.

Geographic support to Office of Reconstruction and Humanitarian Assistance (ORHA) focuses on political issues, such as International and Governate Boundary positions, and support to any future elections. In May the author assessed the state of Iraqi civilian and mapping survey departments in order to allow ORHA to help rebuild a functioning organisation to support reconstruction. This went beyond traditional "geo" into the realms of cadastral survey and very large scale topographic mapping.

The Future

THERE are many pulls on the GEG. On the one hand, as one of three pillars of the Defence Geographic and Imagery Intelligence Agency (DGIA), there is a pull towards the intelligence community. The DGIA works to Chief of Defence Intelligence and includes DGC, responsible for base-plant delivery of geographic information and JARIC, responsible for intelligence production from classified imagery. 42 Engr Regt is the only significant deployable part of the Agency upon which other capabilities, such as forward imagery analysis, could be built.

Digital urban visualisation was used for the first time in warfighting

The second pull is towards the wider environmental information community, in order to provide a joint environmental picture. The Future Defence Environmental Capability will bring this closer to reality by pooling requirements and policy elements of the meteorological, hydrographic, geographic and air information single service staffs under a single one star. Again, 42 Engr Regt could expand to take on the front-line role inherent in this.

The third pull is caused by digitisation. Too little timely thought has been given to developing the skills required for digitisation across the Army, and geographic technicians will be pulled away from geographic work to help with generic data management in many headquarters. This must be resisted, and instead opportunities taken to allow staff officers to access and manipulate geographic data and products directly to meet there requirements, freeing geographic technicians to carry out more detailed analysis.

The last pull is towards the Corps. Some have talked about recapbadging geo to the Intelligence Corps. However, the Royal Engineers are responsible for all aspects of the "ground" and it is a natural place for the geographic community to sit, as proved under the Joint Force Engineer concept. Again, though, the need to move closer to engineer intelligence, perhaps by shifting the role of the terrain analyst, will place demands on the GEG in the future.

These pulls have political as well as logical strings attached. They require measured change where justification is strong and not just change for change sake. Most of all a clear GEG vision and a stable platform to carry out change are prerequisites to success.

There is a move to rear-base much geographic support, and use the communications architecture to deliver forward. This is flawed on several accounts: the communications infrastructure is lacking, timeframes are frequently tight (hours) and direct interface with the tasker is essential. Indeed, other elements of the UK and US intelligence community are actually pushing more capability forward into theatre. 42 Engr Regt is a force element and must be able to train to meet its operational role, not be pulled into a base-plant attitude which will lead to failure at first contact.

Limited rear-basing can be useful, as the Regiment's new Data Preparation Section has admirably proved. However, to provide the all-important continuum between preparation and operations this capability must remain part of the Regiment.

Summary

It is not for the author to surmise whether or not his Op *Telic* geographic support plan was successful, but for the warfighter.

However, all the feedback received from the supported Headquarters has been extremely positive and, judging by increased work levels on this operation, the requirement will continue to grow.

This geographic support concept was the culmination of much development during the 1990s and now reaches wider than ever before. GEG is a Defence capability and not singularly a J2, J3, J4, Engineer or DGIA asset. This fits well with the new Joint Force Engineer concept and thus CGO sits naturally under the Joint Force Engineer.

The geographic support concept has proved successful in warfighting and is similar to that developed for peace support operations. Development will continue in order to keep pace with the various pulls on the GEG and digitisation. There is a real need for geo personnel to be involved in operational planning from Day One, at PJHQ, DGC and 42 Engr Regt (Geo).

Including the latter unit is vital, as a continuum will enable individuals to deploy into theatre already "running" rather than from a standing start. Non-deploying geo staffs undertaking all the planning will deny this.

The Sappers are everywhere. None more so than those from the Geographic Engineer Group, where the work of the geographic community supports elements across the full range of contingents and formations. "Geo" is a vital piece of the jigsaw that enables a Joint Force to operate ubique.

Coordination of the Joint Engineer Effort

LIEUTENANT COLONEL R J RIDER MA BA

The author studied at Dulwich College, Sydney Grammar School and at Trinity College Cambridge. He was a mechanised troop commander in Germany, a field troop commander with 9 Parachute Squadron and Adjutant 28 Engr Regt, serving tours in Northern Ireland, Belize and Bosnia (UNPROFOR). He is a graduate of the German Armed Forces Staff College in Hamburg (GAFSC) and worked in J5 Plans at PJHQ from 1998 to 2000 before commanding 9 Parachute Squadron on operations in Northern Ireland, Macedonia and Afghanistan. He is currently the SO1 DS/BLO at GAFSC and was "Resubordinated" on Op Telic *in February 2003.*

I WILL aim this piece at anyone wishing to do an SO1 Engr Ops/Coord/Plans job in the future. I will look at: Doctrine/initial work up training; Joint Force engineer branch structure and integration into the NCHQ; Sapper ORBAT; Tasks undertaken; Lessons identified with recommendations.

My main observation is that engineers are generally well-placed to influence military-strategic, operational and tactical planning, holding posts within MOD (DMO), PJHQ (singleton J3 posts, Ingra and Geo elements), the JFHQ engineer post (surely the most interesting SO2 Engr job in the Corps), within LAND (HQRE Theatre Troops) and in Strike Command with 12 (Air Sp) Engr Bde. The gap from my perspective has always been the lack of a dedicated Sapper Cell within PJHQ. Great progress has been made conceptually with the introduction of NATO Engineering Doctrine AJP 3.12 (sponsored by Brigadier Mungo Melvin), which assisted the development of Joint Force Engineer doctrine. This made the case that Force Engineering is not a single service activity but Joint Activity encompassing the provision of infrastructure for a deployed force from ports, airfields and lines of communication to the Close Battle. Subsequent Sapper activity from *Saif Sareea*, Macedonia and Afghanistan confirms this viewpoint[1], although it has not necessarily been hoisted in by all of our colleagues in the Armed Forces.

Sapper Integration and Force Generation: The Sapper input to operational planning for Op *Telic* began in earnest in October/November 2002. As part of CENTCOM CONPLAN 1003V, the UK intended to insert its forces into Northern Iraq via Turkey and seize the Kirkuk oilfields. These scenarios were rehearsed on Ex *Internal Look* in November/December 2002 held at CENTCOM (Fwd) in Qatar, which saw the first run out of the JF Engr Branch[2]. Force structures were sketched in outline by December 2002 and confirmed as a result of a 1 Div/LAND Force Generation process in early January 2003. By then, the plan had changed and the UK's scheme of maneouvre had changed to its old hunting ground of Kuwait, with the aim of securing South East Iraq after 1 MEF and V Corps had launched an Army Group attack on Bagdhad. The rapid deployment, a race against time, then began in earnest. It is easy to comment that politicians should decide earlier if they want to take part in an operation or not to allow the necessary logistical preparations to take place, but political imperatives, which only allow for last moment decision-making, preclude this decisiveness. As detrimental to campaign planning, was the fact that the force profile was still tailored to that of Op *Resinate* (Ops *Southern/Northern Watch*), which affected the UK's ability to shape its own battlespace and also put its operational profile at odds with the more robust profile of that of the US.

Notwithstanding this the final Sapper ORBAT is shown on the attached diagram. The key points to note are as follows:

All contingents/components must be supported by:

- A Sapper C2 node and Staff.
- Close and/or General Support engineers.
- Geo, EOD (can be joint) and infra specialists and staff (MWF).

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[1] See Brig Mark Mans' Article RE *Journal* Apr 02.
[2] The SO1 Engr Ops/Coord was then Lt Col Simon Winkworth, subsequently posted to JSCSC.

The basic sapper structure for Op *Telic* was:

- Sp to UKLC: CS Engr Regt per Bde; CS Sqn per BG and GS Engr Regt to sp the Div
- Sp to JFLogC: GS Engr Regt and JFLogC Engr Staff
- Sp to UKAC: Early deployment of 12 (Air Sp) Engr Bde incl extensive TA Backfill; Cyprus based engr assets
- Sp to UKMC (later passed to UKLC) 3 Cdo Bde BEG (Bde Engr Gp)
- Sp to SF; EOD, Geo, Infra, UKAC and Cyprus engrs

Additional JF Engr forces:

- JFEOD Gp (RE, RLC (IEDD), RAF and RN EOD/UXO teams and RAVC (for search dogs)
- Force Geo Gp
  64 CRE (Wks)

The final total for deployment with TA backfill reached just less than 4000, just less than 10 per cent of the final force total of 45000, but representing more than 50 per cent of the Corps in the Field Army. The decision was made to front load the Corps as a maximum effort at the start of the operation with firm riding instructions to redeploy capability as soon as possible to enable the Corps to meet its extensive OCP/FRC commitments.

The structure of the Joint Force Engineer branch is shown in Figure 1.

The JF Engr Branch integrated within the NCHQ by providing a single, clear focus for engineer advice and support. The JF Engr had direct access (often to the jealousy of other staff branches) to the National Component Commander (normally in doctrinal terms the Joint Task Force Commander (JTFC)) on engineering matters, which raised our profile and exercised functional control over all engineer forces. This tended to work in practice through lengthy negotiation with the contingents/component CREs. From this, the engineer branch coordinated all activities with the Joint Staff Branches of the NCHQ, most notably in the following areas:

- J2: Intelligence & Geographic. Participation in the intelligence cycle, coordinating intelligence requirements (CCIRs, PIRs RFIs), providing imagery, topographical and geospatial information (most of it from DIA and NIMA), forming a mines and unexploded ordnance (UXO) database, and an infrastructure database, which concentrated on: ports, airfields, hydrology – control of water in Iraq is particularly important and oil infrastructure, utilities information such as power, sewage systems and provision of water, roads, bridges and railways.
- J3 Operations. Integration in the day to day battle rhythm of the HQ, controlling the deployment, employment and redeployment of major component/contingent engineer capabilities, ministerial submissions, PQs, (the so-called "Submission Command" to PJHQ), providing a sapper C2 and information node to HQRE Th Tps and EinC (A); Lastly, reporting and briefing engineer activities often on infrastructure/utilities or EOD related issues. Also J3 Ops Support: Assistance with the Information Operations and Media plans, and CIMIC/CMO and J3 Mov (prioritization).
- J5 Plans. Addressing all potential engineer requirements early in the planning process, both within national and Coalition (US) planning cycles. Contribution to own synchronisation matrix and establishment of ECIRs and DPs. On Op *Telic 2* there will be a requirement for extensive multinational cross-component liaison.
- Log/Mov and Infra: Deployment, control, use and

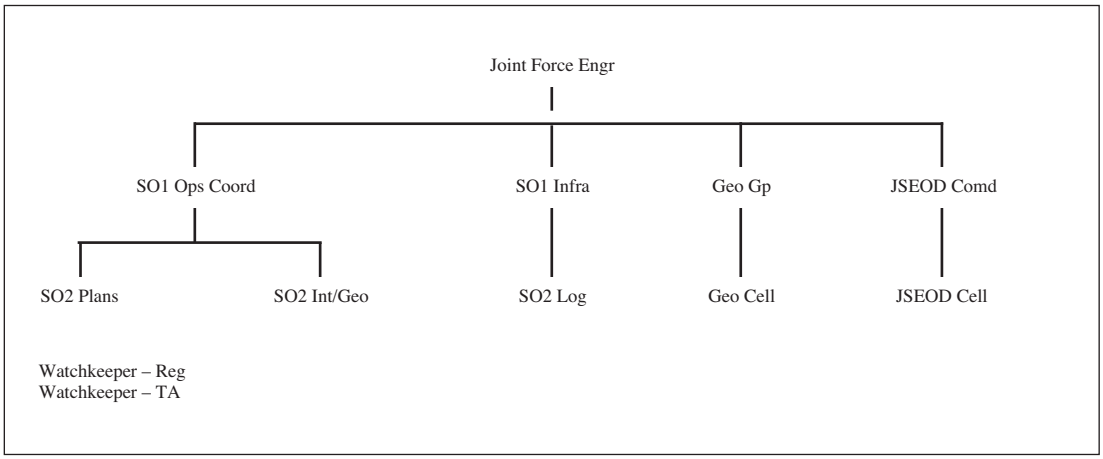

Figure 1 – The Structure of the Joint Force Engineer Branch.

redeployment of all engineer materiel in theatre and force bed-down. Also assistance to the reconstruction of Iraq Infrastructure, resources and finances materiel into and within the theatre. As the NCHQ did not deploy a CIVSEC to control finances, there was little involvement in J8 issues
- J9 – POLAD, liaison with Other Government Departments (OGDs) such as DFID and the FCO.

The key tasks of the SO1 Engr Ops/Coord was to coordinate all of the above. My tasks in detail were:

- Act as Deputy Joint Force Engr
- Coordinate the engr staff
- Coordinate engr activity with other staff branches: J1 – J9 and Coalition partners (US, AUS, CAN – until 18 Mar 03 or so![3])
- Liaison with JFLogC, Contingent (Component Commanders' CREs) and coalition engr staffs.
- Coordinate engr staff daily work.
- Task the engr staff cells.
- Ensure that the engr staff work fits into NCHQ/PJHQ decision cycle.
- Prepare policy and commander's guidance for the Jt Force Engr.
- Plan, synchronize and coordinate future engr operations.
- Assess engr capabilities/resources and specialists to conduct future ops.
- Provide engr input to NCC Staff planning.

The main focus after my arrival in mid-February was to ensure that the right engineer capabilities arrived in time to carry out their assigned role; work out an engineer plan/synchronisation matrix[4] which would allow for the most efficient use of engineer capability across the force in the form of cross-component balancing; work on policy issues, cross-coalition issues, and even at this early stage work out the redeployment plan to ensure sapper assets could get back to the UK or Germany to meet a complex series of OCP/FRC/G1 morale and welfare issues. We juxtaposed the likely sequence operational activity, based on an estimate, best guess and some operational experience, with the requirement for redeployment, and I believe we hit 90 per cent accuracy. Perhaps immodestly but none the less true, we were usually several weeks ahead in terms of conceptual thought and output in comparison to the rest of the HQ, and the US, the difference being with the latter, they were in a position to resource their schemes through the deployment of 40,000 engineers! As a lesson identified, this planning also raised the issue of the clarity of command within the JF Engr concept, which remains an area for further development, as the aim is to make the best and most efficient use of highly trained assets.

Other key operations and planning involved seizing the vital oil infrastructure of Southern Iraq, which was critical to the continuation of the Oil for Food Programme (OFF). A sapper briefing to the COS NCHQ (Maj Gen Peter Wall) led to the UK influencing the overall campaign plan by convincing the US that the air campaign must be compressed to prevent the Iraqis sabotaging their oil infrastructure, as they had destroyed the Kuwaiti oilfields in 1991. Similarly, Sappers contributed to a more intelligent targeting process by elimination of key infrastructure targets from the Joint Target List (JTL) such as the railways lines and stockyards around Umm Qasr and Basra, even if this did earn us the somewhat sarcastic nickname of the "Railway Preservation Society". I suppose we had the last laugh as the trains were running between Umm Qasr and Bagdhad before the declaration of the end of high intensity operations on 1 May 03!

Close integration with the US via the Coalition Engineer Coord Organisation (CECO), which was based on the engr cell flown forward from CENTCOM at Tampa was also key. US Engineers dilute themselves into several staff branches, which presents organisational challenges. ME was with J4, beddown of the force and infrastructure engineering. The US is extremely well resourced both in engineer staffing effort and capability, which leads them to adopt a fine strategic approach to the whole infrastructure of the force beddown, operational movement and subsequently the infrastructure of Iraq. Examples: the US could lay down over 100 miles of fuel pipeline to high specifications; resource a hugely expensive build for their permanent headquarters in the JOA such as Al Udeid and As Saliyah in Qatar and Camp Doha and Arifjan in

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[3] The Canadian Govt announced on 16 Mar 03 that Canadian Forces were not to be utilised on Decisive Ops, prompting a swift and mildly embarrassing withdrawal of their staff from the Coalition HQ.

[4] The planning tools developed and commented upon in Major Sid Lawrence's article,which allowed us to work to a "Masterplan".

Kuwait; Similarly, they tasked Task Force RIO (Restoration of Iraqi Oil) at the cost of $2 Billion to repair the creaking Iraqi oil infrastructure in Southern and Northern Iraq. Other aspects such as Geo fall into J2/C2 intelligence, causing inevitable releasibility problems, and EOD falls under J4/C4 as an ordnance issue. CIMIC/CMO activity falls under J9/C9, which means that obtaining an overall picture of US Engineer activity is difficult. Simple matters such as Combat Engineering fall under C7, which meant that CECO engineers had limited influence over CFLCC engineer activities. Nevertheless, liaison with US Engineers was made easier by frequent VTCs involving all engineer cells from major and subordinate US Commands, including Fort Leonard Wood in Missouri. The VTC system should be exploited by the ARRC Engr (if they deploy) and 3 Div DEG engr branches when they deploy on Op *Telic* 2 later in the year to make the most of multinational engineer capabilities. Final points on the US: they have more general support engineers so are usually willing to take on task, which would tie up our own limited resources – the US Navy "SEABEES" are particularly able here – if slower than our own troops; similarly, we can offer the US "Niche capabilities" particularly in the areas of Geo, EOD, special capabilities which they lack such as M3 ferrying, Bulk Petroleum, Water Development and Railway specialists from MWF. CRE 1 Div will no doubt cover this issue in his own publications but the US Close Support engineers are less capable than our own; when TERRIER, TROJAN and TITAN come into service, this will be one area where we, as a Corps, will be well ahead of the US. A point for the future is that the Corps needs to strengthen its liaison activities with the US, at a minimum in areas such as Geo and EOD. Expensive to be sure, but operationally critical.

A key function of the SO1 Ops/Coord or equivalent in later phases of Op *Telic* will be multinational cross-contingent liaison with a raft of other countries. At the time of writing, contributions were expected from Denmark, Norway, the Netherlands, Poland, the Czech Republic, Spain and Italy.

The main national task of the JF Engr Branch was controlling and coordinating cross-component activity. Working on the principle that Close Support Engineer Regiments were tied up supporting their manoeuvre Brigades, and General Support engineers were stretched supporting the manoeuvre Division or JFLogC, the only flexibility in terms of additional manpower came from UKAC engineers. Once the initial bed-down of the air component was completed, these could be used on a variety of tasks, ranging from Prisoner of War Guarding tasks and humanitarian water pipeline tasks at Umm Qasr, assistance to the Joint Helicopter Force (JHF), (the support of which remains a thorn in the side of the engineer planners in terms in lack of general support engineers) and camp construction. The UKAC engineers are particularly strong in terms of design capability and construction skills. Moves between the contingents were controlled by "Resubordination" FRAGOs, which assisted in the process of "Tidying up the Battlefield". Examples of this kind of staff work have been "Captured Electronically" and are held at HQRE Th Tps ready for the next deployment.

Actual Tasks: Contingent/Component CREs will brief in detail on activities in their own areas, but I thought I would give an overview on the kind of tasks undertaken as most of them are generic to any operation.

Pre-conflict Phase: Considerable enabling works were carried out in preparation for the Force to enter the theatre. This started initially with intelligence collection and research into Iraqi and Kuwaiti infrastructure including the availability of equipment and construction material in the JOA. Infra staff prepared agreements and contracts for support from host nation agencies and companies such as La Nouvelle, with the camp infrastructure contract in Kuwait running to £77 million and providing over 26000 bed spaces. As early as January 2003, 12 (Air Sp) Engr Bde, deployed forces to enable the Deployed Operating Bases (DOB) around the JOA for the RAF and also Forward Operating Bases (FOB) for Joint Helicopter Force (JHF) aviation. At the same time, the JF Engr Branch was influencing the Coalition Campaign Plan through the Targeting process, by trying to shape and prepare the battlespace by avoiding disproportionate collateral damage to infrastructure and civilians. The basic premise for this was that Phase 4 (Reconstruction of Iraq) imperatives must surely shape the way Phase 3 was to be fought. A concept not understood by all. There was also a heavy requirement for general support engineers to assist the bed-down of the force, whilst assisting mobility throughout the JOA in terms of LofC maintenance. Lessons identified: there was a lack of heavy plant and prime movers for plant vehicles, and that attempting the same operation over extended LofC in temperate or mountainous con-

ditions (such as from Southern Turkey) could well have been beyond the capacity of the UK force; this despite the deployment of both general support engineer regiments and very good desert conditions. The only flexibility or enhanced capability in terms of general support came in the form of the air support engineer regiment - exactly as in the last Gulf War/Op *Granby*.

It is worthwhile at this stage to make some observations on engineer support to the Joint Force Logistic Component (JFLogC). The Sappers supported the receipt, staging, and onward movement (RSOM) of the force into theatre, then enhanced the facilities and infrastructure necessary to sustain the force. A key problem identified was the inability (or lack of will) of British troops to live in harsh conditions i.e. out of the back of vehicles for up to 30 days. Others included the requirement for the Engineer Logistic Squadron to deploy at WFE (if this latter term has any relevance anymore). Support to the JFLogC built on the ground work done during Exercises *Saif Sareea (01)* and *Log Viper (02)*. The JFLogC engr staff added valuable input to the staffing process within the JFLogC based on 102 Log Bde (which then rouled with 101 Log Bde in May 03) proving the requirement for a general support engineer regiment to support this organisation at the build up to, and during, warfighting operations. Thereafter the commitment can draw down during subsequent peace keeping phases – no doubt to the consternation of the logistic brigade commanders. There is no doubt that a review of dedicated sapper support to the log bdes needs to be reviewed, a difficult conundrum given scarce resources, and the engr staff need to be earmarked and regularly exercised to avoid *ad hoc* arrangements during operations.

A point here on the utility of Cyprus, as its contribution could otherwise be overlooked. The work carried out by the Cyprus Works Unit, HQ BFC Infra staff and 62 Cyprus Sp Sqn was exceptional and assisted the deployment of US and UK troops into theatre and also provided for the basing of up to 40 KC-135 US super tankers on extended aprons at RAF Akrotiri. Sappers also built fuel pipelines with a capacity of providing up to three million litres of fuel per day. Additionally the Cyprus Sappers provided accommodation for UKSF. The US is now much taken with the concept of the utility of the Sovereign Base Areas and we can expect further demands to use the bases, despite the tortuous political situation on the island and the sensitivity of opening the bases to non-British forces.

Decisive operations: This phase ran effectively from 16 March until the declaration of R Day on 19 Apr 03, which saw the end of the "War-fighting Phase". Engineers were heavily involved in influencing all aspects of the campaign: Providing and maintaining the infrastructure to protect and sustain the force (security engineering), enhancing tactical and operational mobility by enabling deployable operating bases (DOBs) and FARPs (such as at Safwan, Shaibah and Tallil), breaching the main Iraq/Kuwait berms, constructing close sp, general sp and LofC bridges, maintaining routes, providing M3 ferrying services, clearing safe lanes, breaching minefields and providing geographic and geospatial information and logistical assistance to support the deployed forces.

A few observations on component/contingent engineering as seen from a JF Engr perspective:

Land: The Land Component provided significant capability across the spectrum of close and general support engineering. From a Joint perspective the JFEOD Group, described in detail in another articles, provided much needed C2 focus for the various EOD agencies, (RLC, RN, RAF, and RAVC (for search dogs) and also assisted EOD/UXO policy guidance. The first operational use of M3 rigs, was also conducted over the Shatt-al-Basra canal, by TA amphibious crews from 412 Amph Engr Sqn (V), which was a major positive point, particularly as it allowed Challenger 2 to be ferried across the river to support 3 Cdo Bde in the break-in battle to Basra. As a former Adjutant of 28 Engr Regt, I was always mildly sceptical of the procurement of the M3 at a time when there were other high priority procurement issues such as secure radios in the scramble for scarce resources. I am relieved the capability has proved its operational value on the wide water ways of Iraq, so much so that the US continually requesting the loan of the rigs to support their own operations.

Further points: the Close Support concept proved once again that there is a requirement during warfighting operations to provide a close support regiment per brigade and a close support squadron to each battlegroup. During peacekeeping this can be reduced, but there is still a requirement to provide the minimum of a BGE party on a permanent basis for advice, with the military construction force (MCF) being provided on a surge basis, according to the component/contingent commander's priorities. Most non-armoured combat engi-

neering was focussed on bridging GSB/LofC, a great battlefield UXO clearance, which was strictly controlled by directive and the stripping of demolition charges off captured bridges such as at North Rumaylah Bridge in 16 Air Asslt Bde's AO. Armoured combat engineering tasks included: breaching the Berms on the Kuwait/Iraqi border on D Day to allow 1 Marine Expeditionary Force (1 MEF); 7 Armd Bde and 16 Air Asslt Bde to advance into Iraq; close sp bridging/armoured bridging across the anti-tank ditches on the Iraqi side ; general sp bridging (GSB) replace the AVLBs; Minefield clearance using AVRE; Obstacle clearance using AVRE in Urban Operations (UO) in the battles for Basra and Az Zubayr, which included driving into buildings as "Forced Entry" – a technique possible in Mesopotamia; due to the stocking of Engines and Main Assemblys (E & MA), AVLB/AVRE availability was kept high at 90 per cent, which contrasted with the poor performance of CET. One can hardly wait until the TERRIER ISD of 2008!

Force Engineering. (Infrastructure engineering). The Corps focussed on Iraqi utilities and vital infrastructure. The best examples of this were the seizure of the Rumaylah oilfields, where STRE Bulk Petroleum and EOD operators were in the van of battle to assist 1 MEF securing the Gas and Oil Separation Platforms (GOSPs) and pump stations, and then advised Task Force RIO in restarting operation of the facilities; MWF was then able to engage on long-term projects in revitalising the essential utilities of Basra. Despite the fact that billions of pounds are needed to renew the shattered infrastructure – caused by the First/Second Iran-Iraq wars and years of neglect (by Saddam Hussein), local successes were made, particularly in the area of water distribution where STRE WD experts restarted the Basra distribution system. The Engineer and Logistic Staff Corps (E&LSC) were able to make a significant contribution in enabling power generation in Southern Iraq. These civilians should be nurtured as key force multipliers and attendance at the Joint Professional Meeting should be encouraged for all officers as soon as possible. Other successes occurred with 507 STRE (Railway) (V) offering technical assistance to the Southern Iraqi railway company and the US Office for Reconstruction and Humanitarian Affairs (ORHA) and the Central Forces Command Land Component (CFLCC) by carrying out a recce and assisting the enabling of the railway line from Umm Qasr to An Nasriyiah. The Iraqis then enabled the line to Bagdhad with US assistance.

Maritime: Engineer support to the MCC, took the form essentially of support to the amphibious capability of 3 Cdo Bde, which was later passed OPCON to the UK Land Component. 59 Indep Cdo Sqn were admirably reinforced by 131 Cdo Sqn (V) to form the Brigade Engineer Group (BEG), carrying out a raft of combat engineer tasks, including operational minefield breaches on the Al Faw peninsular, as well as assisting seizing the port of Umm Qasr and the Al Faw oil manifold. The key lesson identified was that the Commando Brigade badly needs a dedicated RHQ and an additional Squadron(s), a point supported by Commander 3 Brigade. Similarly the value of the RE TA was also underlined by 131's deployment.

Air Component: Comd 12 (Air Sp) Bde has commented extensively in his article, but from a Joint Force engineer perspective the air component engineers offered additional sapper capability, ranging from cross-component construction support, airfield construction, maintenance, repair and sustainment operations such as fuel engineering (Tactical Fuel Handling Equipment (TFHE)), and ammunition protection (Explosive Storage Areas (ESAs), provision of accommodation at the Tallil Coalition FARP, to the enabling of Basra International Airfield (BSR) as an APOD for the RAF and a FOB for the JHF, along with prisoner of war guarding tasks. Air support engineers also offer a great deal in the way of niche skills and capabilities, which the US does not possess. They are also more responsive and swifter than their US counterparts.

Post Conflict Phase and *Op Telic 1* Drawdown: The emphasis has now switched to force engineering, such as force infrastructure and development (ECI/TFA and TDA camps), the provision of utilities in Southern Iraq (essentially an MWF lead), and Force Protection (FP), which also includes extensive battlefield clearance. Challenges ahead include: supporting and influencing ORHA, G5 CIMIC operations where the sappers are the main military deliverers of capability, and from my experience, are well placed to advise on coordination. Similarly, the drawdown of the NCHQ and the handover of its responsibilities to COMBRITFOR and to PJHQ means that CRE 1 Div becomes CRE COMBRITFOR and takes on those command and control functions of the Joint Force Engineer, as well as a raft of staffing issues, previously unknown

to them to quench the thirst of ministers and the media. The JFLogC engr staff and sapper support will draw down primarily to two staff officers and 70 Gurkha Fd Sp Sqn, with additional engineer support being provided in accordance with COMBRITFOR's priorities. The UKAC engineer contingent drew down at the beginning of May, leaving 53 Fd Sqn (Air Sp) TACOM to CRE COMBRITFOR to support the air component and provide general support engineering to the force. JF Engr FRAGOs tidied up all this activity.

JOINT FORCE ENGINEER LESSONS IDENTIFIED:

- The JF Engr and JF EOD concepts are validated although there is always room for improvement.
- Requirement to earmarking augmentees for the JF Engr branch, the JFLogC engineer staff branch and to train these branches on JFHQ exercises.
- The requirement for sappers to have dual-trades – keep fighting the corner!
- Requirement for earlier engagement in the planning process at PJHQ.
- Requirement to develop links and train with OGDs, particularly with DfID and also NGOs.
- The requirement to foster links with industry on the big engineering power and utility industries, especially via E&LSC.
- The value added to the operation by TA Sappers, MWF specialists and the E&LSC.
- The value of Clerk of Works and Professional Engineer Training (and this from a former OC of 9 Para Sqn!).
- However the call up procedures and general handling of the TA after RTMC and on deployments needs much improvement.
- Due to UK commitments / overstretch in the Corps, greater use needs to be made of contractors, best resolved by using MWF as contract managers and LEC tradesmen on construction projects.
- Despite hi-intensity ops there was an imbalance in the force between Close Sp engrs (perhaps too many) and General Sp engrs (definitely too few). This is probably a Corps structural issue. There is also a proven requirement for robust engineer C2 nodes at the JFLogC level and engineer RHQ for the Commando Brigade.

Summary: The JF Engr concept proved itself on Op *Telic*, moving on from *Saif Sareea*, Macedonia and Afghanistan, and integrating smoothly within the JFHQ dominated NCHQ. The operation provided a remarkable opportunity for the Corps to demonstrate its full range of capabilities in a high-intensity conflict and then in a peace-keeping operation. The impact of the Corps was invaluable: Critical to the deployment; Arranging the bed-down of the land and air forces in the initial phases; Offering key niche capabilities during the war-fighting phases; Leading the way in the reconstruction of the utilities of Southern Iraq in the peace-keeping phases. The basis for the Corps contribution lies in the dual trade system, the intellectual and practical excellence of our officers and soldiers, and our contacts with experts in the utilities and construction industries, which ensure we have the right capabilities and engage only in relevant activities. The Corps thereby achieves tactical, operational and strategic effects through the entire range of UK operations. As seen by General Albert Whitley and his trains, the Corps had a direct impact on the return to normalisation for the Iraqi people, offering them the chance to control their own destiny.

Specialist Engineers within the Joint Force Engineer Concept

LIEUTENANT COLONEL G E WILMSHURST-SMITH BSc CEng MIMechE

Lt Col Guy Wilmshurst-Smith joined the Corps in 1981 having graduated from University College Cardiff with a degree in material science. Following Sandhurst and a series of fun tours at 59 Indep Cdo Sqn, Jnr Ldrs Regt, 32 Armd Engr Regt, and on the Staff of HQ NI and 1 Inf Bde, he elected to undertake the long engineering course as it offered a chance for a decent tour in the USA. Coming top of a course of one, he duly got his wish and had an excellent couple of years in the States before commanding 516 STRE(BP) and 15 Fd Pk Sqn. Following a bruising stint as SO2 Infra Engr Plans at LAND, he was promoted and posted to the lucrative delights of Rheindahlen as SO1 Estate & Works. In November last, he moved back to Chilwell to take command of 64 CRE(Wks) and at the time of writing, was deployed on Op Telic. *He is married with two children, at schools he can't afford, leaving only just enough money for the annual family pilgrimage to the Alps.*

Introduction

64 CRE (Wks) deployed to the Gulf in January 2003 working under the Joint Force Engineer concept for the first time. The concept resulted in two principal changes: firstly[1], all specialist engineer capability was retained under OPCON of the JFEngr (but placed TACOM under JFLogC and the JFLC as appropriate) and grouped under command of the CO CRE (Wks). Secondly, the staff function of SO1 Infrastructure was carried out separately within each component by other poor souls allowing the CO to get on with his job. Whilst, at first glance, this may appear to be a fine tuning of previous arrangements, the difference to the operational effectiveness of the CRE (Wks) was significant. The ability to focus all engineer activity in one command chain unquestionably made life simpler and, in particular, allowed the CO to rapidly create bespoke teams, fine tuned for the nature of the task to be undertaken. This process occurred many times during the tour and allowed the full exploitation of the specific individual skills that are unique to the CRE (Wks). For example, the 516 STRE (BP) that crossed the start line on G Day was in reality a composite STRE made up of components of 509 STRE (Utils)(V), 516 STRE (BP), 517 STRE (BP), 521 STRE (WD), 527 STRE (Wks) and 528 STRE (Utils), draining just about all the mechanical engineering expertise available. This was only possible because the CO had full visibility of all the demands on specialist engineering in Theatre and the ability to execute the changes in a timely manner. The need to retain all specialist engineer capability (less air) under one CO, OPCON to the JFEngr, remains one of the main lessons of the operation.

Planning and Mounting

Right from the outset we knew that this deployment was going to be different from its predecessors. 64 CRE (Wks) deployed at a strength of 83 but grew rapidly to over 130 strong including TA, the largest deployment of MWF personnel on one operation since its creation in 1964. We had within our strength a range of technical skills that even the Americans found impressive and we used them all. This breadth of capability, very much in the tradition of the Corps, enabled us to tackle a diverse range of tasks, many of which were no respecter of the military boundaries within which most units operate.

The operation for 64 CRE (Wks) began in late 2002 with two works teams and a fuels team deploying to the region to conduct preparatory work. These included the design of the NCC HQ in Qatar, bed down of SF elements and the establishment of a large tactical fuels system to boost capacity at RAF Akrotiri.

In mid-January, the deployment started in earnest with the reception phase, where the bulk of the CRE (Wks) was placed TACOM to JFLogC with the emphasis on enabling the inload of the force, the temporary bed down of the Division into a concentration area in Northern Kuwait, and an assortment of minor works to make the rear area more effective.

Amongst the plethora of activity, two tasks stand out, representing the two ends of the infrastructure engineering spectrum. The first, the bed down in Northern Kuwait, was technically simple but the management of the contract was a highly ambitious undertaking, with it being carried out under the ACSA agreement with contractual authority being held by the US. It involved the daunting prospect of completing a £25 million project to provide power, water and accommodation for over 20,000 British soldiers in a little over six weeks. To add to the challenge, the project management team from 527 STRE (Wks) was already behind the critical path before they arrived in Theatre, the Team was unable to get access to the contract conditions, which continued to be withheld by the US commercial staff, and the main contractor turned out to be hopelessly incompetent having no experience of construction and little desire to achieve any of the target dates (as the US seemed to pay them regardless). Despite the benefits of using US buying power, the subsequent loss of control and the differing approach to expenditure, reduced the perceived gains to the point where we were probably better off going it alone. The difficulties could have been partly alleviated by embedding resources specialist inside the US commercial staff at the start. When we subsequently did this, we achieved a markedly improved performance.

The other major challenge which was at the limit of our technical capability but relatively

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[1] Except 529 STRE(Air Sp) which remained under the JFAC.

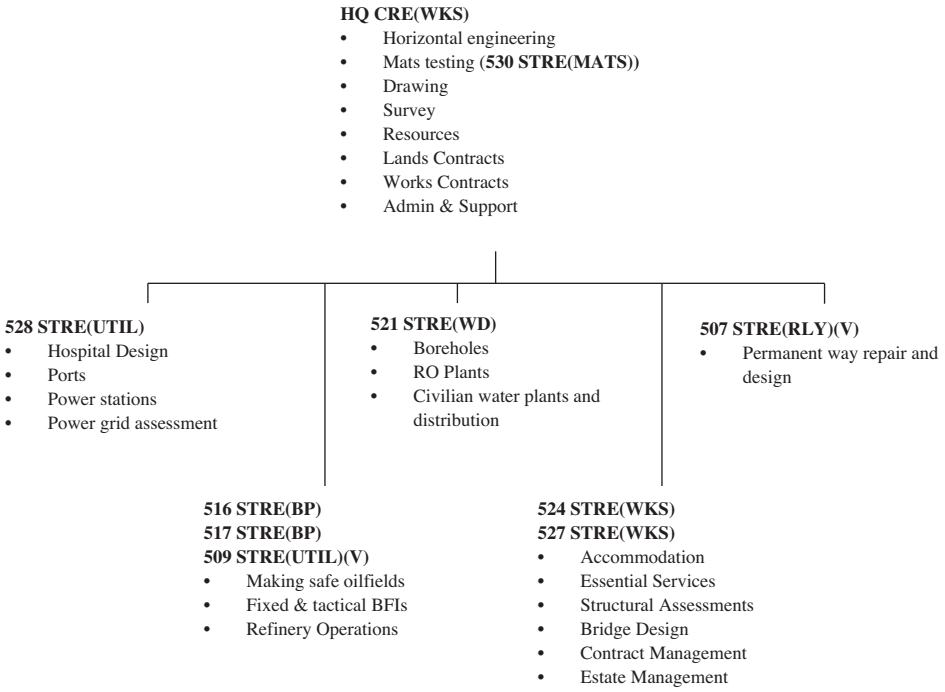

Figure 1 – ORBAT & Tasks of 64 CRE(Wks).

simple to manage, was the need to create a link span bridge at Shuaiba Port to allow the RoRos to off load during periods of low tide. After an initial conceptual design, a contract was let to International Maritime Group (IMG) for the detailed design and construction of the system.

The workload on the CRE (Wks) was immense during this phase especially as we were concurrently arranging our own deployment to Theatre and subsequent preparation for the next phase. The result was that very few of CRE (Wks) personnel were able to conduct any pre-training before G Day, with the notable exception of the fuels teams.

CONDUCTING

As G Day approached, it was decided to deploy the recce elements of the CRE (Wks) forward into the Land Component to join the fuels STREs. Five tasks were identified:

- Making safe of the key oil infrastructure.
- Conducting the battle damage assessment of bridges and other structures.
- Infrastructure recce to determine the suitability for use by the force.
- Restoration of national utilities (particularly water) to ensure the well being of the local population (preventing them becoming refugees).
- Restoration of the port at Umm Qasr to enable the inflow of humanitarian aid.

The oil infrastructure issue was handled by an enhanced 516 STRE (BP) working as an integral part of a joint EOD/STRE team. The task was to secure those key parts of fuel infrastructure that would be required to enable a post-conflict Iraq to pump 800,000 barrels/day within a few months of the end of the conflict. More importantly, they were to ensure that we avoided a major environmental disaster, whilst minimising potential harm to coalition forces. The crux of the mission was to secure the high value nodes that, if destroyed, would take many months to replace. After much analysis, this assessment led to seven key targets: four Gas Oil Separating Plants (GOSPs), two pump stations and the key pipe manifold which fed the export facilities in the Al Faw Peninsular.

Link span in place ready for first use.

Given the early success, the mission was expanded to nine GOSPs, three pump stations and a gas compression plant. The joint team took great pains to explain to the US Marine Corps, which was providing protection, about the risks associated with fighting in a hazardous and potentially explosive environment, amplifying the need for them to restrain themselves in their displays of overwhelming fire power! The mission was a major strategic success for the Corps and much credit must go to the Team OC, Major Mark Tilley, who pulled together the technical side of the operation.

The other key task was undertaken by 528 STRE (Utils) who deployed elements with both the Umm Qasr Task Group and the Safwan Task Group for work on ports and hospitals respectively. The remainder of the CRE (Wks) recce capability, based on 527 STRE (Wks), was co-located with 28 Engr Regt for force protection. The Regt assisted by moving specialists to tasks under armour when the security situation dictated. Given the limited battle damage, assessment tasks were few, as were the bed down requirements for the first few weeks. However, the challenge on the ports and other national infrastructure rapidly became a vast undertaking stretching all of the CRE (Wks) resources to capacity. At the same time, knowing that peace support ops might only be a few weeks away, 524 STRE (Wks) remained behind in Kuwait, continuing support to the rear area and, crucially, preparing design work for the future.

The plan for the restoration of national utilities was fairly straightforward. As soon as possible after the fighting formations had cleared an area, infrastructure recce teams went in to look at both the water and power systems. As you would expect, this started first at the towns close to the Kuwaiti border and it was some weeks before we gained access to the centre of Basrah. This was a great learning experience for all of the CRE (Wks), but particularly for the specialised water, fuels, railways and utilities teams.

Initially we were focused on water as the most critical resource. The expected humanitarian crisis did not occur, so we switched our plans from support to displaced civilian (DC) camps to the population within the various towns and the city of Basrah. Despite some extensive research prior to the operation, much of which was based on US intelligence and rather light on the technical detail, we found that the utilities systems were intact, but suffering from 20 years of poor maintenance. We also discovered that utilities were one of the tools the Ba'ath Party had used to control the population and, having taken out most of the Party hierarchies, the workers left behind had little idea of how their plant fitted into the wider network. We quickly identified that the systems were over centralized and highly fragile, but they were working – just. However, just as we began to relax, we found ourselves on the wrong side of a critical supply loop and running out of time. At this stage, the water systems were running on standby power plants that were not large enough to deliver the full capability needed. To deliver enough water there was a requirement to restore mains power which needed active power stations, but we had closed down the fuel infrastructure that provided the fuel to the stations. To restart the fuel infrastructure we needed more power and water. Luckily, the power systems were still working, but by the time we had entered Basrah and untangled the multitude of conflicting opinions, we found we had two days fuel supply left before we would have to "black start" the grid. Not an activity we were keen to undertake. All the specialized teams were fully engaged at this stage, each co-ordinating a specific area to ensure that the recovery effort remained balanced and we had a nervous week or so where we narrowly avoided complete shut down on several occasions.

Finally, we realized from the outset, that the restoration of the national utilities was an integral part of establishing a secure environment.

So as the situation stabilized and we stepped back from the crisis, we went on to ensure that the water, power and fuel supply continued to improve so that, for instance, the supply of LPG for cookers and diesel for trucks was re-established, allowing a feeling of normality to return. The vast majority of the work was carried out by local Iraqis who proved to be inventive and excellent engineers, honed from years of making things work with a scarcity of resources – sound familiar?! Our role evolved into three functions:

- **Identifying Quick Fixes.** Restoring the system to its pre-war capacity and providing the catalyst to encourage the Iraqis to return to work. This involved simple repairs, supplying critical chemicals and identifying key infrastructure to G3 so that they could arrange for the appropriate level of security to allow essential workers to return and prevent further damage by looters.
- **Encouraging NGOs to take a role**. Briefing to NGOs, G5 and the Office of Reconstruction and Humanitarian Assistance (ORHA) were held regularly with the aim of helping their planning so that they, in turn, could be more effective allowing the CRE(Wks) to withdraw from an installation at the first safe moment.
- **Co-ordination of the Restoration Effort.** Co-ordinate the activity of the multitude of Iraqi agencies and NGOs to get them to help each other and assist in the supply of critical spares such as cable jointing equipment. In particular, our co-operation with ICRC and UNICEF was excellent to the extent where we agreed to split some of the recce effort between us. On occasions, we also directed repairs ourselves, where these were critical, and restarted a number of pump stations just to get the "ball rolling". Finally, we directed the priority of the restoration effort to ensure that a balance was achieved between water, fuel and power. For example, for a period of a few weeks, OC 516 STRE (BP) had to personally direct the strategic fuel distribution system to ensure the right fuel, went to the right plants, in the right quantity so that no one area ran dry. There was some trial and error involved in this process and he did produce the "mother of all fires" by pumping crude up a fractured export pipeline, but we learnt quickly!

The final strand of the utilities work was the restoration of essential services in the port of Umm Qasr and the railways across SE Iraq. OC 528 STRE (Utils) moved in with the task force aiming to restore the port to receive humanitarian aid within nine days. It was a truly joint force with Australians and US *Seabees* all working as a team. The port was in better condition than expected so the Team initially focused on restoring power to the town, which it achieved within five days with much ingenuity. They went on to restore services across the port, including a 20 storey grain silo and a series of massive port cranes.

The grain silo control room.

The deployment of the TA Railways STRE had its own challenges, particularly as they deployed with no officers, no equipment, no comms and no vehicles! However, I placed the 2IC of 528 STRE (Utils) in command and he begged, stole and borrowed enough support to get by. The results were impressive, together with the help of 29 Fd Sqn, they were able to assess, repair and open vital rail links across SE Iraq to allow the movement of humanitarian aid. The skills they used in assessing the condition, overseeing works, and finally handing back the network to the locals was another significant success which further established the impression of a speedy return to normality.

Mentioning an STRE(V), reminds me that I had something of a "road to Damascus" experience regarding the TA during the operation. My previous experiences with the TA had left me scarred and deeply cynical about their usefulness. However, the specialist TA proved invaluable, bringing with them a knowledge and understanding of complex engineering particularly in "niche" areas such as reverse osmosis, sewerage systems and petrochemical refining that was beyond their Regular counterparts. We simply could not have achieved as much without them. The integration of TA specialists into regular STREs was a huge success and I look forward to MWF(V) moving to Chilwell so that the links we have made during

this operation can be further reinforced.

Although no one event seemed to mark the transition, the operation moved from warfighting to peace support operations over the space of a few weeks in April and the emphasis for engineering firmly moved from routes to roofs. We are still in the early stages of this phase, but from an infrastructure perspective, a number of drivers quickly became clear:

- We needed to progressively improve the quality of life for soldiers but concurrently allow for the drawdown of the force. This gave us a peak of Sappers for about eight weeks after which the size of the MCF dwindled significantly. Given the time it would take to procure stores, the window of opportunity was going to be small. However, the design work carried out by 524 STRE (Wks) in Kuwait was to bear fruit and we were able to fine tune existing designs in days, allowing the subsequent construction to proceed considerably faster than traditional timelines.
- We needed to avoid fixing sappers. This was difficult, for as the estate developed, the maintenance burden tended to grow, drawing more sappers into the maintenance of what we had already completed. Our approach was to rapidly make use of local labour and to seek to contractorise the O&M of camps at the earliest opportunity.

Having largely extracted the CRE from the national utilities effort, the focus has now switched to traditional infrastructure tasks. These include camp design (both Improved Tented Camps (ITC) & Temporary Deployable Accommodation (TDA)), logistic bridging, water supply, restoration of local utilities & buildings and the setting & supervision of contracts. As we have seen on previous operations, the front end is dictated by our ability to produce camp bases. Given the shortage of stone in Iraq, considerable risk needed to be taken in the base design to ensure that this area did not become unduly expensive in both time and money. At the time of writing the prime contractor for TDA camp construction, Kellogg's, Brown & Root (KBR), has just started construction of the first TDA camp, so it is too early to make any sensible predictions regarding the success of this particular UOR, but the signs are encouraging. Given the shortage of suitable green field sites, restoration of buildings has been a significant demand. This has included the reactivation of Basrah International Airport by 527 STRE (Wks)[2].

Drilling boreholes for TDA Camps.

Specialist Engineers with the Joint Force Engineer Concept – Did it Work?

The Joint Force Engineer directed that I be candid about whether I regarded the Joint Force Engineer Concept a success. It has been, but then, in the Corps, we always make things work. Perhaps the real issue is whether the specialist engineer effort is best commanded as an integral part of a single engineer component or directed through a separate chain under the DCOS, via the SO1 J4 Infrastructure, as we have seen on some previous operations. There are distinct advantages to both approaches. For example, the main stream of the Corps has still some way to go to fully understand the demands of infrastructure engineering and retaining specialist engineering in the J4 area ensures that the infrastructure effort gets the appropriate focus throughout the operation. It also avoids the risk that separation between designer and contractor becomes blurred, allowing some of the failures of the past to be reinvented. However, on balance, I believe the gains of the Joint Force

[2] 529 STRE (Air Sp) provided support for buildings occupied by 200 RAF personnel.

The first TDA camp in construction.

Engineer concept outweigh the risks. Fundamental to its success is the way in which risk is more easily managed during the intensive phase of operations. This includes the panic to get everyone in to theatre, fighting the war, and then bedding down the force whilst trying to kick start the country you have just closed down. Balancing the operational risks in the specialist engineering area is far easier when you have full visibility of the challenges being faced by other engineer commanders. Later on, when things have calmed down a bit and infrastructure development is almost all contractorized, then it may make sense to revert to a separate J4 Infra and Engineer chain, but whilst the tempo is up, a single team approach is essential.

Other Issues

For the Joint Force Engineer concept to work a number of other conditions need to be met. The CO CRE (Wks) can only serve one master, the Joint Force Engineer. However, once given his priorities, he can work effectively across any component boundary within the limits of effective communications. In working to both JFLogC and JFLC during Op *Telic*, little difficulties or conflicts of priority were encountered, but none that weren't instantly and affably solvable by a quick call between CREs. This holds true for the decision of where to locate the CRE (Wks) and its various teams. Flexibility is the key, with teams moving frequently to where their centre of effort was at any given moment. For HQ CRE (Wks), there are two choices; locate with a GS Engr Regt or with one of the component HQs. For the RSOM and beddown phases, the component HQs need a considerable amount of support from the CRE (Wks) to assist in the planing process, and the CRE (Wks), which spends most of its effort in dealing with various contractors, needs to be near CivSec. Therefore, outside warfighting phase, the HQ CRE (Wks), together with at least one works team, should be located with the appropriate component HQ.

Not all of our work was a success and we faced a number of challenges, which we struggled to deal with at times. First among these was the sorry state of the CRE (Wks) logistic support which was pulled together ad hoc at the last minute before deployment. We deployed without a QM and many of the other support posts were double hatted i.e. the RSM was also a Works Contract Officer. Whilst for smaller and less demanding deployments this was an acceptable risk, for large scale war fighting operations, poor logistic support undermined our capabilities on many occasions.

An additional point was the poor preparation of the CRE (Wks) to handle the rigours of the war fighting environment. The CRE (Wks) had neither the equipment nor had practised living in austere conditions for sometime. The Teams were fine tuned to the established comforts of the Balkan scenarios and incapable of being effective in the field, mostly because our complex IT systems fell over almost immediately. This will be urgently reviewed when the CRE (Wks) gets back to Chilwell.

And Finally

The scale of the engineering challenge was almost overwhelming at times. We walked into power stations, water plants, refineries and other major utilities and were sometimes unprepared to tackle the problems we faced in a timely manner. However, as always, the ability to fall back on a robust understanding of engineering from first principles was fundamental to success. At one stage, we faced the real possibility of needing to operate a massive water pumping station outside Basrah that supplied nearly all the fresh water for 1 million people. I am sure we would have managed but it would have been a very close call – too close for the level of comfort our commanders have the right to expect from the Corps. Training on big engineering will certainly be a major theme for my CRE (Wks) over the next few years. This is not because my predecessors have been idle over the past decade, but because the emphasis of the CRE (Wks), outside operations, has been to assist other parts of the Corps to train for small scale construction tasks.

The Interview By Lionel Ogstuff

MAJOR T CHAPMAN

The author was commissioned into the Corps in 1990 and assumed his first appointment as a mechanised field troop commander in Germany in 1991, serving in Kuwait and Northern Ireland. He subsequently served as the squadron operations officer with 3 Armoured Engineer Squadron during its conversion to the armoured role, and as the Adjutant of 73 Engineer Regiment (Volunteers). Following a tour in HQ 8 Infantry Brigade in Northern Ireland he commanded 11 Field Squadron in Ripon where he deployed to Kosovo twice. He is a graduate of the Defence Logistic Management MSc course at RMAS and is currently serving as the SO2 Engineer Logistics at HQRE Theatre Troops, Wilton.

Q. So Tim, how is it that you became mixed up with Engineer Logistics?

Not a very long and exciting story I'm afraid. I was commanding 11 Fd Sqn in Ripon and looking forward to my second Squadron deployment to Kosovo in two years, when I had my annual chat with RE MCM Div. The output from the meeting was more useful than normal and I was nominated for the Defence Logistic Management MSc at RMCS on completion of my command tour. My current post, SO2 Engr Log Ops at HQRE Th Tps is a well-established progression for graduates of this course.

Q. And is that why you were selected to fill the Engineer Logistic appointment within the Joint Force Engineer Cell in the UK National Contingent Headquarters?

In a word, yes. The Joint Force Engineer concept is still very much in its infancy and has to date only been trialled on exercises, although it is acknowledged as being the way ahead for major, and minor, joint operations. In fact the concept is now enshrined in Allied Joint Publication 3.12 – Joint Engineering.

JFHQ has only a single Sapper post, an SO2, and unfortunately there is still no Sapper focus in PJHQ. Therefore it is necessary that the Joint Force Engineer and his core staff come from HQRE Th Tps where they are employed in similar roles, but more importantly, they come as a cohesive team and can be utilized during routine JFHQ exercises. In addition, they provide the socket into which subsequent Royal Engineer augmentation can engage. The resultant effect is that my appointment in HQRE Th Tps is effectively tied to the Joint Force Engineer core staff.

Q. Being drawn from HQRE Th Tps, did that assist you in the planning?

Absolutely yes! In fact I only played a relatively small role in the preparation of the overall engineer logistic plan. The planning was naturally centred at HQRE Th Tps and led by the SO1 Log, utilising the guidance from TD Note "Engineer Logistic Support to Joint Operations", with contributory inputs from all concerned parties. The early engagement, within the bounds of OPSEC, of the ESS IPT and ERMC was vital to the plan, both in terms of producing a cogent and coherent strategy and also ensuring the provision of necessary enabling and materiel. Not to have engaged them at such an early stage would have led to an unacceptable level of risk being placed upon the entire engineer logistic plan.

The plan was crafted over a protracted period lasting many months and was constantly refined, going into greater and greater detail with each iteration. The only nigger in the woodpile was the fundamental change to the base plan; the removal of the Northern Option, i.e. not going through Turkey. In reality this made the logistic support piece far simpler and in all honesty achievable. The sceptic in me would suggest that the over-arching logistic plan for the Northern Option was far more ambitious than our capability any longer allows. Irrespective of the late change, the engineer logistic plan was essentially sound and was able to cope exceedingly well to this eleventh-hour development.

The overall advantage of being drawn from HQRE Th Tps was that I had lived with the plan from its inception and was aware of the rationale behind its development, therefore to be intimately involved with its execution was clearly sensible.

Q. You mentioned the TD Note – Engineer Logistic Support to Joint Operations, tell me a little more about how this influenced the logistic laydown?

The TD Note didn't just influence the engineer logistic laydown it prescribed it completely. Within a Large-Scale operation, three engineer logistic squadrons should normally be deployed. One would provide 2nd Line engineer logistic support to the Land Contingent engineers and would be based in the Divisional Support Group (DSG), for Op *Telic* this was 65 Fd Sp Sqn. A second would provide support to the Air Contingent engineers, in this case 60 HQ & Sp Sqn based at the key Deployed Operating Base (DOB) at Ali Al Salem in Kuwait. Finally, the third engineer logistic squadron would provide 3rd Line engineer logistic support across the Joint Force and would form part of the Logistic Brigade within the JFLogC, and this was the domain of 70 Gurkha Fd Sp Sqn.

Q. And did it work?

I believe it worked extremely well, but for an impartial answer you need to ask the Engineer regiments forward in the contingents.

Q. Turning away from the plan and looking more towards its execution, what preparations did you undertake?

From previous experience it is clear that the effort you put into preparation prior to a deployment sets the tone for the performance during the operation and as a consequence there was a heavy focus in this area. Preparation was conducted along three particular strands, preparing the individual, preparing the engineer materiel and preparing the process.

Preparing the individual consisted of not only the core military skills such as weapons training, first aid, mines awareness and NBC but concentrated on those particular skills necessary to ensure the smooth operation of the engineer logistic process. This additional training included; driver and operator courses for Container Handling Equipment Rough Terrain (CHERT) and Rough Terrain Container Handle (RTCH), instruction on DeMAS (a new accounting system for the Fd Sp Sqns) and further tuition on GLOBAL and VITAL, including the LPO package. This training was conducted through a mix of utilising existing courses at the School of Logistics and Marchwood and by a bespoke travelling/mobile training team.

The majority of engineer materiel was prepared by Defence Storage and Distribution Agency (DSDA) personnel in base storage locations prior to deployment and included retrieval, configuration, packaging and consignment. However in some instances a much greater degree of preparation was required and additional manpower had to be sourced from units. An example of this was the preparation of Tactical Fuel Handling Equipment (TFHE) for Cyprus, where teams from 39 Engr Regt were utilised in the preparation, checking and packing of equipment in order to meet the tight timelines. This also demonstrates one of the current weaknesses in our system, not holding materiel at readiness. As a consequence of this weakness, there is an over reliance on the UOR system to provide what is not held, but unfortunately this does not always meet the necessary time constraints.

The current state of affairs vis a vis communications infrastructure, both in terms of radios and IT is woefully inadequate for the tasks placed upon a Fd Sp Sqn. Therefore a significant amount of additional preparation was needed in order to provide a communications and IT infrastructure upon which the engineer logistic process could be satisfactorily operated. The extant unit establishment for a Fd Sp Sqn has insufficient radios (HF sets) to provide the functionality required and so it was necessary to double the number of radios held. In tandem with this there was a UOR initiative to provide additional laptops on which to work.

In sum, a lot of preparation was needed because the general state of preparedness in many areas was lower than one would wish.

Q. The deployment of such a huge amount of engineer materiel is obviously a massive undertaking, did it all go to plan?

You know the old adage, "no plan survives first contact", and though in fact in this case the plan did stand up very well. During the planning stage a lot of effort had been made to prioritise and sequence the outload of materiel, to best suit the anticipated requirements of the Theatre. In addition, we had established a small team of liaison officers to monitor the key deployment nodes of Marchwood and RAF Brize Norton, observing and reporting on the progress made and where necessary stepping in and conducting remedial action to put the plan back on track. Finally, we deployed an Engineer Logistic

Advisory Team to Theatre early in the deployment phase.

That said, there were obviously a number of problems encountered along the way. One of the biggest challenges was a result of the overarching deployment plan for the Force, with the enabling elements not having sufficient time to establish themselves prior to the arrival of the main body. Effectively the Fd Sp Sqns, 3rd Line in particular, were in employment before completing deployment. Other problems remain the same campaign after campaign, especially the issue of lift, yet again the poor availability of appropriate 3rd Line lift (including HETS and LETS) delayed the inload of materiel. This was further exacerbated by a limited capability to handle ISO containers, although this did improve over time.

Q. You mentioned earlier about the deployment of the Logistic Advisory Team, was this well received?

The deployment of the Logistic Advisory Team proved to be extremely valuable to all concerned and deployed during the busiest part of the inload period when activity was at its most frenetic. The team, led by OC IER UK, consisted of an experienced IER inspector and a veteran resources specialist with considerable accounting knowledge. The team was able to conduct a raft of technical inspections, including the M3 rigs and the LSB as they came off the shipping and an inspection of the 3rd Line workshop, in addition to advising on the establishment and running of accounts. The engineer logistic staff within the JFLogC and the logistic squadrons gained much benefit and requested that a similar visit be authorised to occur during the recovery phase. In addition, COS ESS IPT deployed for the first part of the visit in order to discover and experience the conditions in which the materiel would be stored and employed and gather any key issues raised in Theatre during the deployment.

Q. What was the emphasis of engineer logistics during combat operations?

On operations, and here I include the deployment phase, Sappers can only work effectively if they are supported and sustained in a timely manner, with engineer materiel and engineer workshop support. The scope of military engineer tasks that may be required in support of an operation are difficult to predict, as is the wide range of engineer materiel which may be required to complete these tasks.

In consideration of this, the general principles of 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:

1 There should be a single, integrated supply chain from 4th Line (Base) through 3rd and 2nd, to 1st Line.
2 Demands for engineer materiel from consuming / user units, normally RE fd sqns, should not be placed directly on 4th Line, but submitted through the appropriate engineer logistic squadron.
3 The supply chain should operate in the same manner in peace as on operations.

In addition to these general principles there is a need for integration and engagement with J4 across the board and at all levels. I found this was particularly valuable within the NCHQ.

Q. In what sort of ways did the J4 interface add value to the engineer logistic effort?

One must not forget that in the big scheme of things engineer logistics is but one element of the wider logistic picture and cannot function independently. To this end integration with the "mainstream" J4 activity is essential, especially when priorities are being allocated for limited or key assets such as; HETS & LETS, MHE, 3rd Line lift and airfreight. But also for the management and co-ordination of the more routine activities like: medical, movement, sustainment and supply.

Q. You mention airfreight, how did you manage the large volumes of diverse equipment competing for a limited amount of airfreight space?

Within the NCHQ the J4 convened a board that sat every 48 to 72 hours. The board consisted of predominantly J4 staff with a J3 Ops-coord staff officer providing the J3 activity priorities. After due deliberation the board determined airfreight priorities and these were promulgated through the NCC Priority List. DLOC then worked to this list when allocating airfreight space. Key to the engineer logistic operation was attendance at this board in order that full representation and consideration was given to engineer materiel in

the context of its benefit to the Force and not just the Sappers.

Q. The relationship with J4 was obviously important, but were there any other significant associations?

Most definitely. Communication with all areas and branches of the Headquarters was very important and one would be extremely foolish not to invest the time and effort needed to nurture such relationships. However, this task was shared and undertaken by all members of the Joint Force Engineer Branch, with individual officers becoming the focal point for particular areas, for example; SO2 Engr Log Ops with J4, SO2 Engr Int with J2 and SO2 Engr Plans with J5.

The most important relationships were not those outside the Branch, but those within it. No one area or aspect of the Engineer piece stands alone, each impacts on another and all must be in harmony for the correct outcome to be assured. For example, engineer logistics is inextricably linked with infrastructure and both operated within the same staff function in the Branch, which worked really well.

The same rationale exists for the character of the relationships required between the NCHQ and the contingents and for the relationships between the contingents themselves. Once again, only when all the elements within the organization are pulling together will their full potential be exploited. I had particularly strong relationships with; SO2 Engr Log in JFLogC, DCOS 12 (Air Sp) Engr Bde in the JFAC and SO2 G4 in the JFLC. These relationships were essential to me and without their collective support I could not have executed my role within the Joint Force Engineer Branch.

Q. So what were the main lessons learnt from your perspective?

As has been demonstrated many times before, lessons are not always learnt so let us look at the main lessons identified and hope that we do learn the majority before the next war, conflict or campaign. I would place them in three groups, manning, procedures and equipment and give them from an engineer logistic perspective.

Manning

1. We went to war and units went at UE and not WFE. There is a general acceptance that the UE/WFE scalings have no further relevance, however most units cannot deploy effectively at just UE. Either there must be an acceptance that reinforcement is required or acknowledge that the only alternative is to accept a lesser capability. Augmentation is necessary within key trades and skill sets in order to provide the current desired level of capability.

2. The call up and deployment of TA/Reservists was not conducted well and in my opinion was certainly not intelligent mobilisation. Even considering the requirement for OPSEC, the mobilisation was, on the whole, not performed in a timely manner. In addition, there were many individuals mobilized inappropriately, undertaking roles for which they were not best suited thus leaving a resultant lack of available trained and skilled manpower in their own key role. Intelligent mobilisation must be driven and co-ordinated from HQ RETA to ensure that each post to be filled is allocated the individual with the most appropriate skill-set available.

Procedures

1. The deployment of the Engineer Logistic Advisory Team early in the operation not only ensured that the correct procedures were being adhered to, but just as importantly, it gave confidence to those individuals involved in engineer logistics at all levels of command and responsibility. The Engineer Logistic Advisory Team was also deployed during the recovery phase and again proved extremely beneficial.

2. There was an over-reliance on UORs to provide the materiel required and often the equipment procured in this manner suffered teething problems. Many UORs did not arrive in theatre on time and were therefore not utilised to their full potential. In most cases industry was not able to meet the surge in demand and where it could significant profits were made. Greater benefits would have been accrued if, within the bounds of OPSEC, industry had been engaged at an earlier juncture in concert with financial commitment. In addition, DSDA should be funded to hold stocks at readiness matched to JRRF liabilities. Just in Time is no substitute for the military necessity of Just in Case unless it is correctly organised, a partnership with industry and fully funded.

3. Generic theatre Fuel and Water Plans should be produced by PJHQ prior to deployment, such that specific plans may be generated by the NCHQ in theatre, progressing them from general state-

ments of policy to operational instructions. Components should then produce their own plans within the constraints of a joint plan, detailing the materiel required.

4. There were a huge number of benefits from the early engagement of ESS IPT and ERMC. This was further improved by the maintenance of regular communication.

EQUIPMENT

1. DSDA should be funded to hold stocks at readiness matched to JRRF liabilities and HQRE Th Tps should be empowered to ensure that JRRF liability stocks are held at the correct readiness.

2. DSDA need to ensure that all materiel held for issue is inspected and maintained regularly and HQRE Th Tps should be empowered to enforce the required standard of maintenance.

3. DSDA appeared at times unable to outload engineer material to meet tight operational time lines without external reinforcement. The failure to issue critical equipment in a serviceable condition and timely fashion could significantly jeopardise missions. Holding serviceable and well maintained equipment at readiness against set criteria would most definitely increase the speed and ease of outload.

4. There was insufficient heavy plant and associated movers. I believe that holdings need to be reviewed and factored into the plant PFI.

5. The requirement for a single secure and robust/reliable communication system remains as strong as ever, without which the whole engineer logistic process will continue to operate at a sub-optimal level.

Q. Finally then, how would you sum up the engineer logistic support provided during Operation *Telic*?

Well it certainly wasn't perfect, but I believe that even acknowledging all the shortcomings, it worked very well. An enormous amount of effort from lots of individuals in many organisations produced a plan that was resourced and executed with determination and resolve. Fortunately for us, the supply chain was never really challenged during the warfighting phase of the operation.

I would suggest that UK strategic holdings of materiel were often inadequate, not held at readiness and that there is insufficient strategic and tactical lift. Finally, it is my opinion that Just in Time logistics do not work and that the UK would have struggled logistically with the Turkish/Northern option.

Engineer Planning at the Operational Level

MAJOR S A LAWRENCE BSc

Maj Lawrence was commissioned in 1992 following three years studying geochemistry at Southampton University. Troop commander tours followed at 22 Engineer Regiment with deployments to Jamaica, Cyprus and the Balkans before becoming Adjutant at 28 Engineer Regiment. In 1998 he returned to Sandhurst for a very enjoyable two years as a platoon commander. More recently he has completed the Joint Services Command and Staff Course before taking up his current post as Requirements Manager in the Engineer Tank Systems IPT. In February 2003 he was augmented into the Operation Telic *National Contingent Headquarter in Qatar where he undertook the post of Engineer Plans. In April he was sent forward into Iraq to the Joint Military Committee within 1 (UK) Armd Div where he worked on the development of the New Iraqi Army before complimenting HQRE as SO2 Engr Ops. He is married with two children and a border terrier. He returned home to Bath in time for the mini rugby season and another year at Abbey Wood.*

INTRODUCTION

THIS article seeks to explore the role of the Engineer Planning Officer (SO2 Engr Plans) within the Joint Force Engineer (JF Engr) construct at the operational level. The vehicle for this discussion will be my augmentation and deployment into the United Kingdom National Contingent Headquarters (UK NCHQ) in Qatar

during Operation *Telic*. I will draw reference from NATO doctrine in the form of Joint Engineering AJP Draft 3.12 and Joint Force Engineer Operation Procedures (JFEOP) 100 Joint Force Engineering, Standing Operating Procedures (SOP) for the Joint Force Engineer. In order to marry my experiences with the dates of my deployment I will concentrate primarily on the Concept Development, Plan Development and Plan Review Phases of the Operational Planning Process (OPP). I will make comment on the key requirements for integration with coalition partners and other external organizations, discuss aspects of integration within an operational level headquarters and highlight some of the staff tools that were developed in order to manage and resource engineering capability across the Joint Operations Area (JOA). The article will conclude by identifying lessons learned during the OPP and highlight areas for further investigation and development. Finally, I will make recommendations on the roles and responsibilities of the engineer planning officer within the JF Engr branch in an operational headquarters to be included in the JFEOP.

Scope

I WAS augmented into the UK NCHQ at the beginning of March 03 after the headquarters had formally stood up in February 03. The NCHQ had also undergone work-up training in November 02 during Exercise *Internal Look*. I arrived in theatre during the latter stages of the Phase III (Decisive Ground Offensive) planning process some two weeks prior to the start of warfighting operations. Thereafter I was involved in Phase IIIB (transition to Phase IV) planning, which dealt with the 30-day period immediately following the cessation of hostilities. Subsequently, I contributed to the US CENTCOM planning of Phase IV (Post Hostilities) through liaison with the J5 Long Range Planning Staff of the CENTCOM Forward Headquarters (CFH). I was given particular liaison responsibilities to the Utilities and Transportation Operational Planning Teams (OPT) within the Civil Administration line of development. My final responsibility within the NCHQ was the development of the redeployment and roulement plan for *Telic 1* forces.

The first few weeks of my deployment were particularly hectic as I linked into a well-developed battle rhythm within both the JF Engr branch and the NCHQ and strove to gain situational awareness through reading and understanding the OPLANs and CONPLANs developed to date. The first key lesson identified was the need to integrate the plans officer into the JF Engr branch from the outset. Whilst planning was undertaken collectively by the remaining staff within the branch the early deployment of the plans officer, dedicated to that role, would have relieved a considerable burden placed on the remainder of the team. Much emphasis is placed on the role of engineers during the Initiation and Orientation Phases of the OPP and whilst Engineer Intelligence and Geo played critical roles during these stages, a plans officer could have contributed considerably and undertaken the key role to co-ordinate staff planning activity. Inclusion of this post for Exercise *Internal Look* would have helped early integration of the JF Engr branch within the J5 planning construct and consideration should be made to include a plans officer for future such predeployment training.

JF Engr Concepts and Doctrine

THE engineer plans officer should contribute significantly during the Concept Development Phase of the OPP. It is here that the engineer staff assists in the development of Courses of Action (COA) for the commander. The engineer staff should conduct the engineer and infrastructure portion of the COA analysis and recommend COAs that make optimal use of engineer resources. This was done effectively during Operation *Telic* with the development of the Infrastructure Development Plan (IDP). The Corps is already well configured to support Joint operations and the allocation of resources to support the force structure was very well managed through the Operations and Commitments desk at HQRE Th Tps. This early contribution to the OPP, most of which was conducted from LAND, was very effective resulting in the correct balance of engineer resources in the JOA to support the force. The core staff of the UK NCHQ JF Engr branch was deployed from within HQRE Th Tps although the plans officer was not included within this number. The engineers were fully engaged in the OPP during the Concept Development Stage of Operation *Telic* but some continuity was lost with the augmentation of a plans officer from outside HQRE Th Tps. The SO2 Ops/ Ctts at HQRE Th Tps or

SO2 Engr from within the deployable JFHQ at PJHQ were intimately involved in the early phases of the OPP and thus would have provided the appropriate continuity to continue the plans role throughout Operation *Telic*. Future operations should consider the role of either of these posts as a dedicated plans officer if a JF Engr branch is required.

Engineer planning was well integrated during the Plan Development and Plan Review Phases of the OPP. This enabled integrated planning within the NCHQ and the co-ordinated drafting of the Engineer Support Annex to the OPLAN. The IDP and EOD policy was also drafted during these stages of the planning process. The Plan Review responsibilities were well demonstrated during the development of the Phase IIIB OPLAN. Here the review of the mission analysis and identification of specified and implied tasks, critical information requirements (CIRs) and points for clarification proved particularly useful.

Particular focus was required for the development of the Phase IV (Post Hostilities) Plan. Key to this process was the integration of the plans officer into the CENTCOM planning process. CENTCOM developed lines of operation and formed a number of OPTs to brainstorm tasks and responsibilities prior to the drafting of the detailed plan. The Civil Administration line of operation, including transportation and utilities, was of particular importance to the JF Engr. CENTCOM developed a staged approach to the Phase IV plan that saw initial stability operations prior to the recovery of Iraqi civil structures and finally the transition to full Iraqi authority. This staged approach also included the transition of responsibility from the military to an Interim Transitional Civil Authority, in the form of the Office of Reconstruction and Humanitarian Assistance (ORHA), and finally to Iraqi Civil Authority. An important aspect of this process was to identify tasks that would be undertaken by the military, ORHA and the Iraqi populace. Once articulated into an OPLAN it was essential to conduct a further engineer mission analysis and estimate from a UK National Contingent perspective to ensure that all specific engineer tasks were identified and the appropriate prioritisation and resources allocated. The engineer plans officer has a very important role to play in the Plan Review Stage of the OPP. Through attendance and engagement of the OPT process with CENTCOM it was possible to have real influence at the operational level in the development of the coalition engineer plan. It is therefore essential to ensure that in future coalition operations a dedicated plans officer is made available for such tasks.

Liaison

THE engineer plans officer is well placed to act as the liaison focus for the JF Engr. This was a particular responsibility undertaken during Operation *Telic*. Visits to the Coalition Forces Land Component Headquarters (CFLC), Task Force IV (the CFLC Phase IV planning cell) and to the Senior British Land Advisor (SBLA) to CFLC proved particularly useful. Following these visits it was possible to integrate and influence engineer plans at Corps level and where necessary and appropriate it was possible to give advice. This visibility of planning at the Corps level proved valuable to the appropriate allocation of UK contingent engineer capabilities. The cessation of warfighting saw the quick transition to stability operations where civil organisations quickly took on wider humanitarian assistance responsibilities. Again visits to the Humanitarian Operations Centre (HOC) and to ORHA proved particularly useful from a planning perspective. In particular the liaison, in conjunction with the infrastructure officer, with the United States Army Corps of Engineers enabled the prioritization and co-ordination of infrastructure tasks and was instrumental to the decision to deploy members of the Engineer and Logistic Staff Corps. Future responsibilities of the engineer plans officer should include liaison. It is essential that this liaison occurs early during the operation so that full engagement takes place that can be integrated fully into the planning process.

Integration

TO ensure maximum co-ordination and staff efficiency within an operational level headquarters it is essential that the JF Engr branch be fully integrated into all staff function areas. During Operation *Telic* there was very effective integration into the J2 and J3 environments, likewise close co-ordination was evident with J4 through the engineer logistics officer. These linkages were developed and considerably enhanced during Exercise *Internal Look*. The lack of a dedicated plans officer during this exercise resulted in the linkages into J5 being less well developed. Considerable engineer planning had taken place, as already discussed, during the Initiation, Orientation, Concept Development and

Plan Development phases of the OPP. Indeed, the JF Engr branch often led the way on J5 issues. For example, the engineer intelligence-led Oil Infrastructure IPB was fundamental to the development of the plan to seize the Rumaylia Oil Fields. Whilst this demonstrated considerable JF Engr influence in the J5 planning process, the availability of a dedicated plans officer could have relieved this considerable burden placed on an already busy staff branch. The availability and utility of the plans officer was shown to good effect during the redeployment and roulement planning for *Telic 1* forces. By integration from the outset, the JF Engr was able to influence this activity, particularly in the identification of an appropriate APOD and SPOD and the requisite infrastructure requirements to support the development of these facilities. Most importantly there was Sapper representation in the development of the priority dates for departure from theatre. This ensured that engineer capability no longer required in the JOA or required to redeploy for subsequent operational commitments was given the appropriate priority on the Joint Date of Departure (JDOD) spreadsheet.

Staff Tools

The importance of the estimate process has been well highlighted throughout this article. In particular, the revisiting of the mission analysis enabled detailed tasks to be continually revised in accordance with the commander's priorities that were revised frequently as the campaign unfolded. Also, the identified CIRs and points for clarification allowed the JF Engr to generate Decision Points for key activities. This process allowed tasks to be identified well in advance and the timely allocation of engineer capability and resources. Collective CIRs generated from all functional areas within the JF Engr branch contributed to the development of Mines and Unexploded Ordnance, and Infrastructure databases which will be progressively built as Operation *Telic* unfolds and will be key to the successful implementation of military and civil activities within Phase IV.

All of the identified tasks and decision points were collated and presented in the form of a JF Engr Synchronisation Matrix. This matrix allowed engineer capability to be prioritised and allocated across UK contingents in support of campaign objectives. It was an extremely effective tool used to manage engineer capability and was the key document from which many decisions were made. The synchronisation matrix enabled effective planning, prioritisation, monitoring of tasks, resource allocation and highlighted spare engineer capacity. With the aid of this staff tool it was possible to reallocate engineer capability across components enabling, for example, air support squadrons to provide general support to the Land component.

Lessons Identified

The employment of a dedicated engineer plans officer within the JF Engr construct during Operation *Telic* proved successful and many positive lessons were identified for future consideration. Liaison with functional branches within an operational level headquarters is essential to enable engineer capabilities to be co-ordinated across all components. The key staff branches with which to liase are J5 and J2 for planning, embedded liaison staff supporting coalition partners, J4, J3 Operations Co-ordination and Force Support. Clearly internal integration with the JF EOD Gp and with the Geo detachment is paramount to enable efficient functioning. Liaison with external agencies is also very important and the links with ORHA and the HOC proved most useful.

The strict adherence to the estimate process reaped large dividends during the Plan Development and Plan Review stages of Phase IIIB and Phase IV operational planning. In particular, the revisiting of the mission analysis enabled detailed specified and implied tasks to be identified and early action to be taken. The use of staff planning tools proved most useful and the adoption of the JF Engr synchronisation matrix proved exceptionally helpful in determining priorities, resourcing tasks, and allocating engineer capability across components. The integration of engineer intelligence within the J2 branch, and engineer plans with J5 proved to be most successful. This liaison enabled the maximum use of high value intelligence assets that proved to be essential in the developing of plans. In particular, the collation and close working relationship between engineer intelligence and J2 enabled detailed plans for the securing of the Rumaylia Oil Fields to be developed. Internal integration within the JF Engr branch was essential to ensure co-ordinated planning. Key to this was the integration of the planning function with J4 Infrastructure and engineer logistics.

The employment of a dedicated engineer plans officer and early integration with the J5 staff branch within the UK NCHQ during Operation

Telic was initially undeveloped. It is most important to ensure early deployment of the engineer plans officer and close working liaison with J5 from the outset is paramount to the success of future operations. Liaison is particularly important during the Initiation and Orientation phases of the OPP. Early integration with all functional staff branches is essential if maximum progress is to be made during the early stages of planning. Finally, when operating at the operational level every effort should be made to focus beyond the tactical battle. Planning to a minimum of 96 hours ahead of current events ensured that contingents were correctly resourced to undertake further missions within the appropriate battle procedure timelines.

CONCLUSIONS

THE JF Engr concept and doctrine has been well proven within an operational level headquarters during Operation *Telic*. The employment and utility of a dedicated engineer plans officer has also been demonstrated. Its is essential that the engineer plans officer is integrated into the JF Engr construct from the outset of future operations and remains employed throughout the planning process to ensure maximum continuity, integration and liaison. To quote from the doctrine:

"Engineer staffs and in particular the plans officer must be involved with the planning process from the outset in order to fully articulate the engineering constraints and capabilities across all components. The JF Engr and component engineer staffs are responsible for ensuring that all engineer issues are given due consideration within the OPP at their respective headquarters".
Joint Engineering AJP Draft 3.12

Finally, I propose roles and responsibilities of the engineer plans officer to be included into JFEOP 100 Joint Force Engineering, Standing Operating Procedures (SOP) for the Joint Force Engineer.

- Key Role: primarily responsible for engineer planning, synchronization and monitoring the execution of engineer tasks within the operational headquarters.
- Responsible for co-ordinating the planning of Joint Force Engineer assets throughout the JOA.
- Responsible for synchronising and monitoring engineer planning across the JOA to ensure integration and effective functioning of engineer capability to meet campaign and UK objectives.
- Provide engineer input to operational level J3/ J5 staff planning, including:
- Conduct Mission Analysis from an engineer point of view.
- Advise on engineer and terrain matters during the development of the concept of operations.
- Draft the engineer annex to the Operations Plan.
- Responsible for ensuring appropriate integration of engineer support to other operational level staff branches, such as CIMIC and Force Support to meet campaign objectives.
- Contribute to operational level doctrine and procedures.
- Identify and plan facilities and other requirements in support of deployment, redeployment and roulement of engineer forces.
- Liase with coalition engineer branches and J5 staff to ensure effective integration and efficient employment of engineer assets.
- Be prepared to undertake engineer tasks as directed by the Joint Force Engineer.

Information to Exploitation

MAJOR I A MCDOUGALL MSC

Ian McDougall was cmmissioned into the Corps 1985 and served at regimental duty with the regular Army and TA until 1995. He saw service in the Falkland Islands, Canada, Cyprus, and Uganda. In 1995 he was posted to HQ 1 (UK) Armd Div as SO3 G1/G4 Engr that included a six month operational tour in HQ MND SW in 1996. He attended the Army Survey Course in 1997, completed a second tour in Bosnia as SO2 Engr Ops in HQ SFOR in 1998-99 prior to assuming the appointment as SO2 Establishments and Manning at the Directorate of Geographic Field Support. During this tour Ian was instrumental in forming the Geographic Engineer Group, re-naming the geographic sub-units and restructuring the trade groups. He was posted to HQ LAND in 1999 as SO2 G7 Geo during which time he became interested in the exploitation of information and the wider use of geospatial data for engineer intelligence. He was re-subordinated to HQRE Th Tps in 2001 to become SO2 Engr Int/Geo and has expended a considerable amount of time supporting operational contingency planning.
Ian left the Service in July 2003 and is now working for PA Consulting Group.

THE events and aftermath of 11 September 2001 acted as a political imperative to combat global terrorism. The implications of such a mandate was that United Kingdom forces and security agencies were to be prepared for global reach, able to conduct force projection and military operations at short notice for limited duration. For Royal Engineers this implied the potential for operations in challenging and disparate environments.

I was the Intelligence Officer of 28 (Amphibious) Engineer Regiment in the late 1980s and I remember the focus for the Regimental information needs at that time: M2 crossing sites, many of which were pre-recced and well documented; demolition target packs, held on microfiche and the large 1st (British) Corps general deployment position (GDP) real estate allocation trace pinned on the wall behind a curtain in the Intelligence Cell. The intelligence requirements of the Regiment were relatively narrow and the bulk of the task was the organisation and structure of the hard copy library for rapid exploitation. World events have moved on considerably since and the information needs for military engineers have increased significantly to meet the diversity of the tasks that they are likely to become engaged in. In my view, our collective thinking in the Corps has not translated to prioritising intelligence for operations and I believe that engineer planning can be conducted more effectively if engineer staffs are cognisant of the intelligence and capability that exists in the wider military context and in the Corps, to inform their decision-making.

By way of background, Headquarters Royal Engineers Theatre Troops (HQRE Th Tps) has developed an engineer and geospatial intelligence capability following a restructuring exercise in Headquarters LAND Command. I had the responsibility for the inception and shaping of how this capability could contribute positively to operational planning. The intelligence and geospatial enhancement brought an additional capability to HQRE that could interface with the other functions within the HQ, particularly operations and infrastructure. The one major leap forward, I believe, is de-mystifying the work that the geospatial community undertake and the attempt to try and harness the potential of geographic information systems (GIS). A GIS is a spatial database that allows geographically-referenced information to be collected, stored and analysed by users in a format that is readily understood: On a map. Following the Int/Geo Cell limited contribution to Operation *Fingal*, collection continued beyond Op *Veritas* on a range of countries that had associations with terrorism, including Somalia and Yemen. The aim was to conform to the doctrinal norm of the intelligence cycle, highlighted in Figure 1. By mid-2002, the Int/Geo staff were looking more closely at Iraq and starting to gather information on the country from a number of sources, both classified and open source. It is key to point out that this activity was conducted without specific direction, however, was consistent with many other J/G2 staffs. At this time, collection was very generic and concentrated on critical infrastructure such as routes, airfields and ports, as well as the significant legacy threat from mines and UXO as a result of the Iran/Iraq war. This situation highlights the fact that intelligence collection may be undertaken without specific direction in order that there is sufficient lead time to gather more focused information, consistent with the requirements and resources available. Detailed planning did not ensue until the Int/Geo personnel were "read in" to the Operation *Telic* planning, by PJHQ, in late September that. In my opinion, this was far later than ideal. Following this time, operational contingency planning focussed on Northern Iraq, the preferred option at that time for the United Kingdom contribution to the Coalition operation.

It was abundantly evident at this time that Royal Engineers formations and units were not well practised at conducting an intelligence estimate in order to articulate their information needs, indeed there

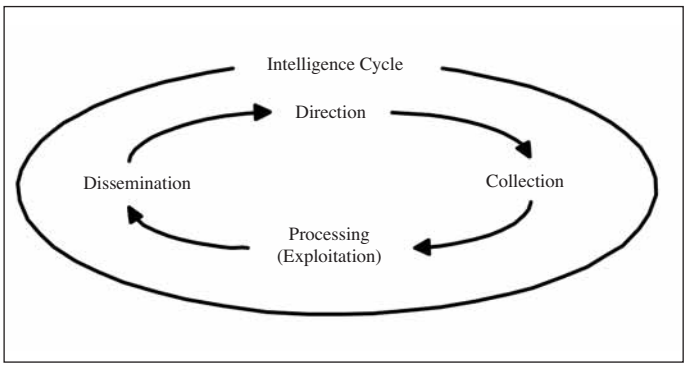

Figure 1 – The Intelligence Cycle.

was little demand for intelligence, less Headquarters 1st (United Kingdom) Armoured Division, who were working intensely on the tactical situation. This was partially due to the lack of situational awareness, given operational security, but, substantially, through a lack of awareness of what information could be made available.

The collection of intelligence was inhibited considerably by the lack of connectivity to national and international security agencies. HQRE Th Tps did not have a direct link to the information systems of the Defence Intelligence Service (DIS) and neither did G2 HQ LAND. Although email connectivity existed, this limited the amount of information that could be passed across the networks. This had a particular impact on imagery-based products that have relatively large file sizes. Consequently, I spent days away from HQRE researching and hand-couriering material back to be used in our planning. This resulted in more time on collection rather than exploitation, therefore, impacting upon intelligence provided to commanders. This situation is duplicated down the chain of command within LAND; there is no direct connectivity between engineer intelligence staff and intelligence information systems. This is a key weakness if engineers wish to play a full part in the contribution to the overall G/J2 picture.

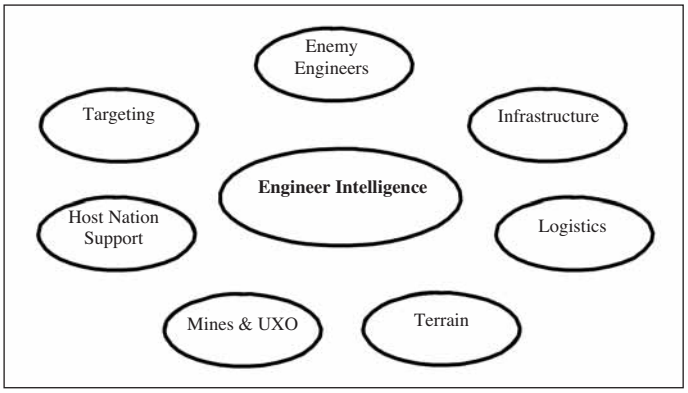

Figure 2 – Selected Aspects of Engineer Intelligence.

HQRE Th Tps deployed staff on Exercise *Internal Look 03* to form the core of the Joint Force Engineer Staff in the National Contingent Headquarters (NCHQ). The aim was to deploy staff to meet the majority of Sapper functional requirements, hence, engineer intelligence, operations, logistics and infrastructure and geospatial support were covered by individual desk officers; EOD was a notable omission, however, this situation was enforced upon us. The deployment of the same staff on Operation *Telic* proved extremely beneficial and much of the staff integration of the HQ had already taken place. The value of this from my perspective was that I was a regular visitor in J2 and the responsibility of engineer intelligence was well defined. Furthermore, JF Engr staff became used to having a direct link into the HQ J2 infrastructure.

The NCHQ intended to meet requests for information (RFI) in two ways: J2 would handle and respond to any enemy RFI; J3 Ops Coord would deal with RFIs on friendly forces and the environment. It became apparent, very quickly, that matters on the environment were being directed at the JF Engr staff, probably quite rightly, as here was a staff with an intimate understanding, through experience, of how the environment could shape military operations. Engineer, including environmental, intelligence spans a broad spectrum of concerns, some of which that have captured in Figure 2.

These areas of interest are not new, however, the extent of Sapper input into such matters within the wider Defence community was only just being understood. Consequently, RFI management in the NCHQ was conducted as shown in Figure 3.

The following issues were of particular relevance during the operation:

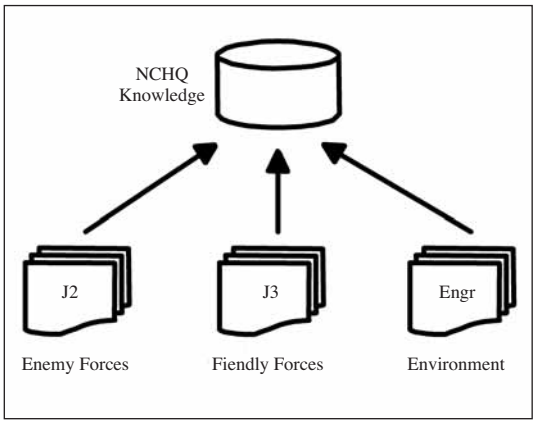

Figure 3 – NCHQ RFI Management

Infrastructure. From the earliest stages of the deployment Royal Engineers were engaged in the planning for securing the southern Rumalyah oilfield. The Rumalyah oilfield contains the majority of the oil reserves within Iraq and was deemed of critical economic significance within the operation. The DIS had been engaged prior to deployment to support our information needs, however, the collection programme on the oil and petrochemical industry of Iraq had only recently started and, therefore, their information base was relatively shallow. We had requested support from the Engineer Logistic and Staff Corps (EL&SC) and met several representatives of the Corps in late January prior to deployment. They proved to be an invaluable asset in providing operational level intelligence that could inform further collection. The Corps also facilitated access to oil and petrochemical facilities in Kuwait to allow 516 STRE (BP) personnel to become familiar with the type of infrastructure that they were likely to come across in southern Iraq. Direct liaison with CENTCOM Forward Headquarters (CFH) also provided significant intelligence that allowed NCHQ to consider the southern Iraq oil infrastructure network and decide upon the critical nodes within it. This allowed the JF Engr staff to highlight the significance of the risk of the operation to seize and secure the critical oil infrastructure to the National Contingent Commander. This was a critical, if not overriding, factor in decisive ground operations preceding air operations. The provision of potable water to the Iraqi public was also construed as being of importance in generating confidence in the Coalition. With extremely high infant mortality rates of 105/1000 births caused directly by a lack of clean drinking water and poor sanitation, it was important for military engineers either to make expedient repairs on existing infrastructure or facilitating OGDs/NGOs to undertake such work. The information held on water and sewage plans was minimal, both in UK and US HQs. The principal reason for this matter is that national intelligence agencies tend not to collect on facilities that do not pose a threat. However, this rationale is a point of contention when a Coalition strategic end-state is the regeneration of the infrastructure of the country.

Mines and UXO. It was important that deploying UK forces had a clear view of the threat posed by mines and UXO in theatre. A long time prior to deployment, a database of the legacy mines and UXO from the Iran/Iraq war was obtained through US contacts. This threat existed, predominantly in the north and east. Unfortunately, little was known of the munitions deployed in Operations *Northern* and *Southern Watch*. Consequently, there was no overarching view of the threat in Iraq prior to the commencement of ground operations. It was intended that UK forces should construct and administer a UK mines and UXO database, similar to Operation *Veritas*, that would reflect the threats likely to be encountered: The legacy threat, the threat from enemy action (mines and booby-trapping) and the threat remaining from Coalition air-delivered munitions, an issue that is often overlooked, but is a significant physical threat. There was early engagement with the Combined Force Land Component Command (CFLCC) who had been mandated with maintaining the operational picture relating to mines and UXO for the Coalition. It was the aspiration of the US HQ to manage this information within a GIS, which would allow the distribution of data files via the Coalition information systems. Furthermore, there was to be a direct data link between the targets staff planning Coalition air missions and the system. This proposal was well received by the UK, however, it became apparent that there were some teething problems that could affect this plan, notably that the US personnel managing the system were not as technically capable as similar UK geospatial personnel and, later it became apparent that the data at that time was NOFORN, non-releasable to non-US nationals! This became a matter for some concern on the evening prior to 3 Commando Brigade flying into Iraq.

The JF Engr took the decision at an early stage, on the recommendation of his staff, to provide CFLCC with a SO3 (EOD) and junior NCO (geospatial technician), to "assist" in the management of the mines and UXO database. This served two purposes: To show a commitment to maintaining a Coalition picture and to ensure quality assurance for UK forces. This proved the worth of integrating Sapper capability, however, it showed that the vast resource base of the US is not always as it would seem and the UK proved that they could understand the intellectual problem of managing such information for a large Force. This demonstrated the UK ability to be provide "niche" capability.

KEY LESSONS IDENTIFIED

I HAVE chosen to group the first tranche of lessons identified under the heading of "preparedness". It is probably fair to assume that any future military operations will be as diverse of those of recent history, demanding Sappers to directly support the F Echelon, lead in reconstruction and facilitate regeneration. Therefore, the following points can contribute to the Royal Engineers being better prepared "next time around":

Doctrine. The publication of Military Engineering Volume 1, Part 2, Royal Engineers' Intelligence was welcomed when drafted last year, however, it must be amended to reflect our most recent experiences in large scale operations. First, I would suggest that we formally take ownership of "environmental intelligence[1]" and ensure that this is reflected in publications such as Tactical Doctrine Note 26 and the Land Component Handbook (Terrain – Situational Analysis). It is our collective ability to understand or exploit the environment that will have the greatest impact on military operations. Moreover, the Corps must ensure that intelligence drives operations and that it shapes our methodology for deployment and sustainment.

Training and People. The Corps must look to invest in training personnel should they wish to gain the maximum benefit from intelligence. There is, currently, no bespoke training for anyone holding an intelligence-related appointment, including the SO3 Engr Int/Geo appointments in the Divisional HQs. This situation is unlike the units and formations we support in which battlegroup IOs attend a four week Unit Formation ISTAR Officer Course at DISS Chicksands. I believe that the Corps must scope the perceived training requirements for engineer officers and the UFISTAR Course may be a good place to start. The training must also meet the requirements of the level of command and I have suggested those levels that we should consider training for in Table 1. The BGE level of training should match the requirements of the battlegroup and it may be that this is currently being addressed on the BGE course now. Training for operations at brigade and divisional level should focus on the closer integration of engineer and all-arms intelligence, particularly the liaison with organic G2 staff and, as such, this integration would be best served through some formal process where potential engineer intelligence officers may be exposed to the myriad of resources available to meet Royal Engineers' information requirements. Operation *Telic* has proved that this relationship is mutually beneficial, particularly at the National Contingent Headquarters (NCHQ).

What are the implications of this? Firstly, we must consider the conduct of courses, either as part of all-arms course schedules or independently within the RSME to meet the demands of intelligence appointments. Our key engineer intelligence staff must have formal training and our squadron commanders should be educated in what may be made available to them. As an aside, this may open up avenues of career development that have previously been unavailable to Sapper officers. We must select officers who can think ahead and predict what engineer commanders' information requirements are likely to be in order that there is sufficient time to develop a coherent package of information, federating knowledge to inform the engineer commanders' decision-making. In order to achieve this the individual must be a good communicator and able to mix well; not a trait that is obvious in every officer! We must also dispense with the IO being treated as a RHQ troop commander, assistant operations officer or training officer to the detriment of his appointment. One final, but important, issue is that the officer must have Developed Vetting status. Without such clearances there will always be the stigma of never being fully integrated with other G/J2 staffs and being drawn into their "culture".

Equipment. Ideally, all personnel holding engineer intelligence-related appointments would have access to those information systems that allow connectivity to such agencies as the DIS and JARIC. Unfortunately, this is unlikely to happen, particularly for regimental IOs working within a brigade HQ. However, if the IO had a properly accredited secure laptop computer there is the potential for engineer-related intelligence to be passed down the Sapper chain via CD/DVD and other intelligence to be taken from the parent brigade. Thereafter, the laptop could be connected to the G2 LAN on deployment. This would allow the Sappers to have connectivity to the G2 analysts working within the HQ and G2

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[1] Terrain, weather, infrastructure, utilities, resources and enemy.

Level	BG	Bde	Div
Engr Appt	**BGE**	**Regt IO**	**SO3 Engr Int/Geo**
Typical Activities	• Battlefield Area Evaluation (BAE) • Threat Courses of Action (COA)	• Intelligence Preparation of the Battlespace (IPB) • Doctrinal modelling • Likely enemy COA	• Comprehensive study of factors • Prioritised range of threat COAs • Critical decision points
Example Resources	• TI Spyglass • Raven • II (CVR(T))	• As BG	• As Bde • IMINT • HUMINT • SIGINT • Phoenix • Air • Avn
Suggested Training Requirement	• Intelligence module on BGE course	• Desirable: UFISTAR course • Essential: One to two weeks course at the RSME	• UFISTAR course

Table 1 – Engineer Intelligence Related Appointments.

to have access to engineer related information. At divisional level and above, it is important to have routine access to systems such as STONEGHOST[2] and IMN[3] in order that that the engineer staff officer can search intelligence databases to satisfy the relevant information requirements. This has been extremely pertinent when requiring information on critical infrastructure, such as airfields or bridges.

The second tranche of lessons learned I have grouped under "integration". I have touched on the need for greater integration with G/J2 staffs, however, I feel that there must be greater integration within the Corps, specifically:

The Geospatial Community. The Corps should embrace the Geo community and realise the potential that they may offer to engineer intelligence and HQs as a whole. Unfortunately, I believe that they are often abused by HQ staff by the demands placed upon them for tailored geographic products, routinely the same base map with thematic overprint information: Force dispositions, routes and the like. We must ensure that their time is used more effectively undertaking geospatial analysis and exploiting the technology and digital data that they have available to them. By producing geospatial servers in our deployable HQs, we ensure that staff officers can access geo datasets on their desktops. They may then undertake limited analysis themselves and can create their own geographic schematics. This would allow the closer integration of geospatial and engineer intelligence. I have shown how this could system could work in Figure 4.

Engineer intelligence staffs would continue to collect data in the fields relevant to the operation. Geospatial intelligence would be collected and managed for the HQ staff users to access over the LAN. The datasets could include digital maps, imagery, site schematics and, potentially, digital elevation data. This will allow staff users to draw the data they require over the network, work the data as required and conduct some limited analysis. This information may be aggregated to provide engineer intelligence in an understandable format. One such example from Operation *Telic* was the identification of quarry

[2] AUSCANUKUS web-based intelligence system.
[3] Intelligence Messaging Network.

locations. The technological development of such a system is a matter that the Corps can pioneer and lead on within deployable HQs. This is not simply a matter for "tefal-heads" to take forward; the collection, collation, exploitation and dissemination of environmental intelligence is a Sapper responsibility and in my view and we must become engaged in the matter.

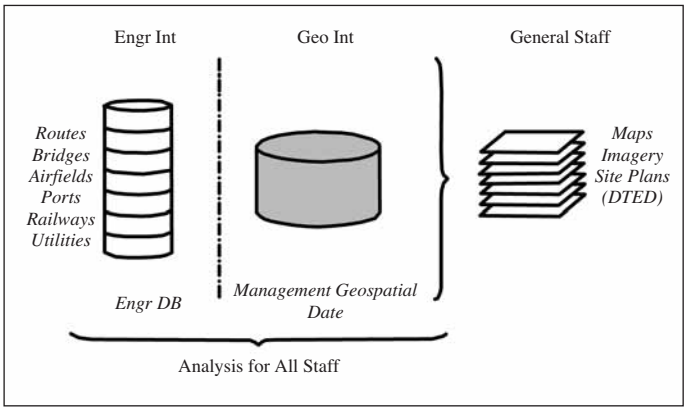


Figure 4 – The Relationship of Engineer and Geospatial Intelligence.

The EOD Community. The collection of mines and UXO data is a vital constituent part of engineer intelligence. Given the likelihood of future military operations, it may be assumed that there could be a significant indigenous mines threat. As such, there are two functions to be considered when dealing with such threats:

Firstly, we must know where and what the threat is. This can be a complex task that may involve dealing with national and international governmental departments as well as non-governmental organisations in order to obtain a coherent view of the physical threat. This is a task that has been successfully undertaken by engineer intelligence personnel on behalf of the Force and EOD community on Operation *Telic*. The EOD community must be engaged at early juncture by the engineer intelligence community is order to gain a coherent view of the threat and how to counter it as well as directing further technical intelligence collection as required.

There must be a method of managing mines and UXO information that is clearly defined, with the system tested and validated, prior to deployment. The Sapper community is realising this and has successfully handled mines and UXO information on Operations *Veritas* and *Telic*, however, on each operation there were no pre-defined procedures prior to deployment and an hoc solution came to the fore (the SO3 and junior NCO). If 33 Engr Regt (EOD) are to take the lead in forming the nucleus of a deployable Joint Force EOD Group, the Regiment must develop a permanent capability to manage such data. The implications are the establishment of a terrain analyst and the hardware and software to operate a deployable mines and UXO database. Consideration should also be given to the methodology for the passage of such data to a widely distributed force. If JOCS is to be used as the backbone of UK deployable C2, data files must be passed routinely over this means to maintain a common operational picture of the physical threat. The procedures must be regularly validated on JFHQ exercises.

The Infrastructure Community. A major part of engineer intelligence is gathering and exploiting information on infrastructure. The relevance of this was articulated earlier in the article regarding the southern Iraq oil infrastructure. However, Operation *Telic* and, I believe, future operations will demand Royal Engineers to undertake regeneration work on infrastructure and utilities at short notice in order to inspire confidence for UK forces in the indigenous population and shape media reporting though "quick fix, quick wins". In order to achieve this it is important to have a detailed knowledge of water and power infrastructure and their connectivity. Only then may one be able identify key nodes within the infrastructure networks and direct resources for the early recce of such facilities. It is therefore important for infrastructure engineers to liase closely with engineer intelligence staffs to articulate and prioritise their information requirements. This process worked well on the NCHQ staff with Lieutenant Colonel Steven Boyd and myself routinely reviewing our collective information requirements. This allowed a consolidated matrix of requests for information to be developed within the NCHQ staff to inform post-hostility operational planning. We must, though, improve the ability to communicate between the operational HQ and the contingent HQs. Operation *Telic* proved that the flow of information tended to go from the top down,

however, we must realize that there is benefit for information to flow from the bottom up in order that it may aggregated and the true benefits derived for all contingents.

SUMMARY

THE benefits of dedicated engineer intelligence are being recognized, but not truly realised, in the Corps as a potent capability to inform decision-making. We, collectively, are re-educating ourselves and realising the need to gather intelligence on the more disparate nature of the future battlespace that Royal Engineers will operate within. The most recent operational experiences of Operations *Fingal* and *Telic* have demonstrated relatively immature capabilities that require inward investment and development.

Engineers must act as a focus for environmental intelligence; we know what shapes the battlespace. There must, though, be a drive for greater integration within the Corps to stimulate the true potential on offer. Commanders must realise that this is not a "nice to have" but is essential if we are to undertake engineer and all-arms operations more effectively and efficiently (dare I say intelligently!) in the future. We must be prepared to cast off obsolete parochial attitudes and strive to harness the strengths that we have within the Corps, notably in the Geo, EOD and Infra staffs. Each has a significant part to

A Joint Force Engineer Watchkeeper's Perspective

CAPTAIN S M NEVILLE

Captain Neville was commissioned into the Corps in December 1997 having attended Welbeck College. He has spent tours as a Plant Troop Commander in 20 Field Squadron and a Field Troop and Reconnaissance Troop Commander in 59 Independent Commando Squadron and has previously deployed on operations to Macedonia, Kosovo and Afghanistan. He has been responsible for Officer Recruiting within the Engineer-in-Chief's Recruiting Liaison Staff since August 2002 and was 'augmented' to Op Telic *in February 2003. He started a Computer Engineering Degree course at Southampton University in October 2003.*

SINCE 17 February 2003 I have been deployed on Op *Telic* working as a watchkeeper in the Joint Force Engineer (JF Engr) Cell at the National Contingent Headquarters (NCHQ) in Qatar. For the majority of this time I have been responsible for keeping watch at night, usually working from 1930 hours to 0800 hours each day. This article seeks to discuss the role of the NCHQ and give an account of my personal experience working within it. It is aimed at the junior Officers in the Corps with a view to giving them an insight to working in an Operational headquarters as an SO3. It should be emphasized that, despite spending the last two years of a previous posting working in a Brigade headquarters, this is the first time that I have worked at this level.

It became clear to me shortly after arriving in Qatar that my perception of what the headquarters was going to be like was far from reality. I thought that I would be working in a state of the art headquarters, firstly because it was the national headquarters for UK involvement in Op *Iraqi Freedom*, and secondly because the Coalition was led by the US. Furthermore, I thought we would be co-located with the other members of the Coalition, working directly alongside the Americans and Australians. Instead the UK NCHQ was located a short walk away from US Central Command (CENTCOM) and AUS NCHQ and was set up and equipped in a similar way to any other UK formation headquarters. It has been enlightening to see that, even at the strategic level, communications are still a constant problem and activity in some cells within the headquarters more or less grinds to a halt when the computer information systems go down!

Ever since the events of 11 September 2001 the threat to international security posed by the Iraqi Regime had been a focus for world politics. Despite the efforts of the US and UK governments to convince the world that this threat was significant enough that the use of force was justified to eradicate it, when the war began the Coalition consisted primarily of US, UK and AUS forces. It was only sensible that the national headquarters of each country should be co-located

for the Coalition to operate as effectively and efficiently as possible. As a result the UK and AUS NCHQs were set up with CENTCOM in Qatar. There were plans for every other member of the Coalition to set up a headquarters here too however the hangar in which they would have been located has stood empty. It was from Qatar here that General Tommy Franks led the Coalition as Commander-in-Chief Central Command.

As the UK force constituted only approximately one fifth of the total fighting force its Maritime, Land and Air Contingents were placed under command of the respective US Maritime, Land and Air Components. It should be noted that the UK contribution in terms of Combat Power was much greater than this, for example the 116 Challenger tanks of the British 7th Armoured Brigade accounted for almost half the total number of tanks within the US 1 Marine Expeditionary Force. Hence the NCHQ did not directly command UK forces (with the exception of the Joint Force Logistic Component), instead its role was to influence, support and report, to influence the Coalition Plan, to support UK forces and to report to London via the Permanent Joint Headquarters (PJHQ).

In the interests of the British Government and its Armed Forces, it was critical that the senior British Commander in the region was located in the same place as the Coalition Commander and his staff. In the same way there was a requirement for a number of UK Officers to be 'embedded' within CENTCOM in key posts to ensure that the Concept of Operations and the final Coalition Plan, OPLAN 1003V, were acceptable for execution by UK forces and in line with current doctrine and political direction. Ultimately, and perhaps more importantly, it meant that the interests of each and every British Serviceman were looked after and that the role they would play was vital to the success of the Coalition.

It was extremely interesting to see how different the UK/US strategy was regarding particular issues, and therefore just how important the role of the embedded staff was. As an example, there were times during target analysis when the potential loss of life was deemed to be unacceptable by UK policy but assessed as acceptable by the US. In addition the complexities of the command and control structure meant that sometimes, particularly early on, by the time a target had been authorized by the UK, US air assets were already on their way to strike it.

Taking the role of the NCHQ as previously given in a literal sense may lead to the misconception that once the executive order for Op *Telic* was given the Coalition plan could no longer be influenced, leaving only the supporting and reporting functions to be fulfiled. This was not the case. The UK had to be in a position to influence planning at all levels and for all phases of the campaign, of which there were four:

Phase 1 – The Build Up
Phase 2 – Shaping the Battlespace (including limited attacks against the Regime)
Phase 3 – Complete Regime Destruction
Phase 4 – Post Hostilities and Redeployment

In order to achieve this, the nucleus of staff in the NCHQ worked in the Joint Force Headquarters (JFHQ) at PJHQ, who had been planning for potential operations in the Middle East, in conjunction with LAND, FLEET and STRIKE Headquarters, since the middle of last summer. The main focus of the NCHQ was not, therefore, the current battle but the planning for what might happen in the weeks and months ahead. Most of the strategic planning for Phases 1 and 2 was complete prior to the NCHQ standing up, with only the final touches needing to be made to OPLAN 1003V. The majority of staff work produced by the headquarters centred on the reconstruction of Iraq and the roulement of forces for Op *Telic 2*. This was certainly interesting, particularly from a JF Engr perspective, although it was demoralizing to see the war being fought, from the relative safety and comfort of a country hundreds of miles away. I have no doubt that the majority of the staff in the NCHQ felt the same way, but I found it very difficult to accept that my role was not as a commander on the ground as on previous operations. Hopefully the situation for the troops in Iraq was improved as a direct result of at least some of the work produced by this headquarters.

I found it particularly interesting to see the differences between UK and US foreign policy and to see the effect that political decisions had at the strategic, operational and tactical level. US objectives included overthrowing the Iraqi Regime, destroying the Iraqi Weapons of Mass Destruction (WMD) capability and destroying Iraqi terrorist networks. UK objectives included creating the conditions to deny Iraq the ability to

develop WMD, although no mention was made to overthrowing the Regime (it was later accepted that this would have to happen if the ability to develop WMD was to be denied) or to destroying Iraqi terrorist networks and connections to global terrorism. Protecting neighbouring countries, setting the conditions for long-term stability in the region and protecting the territorial integrity of Iraq were key objectives of both countries.

In my opinion hostilities against Iraq were justified by the US because of the threat the Regime posed to her national security due its connections with terrorism. The UK however justified such action because of the threat posed by the Iraqi WMD capability to the security of the region, and subsequently to international security. How real this threat actually was may never be made public but I find it fascinating to see the ever-increasing efforts by both countries to find the "smoking gun" in order to justify the invasion. In the mean time, the most has to be made of the liberation of the Iraqi people and the ensuing humanitarian crisis (which does not exist).

I have benefited from the experience of working in a Joint operational headquarters, despite my frustration at not being at the sharp end. To be in position to see the activity develop at the frontline and see the planning and work that is required behind the scenes at MOD and ministerial level, as well as all the levels in between, has been of great value. It has been particularly useful to see how the force has been organized and to be privy to the key issues and some of the detailed planning that has taken place within the UK Contingents and the Coalition as a whole. It has also been interesting to see the interaction with the government, with the appointment of a Political Advisor (POLAD), and its agencies, such as the Operational Analysis (OA) teams. I now have a far better understanding of Land, Maritime and Air operations in support of both Joint and Coalition Operations.

In addition, I now have a good understanding of Engineer Operations at the Operational level. I understand the role of each of the appointments within the JF Engr Cell (Operations, Plans, Infrastructure, Geographic, Intelligence, Logistic Operations and Explosive Ordnance Disposal), how they relate to each other and to the other staff branches (J1-9) within the headquarters. It has been particularly interesting to see the input that Infra and Geo have had in the overall campaign plan and in the Time Sensitive Targeting (TST) process and to see the operational significance of Infra, Geo and EOD operations. I have been privileged to see the complete range of engineer support being provided to all three services and how manpower, equipment and resources have been redistributed between Contingents as necessary. I have a better understanding of how TA/Reservists are mobilized and employed within the Corps and how assets such as the Engineer and Logistic Staff Corps and 507 STRE (Railways) (V) are utilized. Finally, I have been able to see how the Corps has supported operations outside the UK Area of Operations, in support of US and SF operations. Of note is the significant role that UK EOD and STRE teams played in support of 1 MEF operations to seize, secure and clear the Ramaylah Oilfield Infrastructure, the work of 12 (Air Sp) Engr Bde in support of the activation of the Deployed Operating Base at Tallil for use by US A-10 aircraft and the planning for mobility support to US forces using M3 Rigs to cross the Rivers *Tigris* and *Euphrates*.

I do think, however, that I would have benefited even more from the experience had I been employed in a capacity that required me to work in the daytime when the majority of work was done. I would have preferred to be employed as an SO3 Plans or similar, although I realize that the future structure of the JF Engr Cell does not allow this and that quite possibly an SO3 post Regimental Duty does not have the necessary experience to be employed as such at the operational level. I would recommend Warrant Officers to be considered as watchkeepers for the JF Engr Cell, particularly due to the administrative duties involved.

Hopefully I have given an insight to the role of the NCHQ and my experience of working within it that may be of benefit to the junior officers of the Corps if they ever have to deploy as a watchkeeper in a Joint Operational headquarters. Although it has been extremely frustrating not being closer to the tactical battle I am sure my experience will stand me in good stead in the future.

Mobilization of a TA Officer

LIEUTENANT N E ROBBINS

Lieutenant Nicholas Robbins serves as a Troop Officer in the Birkenhead based 107 (Lancashire and Cheshire) Field Squadron RE (Volunteers), part of 75 Engineer Regiment (Volunteers), and as he explains, was mobilized for Operation Telic.

Introduction

The mobilization of many thousands of its ranks will undoubtedly be remembered as one of the most significant events to affect the TA for some time, so any attempt to tackle the lessons learnt from it here would clearly do it no justice. It is, however, perhaps fair to dwell on my own experiences, though obviously I am in no position to claim these are representative. Equally, at this stage – two months in and some time still to go – I'd like to think my experiences are just beginning. As such, if nothing else, this article should give me something interesting to reflect on when I finally return to the comfort of my civilian everyday 9 'till 5 job.

Mobilization

For me the realization that I might be mobilized came on a typically British Saturday morning while on Altcar ranges. I was there for the day with the Regimental shooting team as I was due to captain them in a series of competitions that at the time had seemed a military priority. News came in that morning that several people from the Squadron had received ominous brown envelopes, and as rumours spread ever more quickly, everyone began frantically 'phoning home to see if they too had received one of those little brown envelopes. For myself and the rest of the people on the range that day there were no letters, but the possibility had become real, and the conversation was focused very clearly on only one topic. There was clearly anxiousness at the thought of being mobilized and all that it meant, but at the same time a real excitement and a genuine desire to be one of the people seemingly "selected".

Emotions were mixed. There is obviously a realisation within the TA that we might one day be called upon, but it had always seemed to me to be quite melodramatic to give it too much thought. As such it wasn't really something I had planned for – with certainly a personal belief that circumstances would have had to get extreme for the Army to mobilize any more than just the specialist TA units. Of course, in this situation circumstances had combined, and the opportunity for the TA to show its capability had finally come.

For me news of my mobilization came over a week later. Monday morning at work and a two minute call to a hotline number I'd been given the previous day told me that the possibility that had been running through my head had become reality. I was told to expect the formal letter in the post in a couple of days that would give me more details. However, the countdown had begun as I now had 11 days to organize my life and pack my bags for the unknown. My boss was clearly more surprised and less prepared for the news than I was. This left me in the difficult position of wanting stay at work as long as possible in an attempt to tie up loose ends and pass things on, but then at the same time needing to finish as quickly as possible in order to prepare myself for what was ahead.

Clearly one of the most difficult factors was the time to prepare. Fortunately I didn't have as many ties as a lot of people, and as much as I'd like to think of myself as indispensable at work, I realise it's sadly not the case! I think one of the questions that will clearly be asked once the dust, or sand in this case, has settled will be just how much notification of mobilization is required, or indeed fair. From the perspective of the individual it will always be as much as possible, but the needs of the army and the requirement to react quickly will push it to be as short a time as possible. Again, this is not the place to come up with an answer to this particular question, but while there must remain a need to call up individuals at short notice, there seems little reason not to be open and provide more notice if this planning is already in place. However, it may not always be even that simple as it is clearly a stressful time and to prolong it is equally unfair. However, what must be kept in mind is that the possibility or even likelihood of

being mobilized is in itself stressful for the individual, or more importantly, for the families.

The RTMC

The next stage of my experience was the Reserves Mobilization and Training Centre (RTMC) where the paperwork and checks were done to accept me into full-time regular service. This was intense but given the numbers of reserves passing through the gates it seemed efficient and ordered. Again, many people more informed than myself will be able to reflect on the lessons brought out by this process. Suffice to say those that were sent home at this stage were thrown into a strange position of very mixed emotions. Total devastation and disappointment at the fact that they wouldn't get the opportunity to do for real what they had trained at for years (not to mention the fact that they had turned their lives upside down for no reason). However, at the same time a certain sense of relief that they could return to the comfort of home and to their families and friends. For those that had made it this far a clear sense of relief at making the grade was apparent – but of course now the real question of what lay ahead drifted into our minds.

After a further four days of well organized and professionally delivered training, refreshing all the basic skills from NBC to First Aid, along with the obligatory theatre briefs, we were all set. From Grantham we were set off in our separate directions. We had now known for a couple of days what our roles would be, at least by title, but what exactly these would ultimately require from us as individuals remained a mystery.

The Role

For me the role I had been mobilized for was as a watchkeeper within the NCHQ in Qatar. Along with a second watchkeeper, on the other shift, I was there to maintain a permanent presence at the Joint Force Engineer Branch, to help ensure that issues or requests could be raised and dealt with immediately.

By night it was key to have a watchkeeper to maintain a presence and attempt to resolve any issues that occurred overnight. In many cases these could wait until morning, but obviously if they could not wait, and if it was something I couldn't deal with, then it was my pleasant duty to go and disturb the comfortable nights sleep of the man with the answers! The night shift also provided some quiet time to run through the reports, sort out a few little bits of paperwork, speak to the contingents to get the latest update and in the most extreme of circumstances, sweep the floor! The crucial thing was the passage of information back to the rest of the engineer cell as they reappeared first thing in the morning after what was for them a short break from the events. Bringing them up to speed with the developments overnight and additional staff issues that had dropped out of the various reports, it was time to hand over the responsibilities to the other shift.

The day shift was altogether different despite having the same outline tasks to cover. Clearly there was a lot more background activity with a lot more people working throughout both the HQ and the theatre as a whole, but on the reverse there were a lot more people to answer the questions and pass the issues to as they occurred. The requirement for communication was of course much more immediate – dealing with phone calls or other requests and directing them to the most suitable individual within the group.

Combining this with a routine of reports to be collated and distributed, and other general tasks and information gathering as requested, there was again plenty to keep the humble watchkeeper busy.

The key drawback of the role is that it inevitably revolves around the passage of information, and while this is a crucial and significant role, it does not give much opportunity for decision making or actual responsibility for any specific area. This can prove frustrating, with seemingly the "real work" of the group not really within the scope of the watchkeeper duties. While this is inevitable this is unfortunately amplified at an operational level HQ.

On the positive side it is an excellent exposure for a young officer to experience. To see the joint force concept in operation, to see the full range of British involvement in the campaign and to work with people operating at the highest level allows a detail of understanding that can't help but benefit all the individuals exposed to it. For me it was an excellent experience, and in some way the desire to be more involved at a practical level were fulfilled by the opportunity to move forward into a separate role within Basrah, where I write this from now!

The Use of the TA in Op *Telic*

Not all experiences of TA soldiers mobilized for this campaign will have been the same, and the

effectiveness of them to fulfil the role for which they were mobilized will vary as much. There are clearly some notable successes with soldiers that have been mobilized as a unit, with the example of the TA troop who were involved with first use of M3 rigs in a wartime situation comes immediately to mind. Equally I know of individuals integrated to formed units as individuals who have been able to prove vital assets to the units due to their broader knowledge and experience.

Ultimately this leads to the interesting question of whether TA soldiers are best mobilized as individuals or as units – and perhaps whether consideration of this should be given in the training. The TA units I have served with have tended to train with the mentality that we would be mobilized as a unit rather than individuals and hence be able to work together as such. In some ways this may be where the initial surprise of people within the unit being mobilized stemmed from. One of the concerns with the use of TA is perhaps that the individual TA soldier is either lacking in the depth of military experience compared to their regular counterpart or maybe the possibility of skill fade within what they do have training and experience of. Within the Sappers the breadth and depth of possible tasks and necessary skills makes this more significant. On the reverse the TA soldiers are likely to bring a very different type of experience, which if properly harnessed can add real value. For these reasons it would seem sensible to integrate individuals rather than units, in order to "dilute" the inexperience and "spread round" the broader knowledge.

However, TA units that are mobilized as such are potentially capable of lot more than people may give them credit for, not least due to the mentality of the TA soldier that needs to be experienced rather than described. This helps the units make the most of the strengths of the soldiers, in terms of the broad range of skills and abilities, and effectively overcome any weaknesses that may result from limited time to train and gain experience within the purely military environment. For my own role as a watchkeeper it was much easier to integrate as a TA soldier as the specific responsibilities and requirements could quickly be learnt, and to my knowledge there is no formal training for the role of watchkeeper whether Regular or TA. The ultimate question to ask of the TA is what it is designed to achieve and in what way it is most effective at serving the Regular army. From this the required training for the TA will naturally fall out. Again, my own experiences of the operation aren't sufficient to assess this, but personally I have confidence in the existing training structure – the only question is whether this needs to be tailored for likely future roles.

The Future of the TA

In my opinion, strange as it may sound, the TA is about a lot more than simply supporting the regular army. Obviously it is one of the key purposes, but the TA also tries to be focused on the local community and is hopefully a vital, integrated part of it. I realise that restructuring of the armed forces within, most recently, the Strategic Defence Review, set out to make the TA a much more usable force to directly support the Regular Army, and hopefully this mobilization has served to prove its capability to do just that.

However, much work still needs to be done to develop the TA into a force capable of repeatedly doing this. Currently it is, as a whole, a force that is willing to be mobilized when there are extreme events or conflicts that need to be fought – it is recognised that to maintain a regular force that is capable of dealing with these all the time would be inefficient. The notable thing here is that generally the individual soldier is more than happy to accept this, but it is their employer and their families that struggle to accept that they may be taken away on a regular basis. The issue with the employers is perhaps one of the most crucial, and while there does exist legislation to prevent the employers unfairly disadvantaging people because of their TA commitments, it is perhaps worth considering how to actively encourage companies to employ members of the reserve forces. One option used in the US is to offer tax breaks to companies if they have a certain percentage of reservists in their employment.

For my own sake I hope this mobilization will serve to strengthen the TA, though many challenges undoubtedly lie ahead. For some people the fact that they might actually be called up will make them reconsider their commitment. Additionally, for those that have been mobilized, many may decide that they've now done their bit, and they've achieved what they set out to do. For those that were mobilized and then either failed to make it through the system, or were turned back at a late stage when the roles they were mobilized for had already been filled, there

may be a feeling of frustration. In all these cases the emotional strain from families may be an overriding factor. There may also be others disheartened that they weren't called upon. And for those that remain at the TA units during this campaign there may have been limited training with both stores and instructors unavailable. For all these reasons retention will be a challenge. Although some may argue that this will clear out some of the "dead wood", it should be recognised that not all of a unit will ever be available for mobilization, and that units rely on certain such people to allow them to function effectively in peace time, even if not available in war.However, I'm confident that training will have continued and the reality of the role the TA now has to play will have ensured that this is as professional as ever. I'm sure both recruitment and retention will be buzzwords flying around all the units and much effort will being put into using these events to build the TA into an even stronger and more effective force than ever. This is of course assuming they've noticed that we've left and that things aren't simply carrying on as normal! In many ways I hope the latter is the case.

Conclusions

As I said, I can't attempt to describe more than my own experience and interpretation of it all, or perhaps those of friends around me who have also gone through the experience. I also recognise that some of the difficulties are as much an issue for a regular counterparts and in many ways they are an unavoidable part of the package.

However, what is certain is that I have already gained a lot from the experience and hope to continue to gain from it. In many ways I am already looking forward to returning to the TA and using this experience to help develop my troop and make them as effective as possible – preparing them for whatever it may be we are called upon to do in the future.

Concluding Remarks

COLONEL N M FAIRCLOUGH OBE BA CGIA

I feel enormously privileged to have had the opportunity to be the Joint Force Engr for Op Telic. Our soldiers and officers achieved incredible success. Had we not lost three soldiers from the engineer group as a whole, two Royal Engineers and one Royal Logistics Corps, there would be little to undermine our satisfaction at the Corps' collective contribution to the operation. I believe that we can be justifiably proud of our part in Op *Telic* but I hope that we have the sense and humility to acknowledge where we can improve and that we make the effort to do so in the years ahead. We cannot rest on our laurels, or stand-still, and the articles in this series and the lessons identified in the post operational report record where we should concentrate our effort.

I hope that readers reading this section have read the complete series of articles by the other members of the Op *Telic* engineer community; if not, promise yourself to do so in the near future, or now! It is a unique record. I will conclude the series with some personal thoughts for the future, what I see as Corps vital ground and key terrain and, finally, some words of thanks.

Some thoughts for the Future

On Op *Telic*, Civil Military Affairs (CIMIC) were identified very early on as a key activity in the transition from war fighting operations to the rebuilding of Iraq. The Corps is uniquely placed to influence and shape CIMIC activities but on this operation I feel that we failed to take the lead we could and, perhaps should, have taken. We had little residual capability to take on significant CIMIC projects, indeed it was the UK stated intent to encourage the Iraqi people to help themselves. However, by not providing the intellectual leadership of which we are capable, too many opportunities were lost. 64 (CRE) Wks did fabulous work on Iraqi utilities but due to the lack of technical competence and staffing capacity within the divisional CIMIC organisation, and in some of the NGOs, an opportunity was missed to "manage" the situation in accordance with an established plan. We were generally too reactive, rather than pro-active, and we were shy of taking on responsibility. We did this consciously because we knew we could be sucked into a bottomless pit of requirement as Iraq has suffered from many years of under investment in

its' infrastructure. But few people are as well placed as the Corps to establish what is technically feasible, to identify where the greatest impact can be made with minimum effort or to understand the resource and time implications of an activity. I believe, therefore, that we should examine what part we want to play in CIMIC and consciously engage in, or disengage from, this important area.

I also think that collectively we need to be more robust in providing the units and formations we support with what they "need" rather than let them dictate what they "want". Similarly, we must invest in "expectation management"; unrealistic expectations should be confronted head-on as time and resources are almost always in too short supply to allow the ideal solution. We should not be apologetic about this; it is not our choice but a fact of the situation in which we have to operate. Finally, in the absence of direction we must have the confidence to take the initiative and get ahead of the command and staff decision making process if it threatens our operational success. Establishing closer training and exercise relations with potential deployable force headquarters would be a useful first step.

Vital Ground and Key Terrain

From the lessons of Op *Telic*, and I believe from all the operations of the last few years at least, the Corps vital ground is the dual trade sapper soldier. Iain James, Peter Davies and Tony Carruth feel the same. There should be no doubt that the collective performance of our combat engineers/tradesmen is what ensures our success on operations. We must safeguard our dual trading at almost any cost.

Our collective training is our key terrain; it is the "means" by which we develop the kind of flexibility we demonstrate on almost every operation. We should look again at what we do on our overseas exercises, and perhaps some changes would be justified, but they are too important to be lost.

Appreciation

Each and every member of the J F Engr staff has personal words of thanks for many people who supported the operation. I promised to acknowledge our collective appreciation in my article so most of the JF Engr staff have not listed those who they feel deserve mention in their own submissions. We all feel that Op *Tel*ic was a Royal Engineer "family" effort, with family defined in the widest sense: HQ EinQ(A), HQRE Th Tps, BEW/MITC, ESS IPT, E&LSC, ERMC at SCOC and many others.

On behalf of all the members of the JF Engr staff, thank you.

Somewhere Between a Rock Drill and a Hard Place; General Support Engineering During Operation Telic 1

LIEUTENANT COLONEL D C HUDSON MBE

Lieutenant Colonel David Hudson MBE RE was commissioned into the Corps in December 1982. He served with 24 Field Squadron as a troop commander and 9 Parachute Squadron as both troop commander and second in command before working as SO3 Engr Ops at HQ LAND. He commanded 9 Parachute Squadron on operations in Northern Ireland and took them on an airborne exercise in USA and a construction exercise in Kenya. He worked as an SO2 operations and plans officer in MOD before completing an MDA with Cranfield University at Shrivenham. After a tour with the Joint Force Headquarters as SO1 Operations Support he commanded 36 Engineer Regiment on Operation Telic 1.

36 ENGINEER Regiment loaded ships for Operation *Telic 1* forty hours after being warned for deployment. Over the Christmas period, the Regiment had been removed from the Force Equipment Table (FET).

Lesson 1. *The NTM system and orders process was ineffective.*

The operational focus for the Regiment for the four months prior to Christmas was desert operations in Iraq. We conducted an estimate without direction and identified several battle winning items, which we submitted as UORs. Five months into the tour, none of them had arrived.

Lesson 2. *Go with what you've got.*

We stayed ahead of the game as key enablers to JFLogC due to a joint recce party comprising CO 64 CRE Works, CO 36 Engineer Regiment and OC 70 Gurkha Field Support Squadron.

Lesson 3. *Joint recce, as in design, resource, construct, is essential for major enabling and infrastructure operations.*

We received few orders throughout the operation, and no orders for the warfighting phase.

Lesson 4. *An ad hoc HQRE staff needs to be properly trained to provide the commander's direction in the most appropriate operational staff format, and engineer command and control needs to be completely clear. Moreover, the SO2 Engr on the Log Bde HQ must be staff trained and ideally post-Fd Sp Sqn comd.*

70 Gurkha Field Support Squadron were very nearly caught out by the masses of un-manifested engineer resources that flooded into theatre. Asset visibility and asset tracking failed and this was compounded by the lack of strategic communications.

Lesson 5. *Heavily cadreised Field Support Squadrons do not work. They must be fully manned and equipped with appropriate strategic communications.*

We relied heavily on contractor plant for the majority of the operation; if it has not been available we would have been badly caught out.

Lesson 6. *The plant capability of a General Support Engineer Regiment needs reviewing, especially in terms of heavy plant.*

Engineer intelligence was virtually non-existent and the bearers to transmit it do not exist down to unit, let along sub unit level; there was no collection plan either. Formation recce was equipped for the last Gulf War and needs re-equipping and retraining if it is not to be killed early on the battlefield. We were extremely lucky not to lose anybody this time.

Lesson 7. *We need as a Corps to rethink engineer intelligence and we need to review the whole formation recce concept.*

These are important lessons identified at Unit level and are based on our perception of what was happening around us; as well as above us in the chain of command. They are not criticisms of individuals but observations that I feel should be addressed. Although we won the war and the engineer support piece went well, I feel that there are certainly some areas for improvement. I sense that we need to go back to basics as a result of this operation and make some fundamental improvements to the way in which we do business as a Corps on deployed operations; there is still considerable scope for improving the way that we integrate as a corps on Joint operations. We need to review the way we plan, direct, equip, train, deploy, command, control and operate. Although the operation as a whole is regarded as a success, I saw a lot of things go wrong. I believe that the Joint Engineer approach is the right one but we need to define more clearly what it means and practice more regularly, at the right levels and in the appropriate forums, to inform and educate the other arms and services how we can contribute to the overall campaign.

I would like to finish my introduction by praising the performance and determination of the soldiers and the leadership and drive from my commanders at all levels.

This conflict showed again that our people are our greatest asset and we must continue to look after them properly. I will leave the Regiment's story to my Squadron commanders who all performed admirably; their recollections make interesting reading.

"In Through the Out Door"

GS ENGINEER SUPPORT TO THE JOINT FORCE LOGISTIC COMPONENT

MAJOR S P F HARRIS MA PGCE

"Throughout the Struggle, it was in his logistic inability to maintain his armies in the field that the enemy's fatal weakness lay. Courage his forces had in full measure, but courage was not enough. Reinforcements failed to arrive, weapons, ammunition and food alike ran short and the dearth of fuel caused their powers of tactical mobility to dwindle to vanishing point. In the last stages of the campaign they could do little more than wait for the allied advance to sweep over them".

INTRODUCTION

THE importance of successful and efficient logistics to a campaign cannot be understated. However, in order for the logistic component to be able to support the force, there is a large engineering bill that must first be paid. Engineering in its simplest form is the provision of mobility, counter-mobility, survivability and sustainability. At its most complex it governs the art of the feasible across the entire spectrum of operations.

On the 26 January 2003, the lead elements of 69 Gurkha Field Squadron (The Queen's Gurkha Engineers) arrived in Kuwait. They were collocated with the HQJFLogC in Arafjan awaiting the arrival of the main body. Early briefings from the commander emphasised the importance of the Reception, Staging and Onward Movement (RSOM) phases of the operation and the imperative attached to a smooth and rapid inload of British Forces into theatre. The Squadron and, more importantly elements of the Squadron Headquarters, had practised the process of RSOM over Ex *Log Viper 02* where we and other sub-units of the Regiment provided engineer support to 101 Logistic Brigade. This awareness of the likely engineer tasks that we would be required to undertake allowed us to prepare and train in the United Kingdom over the Christmas period; a policy that later on was to pay dividends.

The Operational Level Plan for Op *Telic* was sub-divided into four phases: the Enabling Phase; the Shaping Phase; the Contact Battle and Post-Conflict Operations. As regards JFLogC support to the operation, the RSOM Process was superimposed over the four phases. Often, each logistic brigade function carried on throughout the war (irrespective of the operational level phase) with the constant infill of troops, continual staging of Battlegroups and a seemingly never-ending

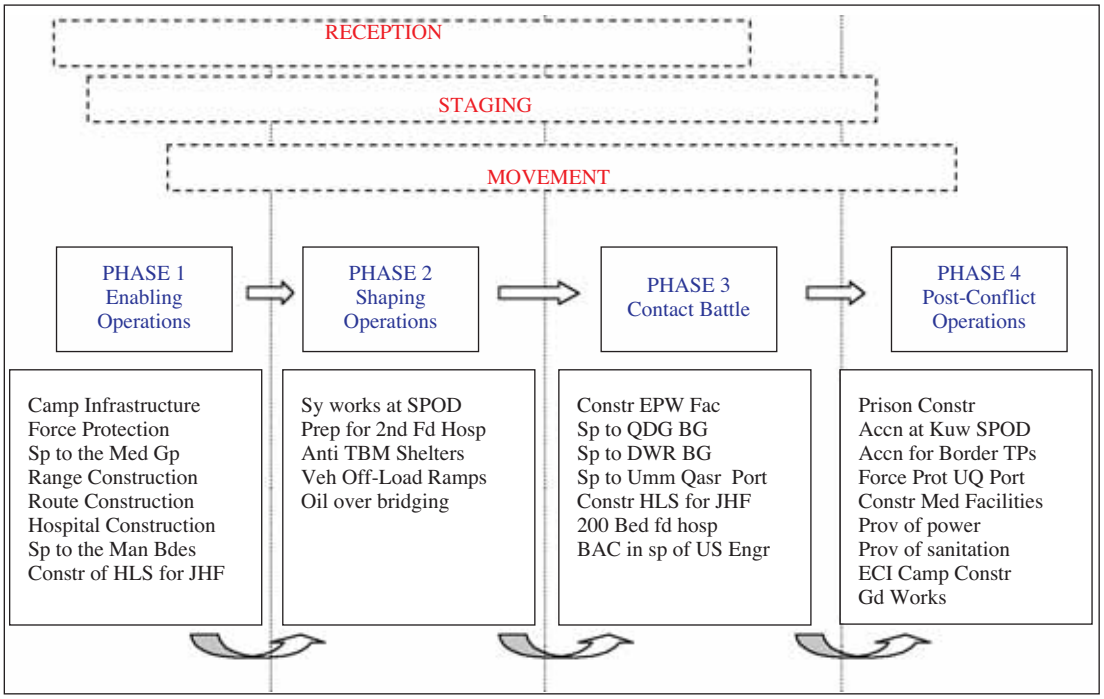


Table 1 – 69 Gurkha Fd Sqn (QGE) - GS Engr Sp to the JFLogC.

requirement to move personnel and equipment across the battlefield. The Squadron reflected the logistic brigade's work programme and as a result was tasked to provide GS support whichever of the four phases the force were involved in.

Table 1 illustrates the melding of boundaries as regards the Squadron engineer effort. The four phases of the operational plan were supported by the RSOM process, which functioned throughout the war. In turn the engineer effort continued throughout the war with little direct relevance between the phase of the war and the type of engineering being produced.

Camp construction, provision of power and force protection occurred in all four phases. It is important to realise that clear and precise phasing of engineer effort is often not applicable and whilst locations and tactical situations might change, the type of engineering produced transcends the artificial timelines set by higher command.

Phase One – Enabling Operations

We arrived in Kuwait in the first week of February and in accordance with the Commanding Officer's direction, immediately deployed into the desert thereby avoiding the somewhat artificial and sanitized environment of Camp Arafjan. The policy of immediate deployment also allowed us to maintain the mental robustness that the Pre-Deployment training had imbued. We married up with the vehicle fleet and moved north to Concentration Area (CA) RIPPER where our first task was the construction of a 500-man camp for 36 Regiment to move into. With a deadline of 48 hours the task of preparing the ground works, flooring, track plan and the erection of 12 large tents including ablutions and lighting was met in full and we were joined by the Regiment (and our lodger unit, 4(GS) Medical Squadron), in good order.

For the early part of the RSOM process, 69 Gurkha Fd Sqn (QGE) was designated the Enabling Squadron for the JFLogC. As a result, we met the majority of the camp infrastructure tasks for the Division (See Figure 1 for locations). As the Regulating Area Headquarters in CA RIPPER struggled to meet the infill of 16 Air Assault Brigade units, we built six 1,000 man camps in a 72 hour period. We were still attempting to acclimatise ourselves and adjust to the desert environment and at the same time to deal with the spoiling attempts of the elements. As fate would dictate, the first three weeks of

February saw Kuwait battered by the strongest sand storms in thirty years. With only some of the Squadron scaled for eye goggles and still dressed in temperate combat dress, the Sapper mantra of "Adapt, Improvise and Overcome" was tested to the full as the CA EAGLE rose from the desert sands only hours ahead of the incoming Battlegroups. It proved to be a busy first week in theatre.

Phase Two – Shaping Operations

The Staging Phase (which ran concurrently with the operational level shaping operations phase) of the operation saw the incoming formations move from the APOD and SPOD out into the forward desert positions. With the Division's Battlegroups moving into CA RIPPER, We began to receive more substantial tasks from the HQJFLogC. The provision of an initial 25 Bed Hospital facility was met within 48 hours of our arrival in HAMMERSMITH. Following this, the requirement for an enhanced 200-Bed facility was identified by the Division and built by 1 Troop over a nine day period. The facility boasted full air conditioning, wooden flooring running water throughout, medical waste disposal through the provision of sluices and a grey water separator, which disposed of water through a developed leech field. At the time of construction, this hospital was amongst the most advanced ever built in the field by a Military Construction Force.

The preparatory work carried out in the UK had prepared the planning team well. Ex *LOG VIPER* had offered an insight into the level of engineer support required by the Medical Group and whilst we had not been formally warned of the likely hospital build, the study and practical exposure to the mechanical components of the hospital kept surprises to a minimum during its construction.

The construction of CA RIPPER allowed the incoming Battlegroups to focus on preparing for the imminent ground operations in Iraq. The construction of a 50-lane No Danger Area Range met this requirement in part. Over a 6-day period, some 6400 cubic metres of spoil was used to create a range suitable for the check firing of the Division's individual and support weapons. The range butts, wing walls and targetry were locally manufactured by the our tradesmen using timber and Texas barriers originally sourced for camp force protection.

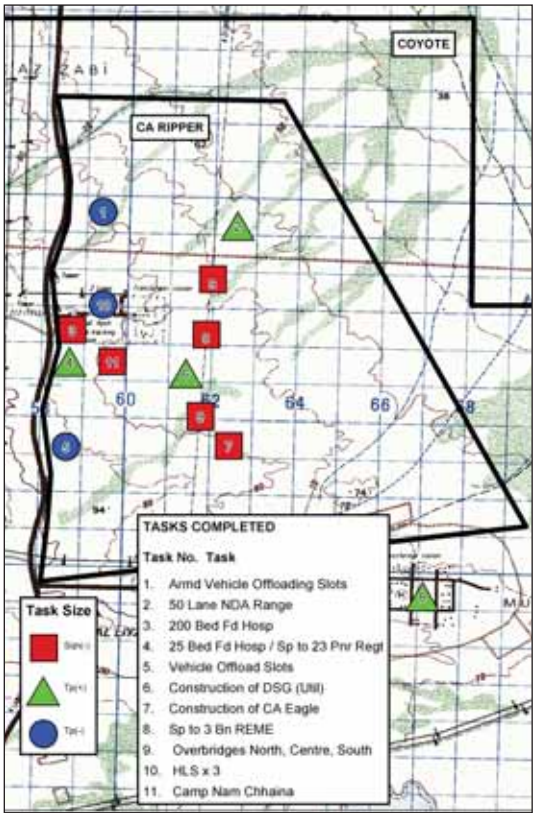


Figure 1 – 69 Gurkha Fd Sqn – Tasks in Phase 1 and 2

Concurrent to this task was the construction of the Hammersmith Route Matrix that would allow the low-mobility RLC and civilian transport to gain access to the Division's harbour areas. Over a three week period, we produced some 10km of graded route and 20 km of bund for force protection.

In terms of Command and Control, the Regimental Headquarters (who in turn received tasking requests from two superior headquarters concurrently), tasked us. The HQJFLogC was clearly the command headquarters for the Regiment and subsequently us. In addition, much of the early works were enabling tasks initiated by the Regulating Area Headquarters. The construction of the sangar for the Force Gas Reserve; the construction of vehicle off-loading ramps; over-bridging the Kuwait-Iraq oil pipelines; infrastructure works on the Force mortuary facility; Helicopter Landing Sites; Theatre Ballistic Missile (TBM) Shelters and GS engineering in support of individual Battlegroups meant a punishing itinerary on a

daily basis as the Division configures itself for the commencement of ground operations.

Phase 3 – The Contact Battle

The much-heralded arrival of G-Day (Ground Day) saw the Squadron move across the border and begin the construction of the (Theatre) Enemy Prisoner of War Handling Organisation in Umm Qasr (see Figure 2 for task locations in this phase). The facility was to be commanded by the QDG Battlegroup with the DWR Battlegroup providing force protection. Both BGs required to be bedded in with the bare essentials. In engineering terms this involved the provision of power, lighting, sanitation, bunding, force protection tasks, a route matrix for the headquarters, accommodation and the A2 echelon and the refurbishment of the Operations Room. Such support however was subordinate to the construction of cages for a 7500 EPW population. The cages were to meet International Committee for the Red Cross (ICRC) standards of care and to include: sanitation, tentage, water (showers) and security fencing and ditching to detain the prison population. The ground produced its own problems with deep loose sand affording little lateral restraint for the pickets and the wiring. In addition, the severe storms that swept through southern Iraq over the 21/22 March accentuated the problems of anchoring the tentage. The prisoner cages each contained two 250 man tents, which doubled up as extremely large parachutes once filled with hot air. The storms devastated much of the region and inflicted some damage on the camp; fortunately the sandbagging and storm lashings offered some resistance and the EPW population continued to enjoy overhead cover throughout the storms and ongoing camp build.

The early days of the ground war also saw the Squadron build its second 200-man enhanced Field Hospital in Shuaiba (just south-west of Al Basrah) and enable the opening of Umm Qasr Port which served as the sole point of entry into Iraq and the Squadron was subjected to regular mortar and RPG attacks whilst constructing the camp. On the 22 March a massive explosion rocked the site. An Iraqi Seersucker missile had impacted on the western berm of the camp and this precipitated an attempt at a mass breakout. The prison population was contained and the camp finally completed, much to the relief of an

Figure 2 – 69 Gurkha Fd Sqn – Tasks in Phase 3 and 4.

exhausted work force who, to a man, had suffered the ignominy of gastro-enteritis without the luxury of toilets or ablutions.

Phase Four – Post Conflict Operations

As the Division moved into Phase 4, 69 Gurkha Fd Sqn continued as the sole GS Fd Sqn in support of the Brigade. Post-conflict tasks included:

- The refurbishment of a gutted port building, which would subsequently house the National Support Element Headquarters.
- A similar project to provide medical support for the Umm Qasr Area of Operations.
- Force Protection for the Port Area (which is roughly the size of Southampton).
- Protection of 102 Logistic Brigade Headquarters.
- The construction of three 25 man camps at the border crossing points.
- The construction of a 150-man camp at the Kuwaiti SPOD at Shwaik.
- Construction of the Force Wash Down Point.
- Construction of a 50-man camp at the EPWHO camp in support of the British Guard Force.

In addition, we had received a warning order for the construction of the Force UOR Hospital build at Shuaiba and the refurbishment of the Basrah Prison. This GS engineer work was to take us up to our departure date from theatre and allow the roulement force (Op *Telic 2*) a more civilised infill during the stifling summer months.

The tasks did not stop at this point because the manoeuvre formations regularly requested our support as the recovery of units began in earnest. The CA EAGLE camps that had been built back in January and February now required re-conditioning as they had either been ravaged by the local Bedouin population or by the harsh Kuwaiti climate. Power, ablutions and tentage were once again required in large quantities. The plumbers and electricians worked around the clock to meet the deadlines set by the Division. Firstly, 3 Commando Brigade would transit through CA EAGLE as they awaited their air transport back to the UK. Thereafter, 16 Air Assault Brigade would recover likewise and then the infill Battlegroups of 19 Brigade would use the CAs EAGLE and RIPPER for their final preparatory training before undertaking Op *Telic 2*. Post-Conflict operations could easily have involved support to the civilian infrastructure. The Squadron had prepared itself for the distribution of Humanitarian Aid; the provision of power to the civilian community, the clearance of obstacles, route construction and the production of potable water from any given source. Instead, the main effort continued to be in support to British Forces in Iraq In order to prepare the theatre for follow-on British Forces, we were tasked with the re-build and refurbishment of the Iraqi infrastructure that would subsequently serve as the core utilities for Op *Telic 2* and any other follow on operations.

Summary

As the GS Engineer Squadron supporting 102 and subsequently 101 Logistic Brigades, our role was one of constant enabling function. Prior to Ex LOG VIPER 02, dedicated engineer support to the logistic brigades had been questionable in terms of utility. As the brigades have their own indigenous pioneer support, the provision of an engineer squadron or regiment was deemed surplus to routine requirements.

This view may have held in the benign environment of Western Europe but in the hostile environment of Kuwait and the ravaged landscape of Iraq, the utility of the GS engineer squadron in support of the logistic effort was proven beyond doubt. For the Squadron, engineer support to the deployed Force was seamless. It did not follow the regiment of the RSOM process or even the four phases of the Operational Plan. Instead, tasks were undertaken which facilitated the successful execution of the JFLogC remit but in themselves continued irrespective of the Phase of War.

69 Gurkha Field Squadron (QGE) were employed in theatre as the JFLogC Enabling squadron from 28 January to 17 July 2003. In that time they undertook 21 major projects and 31 minor projects The Squadron provided the JFLogC with its own indigenous engineer support to use as required, in any sapper role and, in any of the four phases of Op *Telic* and the RSOM Process. The Squadron returned to Maidstone having contributed in full to the operational effort and having proven its utility within the logistic brigade ORBAT.

20 Field Squadron RE Engineer Tasks on Operation Telic 1

MAJOR R WARDLAW BEng

Introduction

WORKING out of my "new" but hopefully temporary office on SHAIBA airfield, SW of AL BASRAH in southern Iraq, while contemplating an early return to the UK, I thought it timely to record my experiences of squadron command over the last three months. The purpose of my writing is to try and capture the highlights of the command of a General Support Squadron in the preparation for and execution of the recent was fighting operations. I will also use the opportunity to identify some of the challenges we faced which we could be better prepared for next time. The specific operations I shall comment on are the missions to: Establish a Forward Ammunition and Refuelling Point (FARP); construct a 200 bed Role 3 Field Hospital and the reconnaissance to enable the re-establishment of the British Embassy in Baghdad.

Joint and Combined Rockdrill at Squadron level.

The Safwan FARP

As I sat in my shell scrape, in our "attack position" on the south side of the Kuwait Iraq border, some 6 hrs before H Hr, I reflected on the previous four weeks. On a cool evening in mid February, the CO had called me in to let me know that my Squadron would provide the engineer support to enable the construction of a coalition FARP near the border town of SAFWAN in the early hours of the war. He added that I would be supported by assets from the Joint Force EOD Group and would be working for the Joint Helicopter Force. The following day, I attended the first, of what would be many, planning meetings. It was a pleasant surprise to find that the Commander of the operation, Wing Commander Mark Driver, was a good acquaintance from a tour of the Falklands, five years previously. It was only later that I would realize the importance of that friendship. The three weeks which followed were probably the busiest, most tiring but satisfying of my life. The mission in simple terms was to establish a FARP for both US and UK helicopter operations on or in the near vicinity of the existing airstrip of SAFWAN, some 5km north of the Kuwait Iraq border. The US were keen to have an initial operating capability established as soon as possible, perhaps as early as H+10 to H+14. The main RAF elements of the UK grouping consisted of 51 Sqn from the RAF Regiment to provide Force Protection and the Tactical Support Wing (TSW) to provide fuel and life support. In addition to 20 Fd Sqn, I had attached an armoured EOD team from 5121 RAF Sqn, a pair of Aardvarks and subsequently a plant team from 39 Engineer Regiment. The operation was to be mounted in

Clearing SAFWAN Airstrip.

conjunction with an equivalent team from our US allies, namely 272 Marine Wing Support Squadron (MWSS).

We trained for the worst, what I called "the right of arc". Satellite imagery and Predator UAV over flights showed that the 3000m airstrip had been denied to air operations using a series of equidistant earth bunds interspersed with abandoned vehicles and plant. What we couldn't ascertain was the presence of mines but putting myself in the enemy's position we had to assume that the bunds were mined and the vehicles rigged with IEDs; after all, was this not what had been found in Afghanistan? And what about the hard shoulders and the access tracks – again intelligence drew a blank. Speed as ever was critical but how could you prove the bunds quickly without unacceptable risk to the equipment and operator even when we secured the use of that monster of the plant world – the Armoured Heavy Wheel Tractor. The solution came from a casual remark by our new Regimental 2IC – Major Doug Wren – recently transferred from the Australian Army, who mentioned seeing chains being pulled through forest undergrowth for the same purpose. But chains through sand? Several trials later and we had confirmed that "chaining" worked.

Returning to my shell scrape. The day had gone well, the move up from the south a success and we had now made the rendezvous with the US engineers and were waiting for H Hr to be called. The previous night had seen the pre-emptive strike on Saddam. We were sure tonight was the night. The guns were the first to confirm it was. The plan was for 51 Sqn to conduct a Relief in Place around H+6 to H+8, with Sqn TAC and a field troop (-) plus plant crossing thereafter. The remainder of the engineer grouping including another troop would move via the MSR, 15km to the East, and join us hopefully as early as H+15. As first light (H Hr) broke we waited eagerly for the call forward. However, it was to be another frustrating 24 hrs before we finally moved as the US forces encountered stiff resistance in this central sector of their push north. When we arrived on the airstrip the chaining quickly revealed that the soil bunds were free of mines and the abandoned cars free of IEDs. Relief was quickly followed by an almost palpable sense of disappointment – this was too easy! The team worked quickly, the HWT (A) s and CETs brushing aside the soil with ease and within 8 hrs we had cleared 3000m of airstrip and constructed the first fuel bunds. An IOC was declared at H+32, with FOC coming at H+48. Given the 24 hr delay, a cracking achievement paying testament to the many hours of planning and rehearsals.

A great deal is talked about "joint operations" and in my experience there is no doubt that at formation level we are far more integrated than we ever have been. But when you are on the coalface at the tactical level, working in such an environment presented many more challenges than I had anticipated. There are three I would like to share with you. Firstly, language. And I don't just mean the use or pronunciation of words but also the way in which orders, wishes and thoughts are expressed is very different between us and our American colleagues and yes, between Services. Where the Americans see

Chaining - Proving the technique worked.

Fuel Bunds complete by last light.

US helicopters arrive at SAFWAN.

black and white, the British see shades of grey. Why use one abbreviation when the Americans use three. And finally, in the field don't assume that the straight, direct and perhaps abrupt approach we are used to in the Army is the way to talk to those who don't share your peculiar brand of military culture! Secondly, command. Changes in command relationships are well understood in the strictest sense; who gives the orders and what they can tell you to do but what seems to be less clearly understood is the responsibility that goes with that command for equipment and life support. Worse still, for the SAFWAN FARP the command status between the UK and the US forces was never defined; it was a collaboration of the willing, which worked surprisingly well as long as our tactical objectives remained co-incident. There is a further, subtler, but acutely important aspect to command and that is the practice of Mission Command. I remember on JDSC, a well known General commenting on operations in Kosovo, that it was only the British Army officer amongst his Coalition allies who, in his opinion, came close to understanding and exercising mission command. On the SAFWAN FARP the contrast in the exercising of Mission Command between allies and Services was clear as it was different. Working in such an environment creates tension and can lead to disappointment from both perspectives. Why wait for further orders when you know the commander's intent – can be viewed from another perspective as reckless and hurried decision-making. Earlier I mentioned the importance of friendship with Wg Cdr Driver – the trust and familiarity which came out of that friendship played a key part in the success of Mission command, especially when the opportunities to train together had been limited, but that was lucky. Finally, tactics and SOPs. Probably the greatest source of tension to the men on the ground, but one that can be avoided provided it is addressed early and thoroughly. `Train hard, fight easy' holds true, but remember to train using the basic tactics and SOPs of the formation you will be working with. We tackled this problem through Mission Rehearsals and when given free reign and some time, what a mission rehearsal area a Royal Engineer WO2 SSM can create! And don't forget that in a flat desert your friendly Geo Sqn can overlay the mission area on to the maps of your training

34 Fd Hospital – a typical ward.

34 Fd Hospital on SHAIBA airfield.

area. Realism and similarity are critical and we had bags of it.

34 Field Hospital

We moved on from SAFWAN to another airfield, this time at SHAIBA, some 10km SW of AL BASRAH. It was here that a decision was finally taken to construct the first Role 3 field Hospital in Raw. I say "finally" as the recce was a story in itself and provides an observation on the decision making process at Formation level. The indecision that seemed to rack the chain of command appeared to be a symptom of "ownership" or lack of it. Was it Commander Medical's decision where to locate the hospital or G3 Ops within Div HQ? The answer was never clear but with recce "pull" much in evidence, SHAIBA it was. The design was for a 200 bed facility including a 500 man Expeditionary Camp Infrastructure. It was a Squadron task and the challenge was to complete the main build within nine days. Given that the first hospital built by the Regiment in Kuwait had taken 11 days the pressure was on. In electing to construct on a hard standing we knew we faced additional problems but on balance this proved to save considerable time. six days later, we completed both the hospital and the supporting camp as much to our own surprise as everyone else's. And here I must single out the attached STRE. WO1 Hastings from 528 STRE (Wks) and his team were magnificent and proved to my mind the value of a "works" grouping. Flexible, adaptable and exceptionally hardworking they took the design and made it suit the ground and the whims of the medics. Which leads me to my final observation. The medical world is laced with competing priorities and officers of senior rank who insist on getting involved on the ground – lets face it, when did you last see a Brigadier erecting tents? At SHAIBA there was more than one. Field Hospitals need to learn from the experiences in both Kuwait and Iraq to establish in peacetime the requirements of each department in war. The delays in construction caused through de-conflicting the requirements of each department could lead to unnecessary loss of life next time around.

The British Embassy Baghdad

20 Squadron's final outing was to lead the reconnaissance to determine the engineer assis-

tance required to establish an Initial Operating Capability for the Foreign and Commonwealth Office based on six containerised offices, placed within the existing British Embassy compound. Sounds simple enough except when you consider that the Embassy closed on 6 Jan 1991, was then finally abandoned in 1997 and latterly had been occupied by both Iraqi civilians and military personnel. Oh, and the Embassy was exactly 537 km from SHAIBA, in a part of Baghdad that was still considered to be semi-permissive. With the task coming directly from Division, I found myself working with another composite grouping: force protection provided by a platoon from 1 PARA; SATCOM signallers and a Field Security Team from 16 AA Bde; technical engineer assistance from 64 CRE; EOD advice from JFEOD and a High Risk Search Team from my own Squadron. The recce team was split into an Advance and Main Body, thus permitting the advance element some time

on the ground with UKSF assistance. This was fortuitous. A 150m stretch of the compound wall no longer provided the necessary Force Protection or cover from view to enable its security by the military guard force. By stalling the Main Body move by 24 hrs we were able to arrange for the required stores and additional manpower to move with it.

We entered the time capsule that was the chancery of the Embassy on 28 April 03. The ambassador's office was as it was left over 13 years ago; except perhaps for the deep layer of dust. A copy of the Baghdad Observer lay on his desk, dated 6th January 1991. Little did the hand which last turned those pages realize it would be another 13 years before the news of that day be of interest again. Certainly, the embassy staff seemed to have left in an orderly rush but not in such a way as if they did not expect to return. It was a privilege to be the first to do so. The Search Team cleared the grounds quickly, making their first find in the shape of a shallow grave and a putrid John Doe. The buildings were clear. The old caretaker showed up and was quick to let us know that despite not being paid for the last five years he had continued to look after the Embassy. Given the lack of looting, an activity they have developed to a fine art in this country, his story was plausible.

Cover from view screens in place, technical recce complete and a night in the compound under our belts, we packed up and returned the 9 hrs south. I had two observations on the previous four days: firstly, again an operation had been conducted were the command status was never made clear. The result was that the passage of information and reporting was confused; direct to 1 UK Div, through my RHQ or through 16 AA Bde pehaps? Despite pushing for clarity, we were again a coalition of the willing – this did cause confusion but we made it work because nothing went really wrong. But that's my point. Secondly, communications. We had SATCOM, but its utility only extends to those that can hear you. When we possess the means for force projection over great distances, were force packaging is essential, is it not about time that we spend the money at unit level to maintain this capability?

Conclusion

It has been a fabulous three months. We have worked exceptionally had, learnt a great deal and are justly proud of our achievements. But it has been a very different three months from the ones expected. In a war fought largely through the OSG, at arms length and using PGMs against an enemy who was wholly overwhelmed, the battlefield we inherited was perhaps less in need of sappers than any of us might have expected.

Thoughts on command, language, tactics/SOPs and communications have been my principle observations on the challenges of command in a joint and combined environment at the tactical level and hopefully provide some food for thought for next time. But I would not be doing the last three months justice if I didn't finish by exposing some myths: firstly, war stocks don't exist, or if they do someone has lost them; just in time is probably better understood as just too late.

Notice to Move is a cruel misuse of three simple words and a Priority 1 spares demand is guaranteed, for Christmas 2004 that is. Enduring truths are that your men will always make up for poor resources and orders and that RE JNCOs, as always, remain our vital ground.

The General Support Engineer Regiment Headquarter Squadron

MAJOR T F HENDERSON

As a teenager I had often walked past the Army Careers Information Office in my hometown of Kilmarnock on the West Coast of Scotland. In December 1974 a picture of soldiers building a bridge in some far-flung foreign country where the annual rainfall was substantially less than that of Scotland caught my eye. I wandered in for a closer look…..

Today I find myself many years later Commanding 50 Headquarters Squadron, part of 36 Engineer Regiment. The Sqn deployed to the Gulf in early February 2003 to play its part in operations against Iraq and participate in the largest deployment of British Forces since. In the period leading up to the Sqn's deployment we had completed a series of CPX, FTX, a large JFLogC exercise and now with

the operation all but behind us we are on the downhill leg of Operation *Telic*. Armed with this experience and some historical evidence from previous operations that the squadron has undertaken in Macedonia and Afghanistan, I will endeavour to make a case for the enhancement of the General Support Headquarters Squadron (GS HQ Sqn).

Let us firstly consider this; is the function of the GS HQ Sqn different to that of the Close Support Headquarters Squadron (CS HQ Sqn)? I am sure many would say no, others would argue that the functions are so similar that it does not warrant any change or recognition.

The point I would make is this, the functions of the CS and GS HQ Sqn's within 3rd (United Kingdom) Division are similar in so much as both provide first line support to their Regiments. In the case of 50 HQ Sqn and 36 Engineer Regiment it is provided at a Readiness State of R2-R5 and without the benefits of the usual cycle of a High Readiness Year, Training Year and Other Tasks year. The Regiment has undertaken three short notice deployments in recent years moving into theatre early with little external support in order to carry out enabling works in an expeditionary role. The lessons learnt from these deployments are echoed in the age-old cry, "we haven't got the equipment right and as a result the manpower needs amending too".

The Regiment's mission as laid down in the DEG PLAN for 2003 is as follows:

- 36 Engineer Regiment is to deliver forces at the stated readiness for war fighting operation in support of 3rd (United Kingdom) Division.
- Conduct expeditionary operations in support of a Logistic Brigade in the JRRF context.
- Be prepared to train for Divisional war fighting operations in support of the manoeuvre brigades and in the Divisional Rear Areas, the latter in support of 2 Infantry Brigade.
- On orders conduct specific operations worldwide, across the spectrum of conflict and in support of the civil authorities.
- Proactively seek to sustain the long-term health of the Regiment.

Officer Manning

The ramp up from PE to WE currently authorised by the AF C 7005 sees a reinforcement of one Captain. In the case of Op *Telic* this was essential to enable 24 hr manning of the SHQ by splitting shifts between the Sqn 2IC and the second Capt. On cessation of hostilities the Sqn 2IC assumed his normal duties and the second Capt switched roles to Sqn Ops Offr. This worked extremely well allowing great flexibility within the SHQ.

The argument for the provision of an Sqn Quartermaster for the GS HQ Sqn was reinforced again during Op *Telic* in a similar manner to previous deployments. The Technical Quartermaster is fully committed to G4 activities on behalf of the Regiment and has no spare capacity during operations to carry out any function on behalf of the HQ Sqn. In simplistic terms let us make an equipment comparison with the average Fd Sqn that is scaled for approximately 64 major and 47 minor equipments. 50 HQ Sqn has 86 major and 44 minor equipments. If we add in an equipment table of similar size (but inadequate for expeditionary tasks) for the GS HQ Sqn and then add the burden of some additional accounts and bits and pieces held centrally on behalf of the Regiment then the argument becomes stronger. Technical equipment holdings such as BR 90, ABLE, Plant Troop, Recce Troop and Shielder Detachment are at least on par, possibly requiring greater technical supervision than the Fd Sqn's holdings and you can see how the HQ Sqn starts to feel disadvantaged.

The Construction Supervision Cell sits comfortably within the HQ Sqn and is tasked in accordance with Regimental Priorities. The cell has been extremely busy in recent years and has deployed in part or whole to Belize, Macedonia, Gibraltar, Afghanistan, Mauritania, Kuwait and Iraq. The cell would greatly benefit from being headed by a GE because of the nature of the enabling and expeditionary work that the Regiment undertakes; there is a pressing need for design authority here.

Soldier Manning

Soldier manning is mainly linked to equipment shortages and where there is a recommendation for an increase in equipment holdings there is an obvious requirement to provide the operator. In addition to equipment there are some other soldier manning issues worthy of note:

- During recent deployments the Sqn has had difficulties in fielding its full compliment of Resources Specialists (Res Spec) because of medical down grading problems. Critical on any deployment this is a developing trend within the trade requiring close investigation. The corps will create its own problems for the future if it continues to re-trade soldiers with

medical problems into key posts when there is a high likelihood they will be unable to deploy.

- The posting out of soldiers with key qualifications and licences within the HQ Sqn has caused considerable difficulties in filling certain LSNs on operations. Predominantly shortfalls in ABLE, LETs and DROPS qualifications have been problematic. A policy of a like for like, one out one in, or a posting linked to a qualifying course would greatly ease this problem.
- During recent deployments to Afghanistan and the Gulf there has been an increased pressure on the Sqn to provide a basic trade capability. In Afghanistan this was achieved by a small group of QGE being attached to the Sqn and during Op Telic utilising the trades within Recce Tp and TA augmentees with civilian trades. Having a small, well-balanced section of tradesmen established in the GS HQ Sqn may seem excessive but there is a real requirement for them on operations.

EQUIPMENT

The current GS HQ Sqn equipment table is lacking in several areas when faced with deployments similar to Afghanistan and the Gulf, especially when deployed into theatre early and faced with little external support. A complete review of the UET is necessary to ensure the correct levels of equipment are available for expeditionary and enabling work.

Divisional Engineer formation Recce Tp also requires a complete review of its equipment, manning, how it operates and is qualified to conduct reconnaissance on the battlefield based upon its experiences in the Gulf. This will be the subject of a separate report.

The main area of concern lies with Combat Support Troops scaling of plant, prime movers, trailers and communications:

- Ground works for TDA Camps, BFIs, hospitals, security bunding, fortifications, route construction and MSR maintenance were all critical tasks assigned to the Sqn. the current scalings of two MWT, two FL12s with LWT and King Trailers, two MMG, two MWE and two LETs are not sufficient for these tasks. The GS HQ Sqn as a minimum must increase its LETs holding to three to allow freedom of movement for the Regiments equipment, there was never enough lift available (engineer plant does not fit on HETs) resulting in critical delays in getting equipment to the right place at the right time.
- The Sqn's two Graders worked extremely hard on route maintenance but had to be reinforced by two civilian contract teams consisting of four graders, two rollers and eight water bowsers.
  The lack of proper route maintenance equipment within the GS HQ Sqn has been raised on previous deployments. As a minimum the Sqn should be scaled for 3 x Graders, 1 x Medium Roller and a modified "Water Bean Can" for DROPS or an equivalent equipment.
- The current scaling of two MWE should be reduced to one and a MCT issued in its place. The MCT proved invaluable in ground clearance, stock piling, route cutting/alignment and security bunding.
- The GS HQ Sqn is scaled for four DROPS vehicles at PE and six at WE. The PE should be increased to six vehicles complete with trailers. This substantial lift capability has been the backbone in enabling stores, material and ISO containers to arrive where and when they are required.
- The WE scaling of a second crane and plant ancillaries 14t flatbed with cam arm should be established as PE.
- Recent operations have dictated vehicle movement restrictions numerically and with communications. Current scalings of FFR vehicles has made convoy escorting critical resulting in an increased requirement for FFR vehicles.
- The Regimental Diving Team Store was successfully fitted to an ISO container for Op *Telic* and this proved an ideal means of transporting and securing diving equipment. It is recommended that a side opening ISO should be permanently allocated to the diving team and brought on to the HQ Squadron equipment table.

Engineer Logistics in Support of the Joint Force Logistic Component (JFLOGC)

MAJOR R J ORR BEng Msc MIExpE

"An Engineer Squadron without resources is a Rifle company"…….Anon.

Mid afternoon on Wednesday 15 January 2003, during a football match and a Gurkha festival, 70 Gurkha Fd Sp Sqn was warned to deploy on Op *Telic* as part of possible operations in the Middle East. The Squadron was to be the 3rd Line Engineer Logistic Squadron for the Joint force, deploying at Unit Establishment (UE; in practice this meant "Best Effort" for manpower, and backfilling with equipment and vehicles from other units). 70 Gurkha Fd Sp Sqn was to deploy half its equipment, prepared and manifested for a sea move, to Marchwood Military Port (MMP) by 0700 hrs Friday 17 January, with the balance to be there 24 hours later. On Saturday 1 February half the manpower deployed to Kuwait, and the remainder followed on a week later.

Since its reformation three years earlier, 70 Gurkha Fd Sp Sqn's role had been to provide 2nd line engineer logistic support to a division; the squadron understood the principles of how a Joint Force Logistic component (JFLogC) worked, but the detail of how a 3rd line engineer logistic squadron would actually work within the Joint force, how the C2 relationships would develop and change (particularly as the operation proceeded), and how a squadron, deployed at 35 per cent of its sapper WFE would handle an engineer logistic task much larger than that of Op GRANBY and many operations before, was less clear.

The aim of this article is to describe how many of the challenges faced by 70 Gurkha Fd Sp Sqn were met and overcome during Op *Telic*, in order to inform the developing doctrine (being drafted by the author) for the delivery of 3rd line engineer logistic support to a Joint Force, based on first hand, practical experience in a demanding environment. It is unashamedly written from the perspective of the squadron on the ground, as this is after all where it ultimately comes together.

The outline of how Op *Telic* developed is well known, and it is safe to say that the work load of 70 Gurkha Fd Sp Sqn followed the well established curve of being very busy for the first eight weeks inloading checking and configuring, slightly less busy for the next three weeks during the height of the conflict and then very busy for the remaining 10 weeks as the squadron configured, checked and outloaded the materiel that was staying North into Iraq, and that returning to the UK South to the SPODs.

The first challenge facing 70 Gurkha Fd Sp Sqn was the location of the engineer resources park. This was dictated to the squadron, and was situated over 15km off metalled roads into the Kuwaiti desert. The location was 80 minutes travelling time from the APOD and the closest SPOD, and nearer 3 hrs convoy travelling time from the main SPOD. The environment provided major challenges for the squadron, its personnel, equipment, IT, and communications as well as the engineer resources and materiel. When the squadron first deployed temperatures were close to freezing at night, and by the time the squadron left it was 55^{O}C during the day, and close to 70^{O}C in the containers being packed. Sand storms were a regular feature, as were lightning storms. Rain featured heavily in the first three months, and the squadron even had a hail storm with stones at least an inch in diameter. The message was and is clear – a good location for a 3rd line engineer logistic squadron is

Part of the Engineer Resources Park at the end of a sand storm.

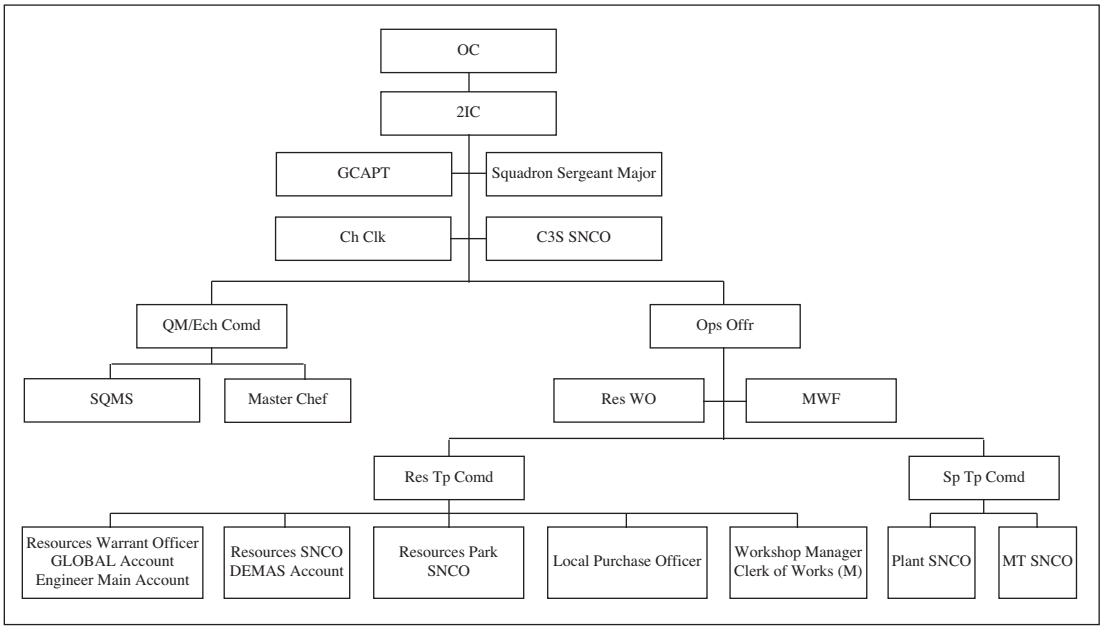


Figure 3 – 70 Gurkha Fd Sp Sqn Organization on Deployment (February 2003).

essential if it is to deliver the service demanded of it, and this location was not good.

It was obvious even before deployment that the 3rd line engineer logistic squadron task was huge; the largest outload of operational engineer resources and materiel since well before Op GRANBY. ECI alone consisted of over 1030 container (8 x 500 man camps, 1 x 125 man camp and 3 x UOR Field Hospitals) to be accounted for on a new IT system called Defence Multiple Accounting system (DEMAS) that very few Resources specialists had any experience with. Additional Resources specialists were bid for and allocated from across the corps, and training conducted. This brought the deployed resources specialists to something similar to WFE and was found to be both adequate and sustainable. In addition, an Ops Cell was established to act as the initial filter upward as well as the allocation of tasks downwards (see Figure 3). This worked well and shielded much of the squadron from many of the initial tasking difficulties encountered with poorly written Statements of Requirement and the desire of everyone wanting everything now.

It also became obvious that the peacetime organization that grouped the engineer workshops under the Resources Troop was too much for a single Troop Commander.

The provision of a suitable augmentee allowed the workshops to be split away for the Resources Troop and in mid March the structure of the Squadron was revised to that shown in Figure 4.

As the 3rd Line Engineer Logistic Squadron, 70 Gurkha Fd Sp Sqn was OPCON JFLogC for the

Approximately a quarter of the Engr Resource park.

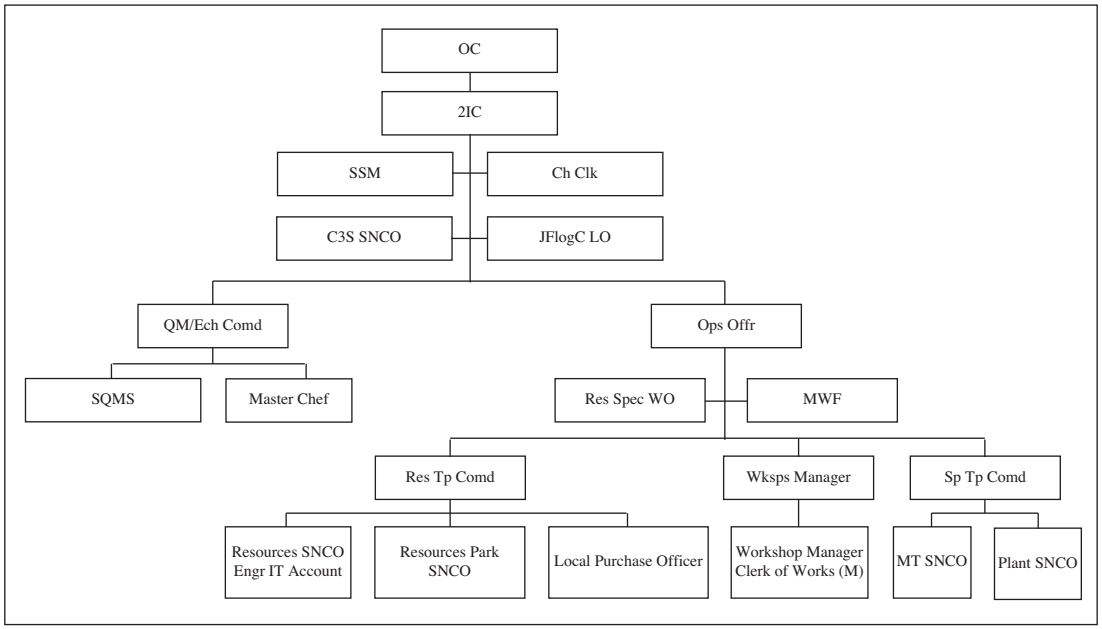


Figure 4 – 70 Gurkha Fd Sp Sqn QGE Organization on Post Resources/Workshops split (March 2003).

majority of the operation, and thus independent from the GS engineer regiment allocated to JFLogC. this is the correct command relationship as the squadron was required to support the entire engineer effort across all contingents and components, but does present one or two anomalies. As the 3rd line engineer logistic squadron, 70 Gurkha Fd Sp Sqn was holding 3rd line engineer materiel and resources on behalf of the Land contingent (LC; 1(UK) Armd Div), who naturally wanted those items delivered on demand. Thus HQ 1(UK)Armd Div would task 70 Gurkha Fd Sp Sqn direct for their materiel, even though the squadron was in a separate chain of command.

Another anomaly arose as 70 Gurkha Fd Sp Sqn had to provide more than just 3rd line support; it would also have to provide 2nd line engineer logistic support to the JFLogC engineer units. This it did throughout the time the JFLogC had engineer units under command. This is a role that 3rd line engineer logistic squadron will have in the future and the pressures to fulfil both tasks will require careful management by both the Joint Staffs and the Chain of Command, especially regarding manning and task priorities. Coupled with this, for the first five weeks the designated 2nd line engineer logistic squadron for the Land Contingent was not in theatre. Thus during this period 70 Gurkha Fd Sp Sqn was preparing for and inloading the theatre's allocation of engineer resources and materiel, providing 3rd line support to the Joint Force, and providing 2nd and 3rd line engineer logistic support to the Land Contingent (including planning and preparations to fulfil the 2nd line role in war if the coalition went in during the first two weeks of March; a distinct possibility). To top it off, for the first two weeks of the deployment the squadron also provided 1st line engineer logistic support until the JFLogC engineer HQ Sqn was established/ clearly this is neither ideal nor desirable for any unit, let alone one that deployed at 35 per cent of its sapper WFE.

The deployment of 70 Gurkha Fd Sp Sqn at UE (best effort) proved particularly difficult when the squadron was inloading ("Clear the SPOD") had been the order from Comd JFLogC), whilst trying to check, receipt, configure and outload at the same time. The squadron was reduced to simply ground dumping what was not immediately needed, fire fighting the priority requirements and checking the rest much later (often weeks later); there were a number of "discussions" as the squadron tried to provide units with what they required in the timeframe they wished (often very different from the possible, let alone practical time). Of course taskings and requests continued, and so

for most of this time the squadron was forced to adopt a reactive posture as opposed to the preferred proactive approach to engineer logistics.

Manning also proved a real challenge when preparing the resources and materiel that was staying in theatre as well as that which was returning to the UK. During this latter time both Plant Troop and the Engineer Workshops was closed down to redeploy the manpower on the Resources Park and assist with convoy escort duties, and the majority of the deployed TA/Reservist augmentees also worked on the park. This allowed the Resources Specialists to concentrate on the task of preparing the documentation.

The Inspector of Engineer Resources (IER) deployed a team out to theatre shortly after the squadron established itself. The team provided an advisory function and check to ensure that the procedures and practices being set up by 70 Gurkha Fd Sp Sqn would satisfy the requirements of the chain of command for the management, accounting and handling of engineer resources for Op *Telic*. The visit included JFLogC engineer logistic staff from the outset and it was found to be of great benefit to all, ensuring that everyone started from the same point with an agreed process that would see all the accounts through to final closure. a similar team deployed during the back loading phase; again this proved to be of real assistance, especially as it was prior to the more formal Accounts Closure Team visit.

In conjunction with the Engineer Logistic staff of the JFLogC and 70 Gurkha Fd Sp Sqn QGE, a pragmatic and workable approach to the provision of engineer logistic support to the Joint force was agreed. this approach was based on the long established engineer principles and procedures, all of which were found to be applicable, but focused on how to achieve the movement and accounting of materiel in the speed and timeframe demanded by the contingents, in particular the Land contingent. This included a combination of excellent communications (generally not possible and a source of much frustration throughout the operation), the education of all of how to get what was needed (including sappers, often the hardest), and the understanding by both the planning staff and units of the realities of what was both possible and available (this applies to sapper staff and units as much as others). these issues dogged the engineer logistic chain throughout the deployment and were never fully resolved.

The Resources augmentees left 70 Gurkha Fd Sp Sqn early (many were warned to be prepared to return within a few months on future deployments) when most of the engineer resources and materiel were still in theatre awaiting disposal instructions. The remaining establishment was extremely hard pressed to cope. Ignore the role, responsibilities and sustainability of Resources Specialists at your peril; you'll have everyone blaming you for failure to deliver, and the prospect of a National audit Office Inspection Team all over you (peace time accounting continues irrespective of the operation). Equally the Corps ignores the provision of sufficient trained and experienced Resources Specialists at its peril if it expects to conduct sustained warfighting operations in the future.

Just after the end of the war, the decision was made in the UK to turn the 2nd line engineer logistic accounts into the Theatre Engineer Logistic Squadron accounts and close the 3rd line accounts. this was briefed down through the National Contingent HQ to all engineer logistic commanders in theatre mid Apr 03, and plans made accordingly. At the beginning of May (after Easter and the May Bank Holiday), the decision was reversed, with the 3rd line accounts staying and the 2nd line accounts closing. This

Cpl Purnasing Thakuri at work on some of the DTLs.

LCpl Meenbahadur Gurung directing a MWT during route construction around 84 Medical Supply Squadron RAMC.

completely changed the plans, and meant that two weeks work had been wasted.

A new plan was created, and the corrective work undertaken just in time for the decision to be changed back again to the original plan. Thus three weeks (25 per cent of the available time) of effort and work was lost to the immense frustration of all in theatre. It was during this time and for the rest of the tour that the lack of a data link with the UK proved to be a real hindrance for 70 Gurkha Fd Sp Sqn to meet the timelines for the completion of the backload and the departure of the squadron from Kuwait.

Again the lessons are clear; consider the communications available and make timely decisions that are stuck to, even if those decisions are perhaps not the best that might have been made.

Of course the Resources Park is only one part of the role of a Fd Sp Sqn and the provision of engineer logistic; 70 Gurkha Fd Sp Sqn QGE had a busy and vibrant engineer workshops and Plant Troop. The Workshops provided the full range of trade skills and expertise, including manufacture, repairs and maintenance work. Carpentry and Joinery work was the largest task by volume, especially the production of DTLs, often flat packed with CAD drawings and assembly instructions, as well as map boards and furniture. Other tasks included the provision of a metal water tank to run up and test the 82 OBM received into theatre (no rivers or sea 15km into the Kuwaiti desert), and the brazing undertaken to repair the Pressurised Pumping Units (PPUs) that arrived damaged from the UK.

Plant Troop remained busy throughout the deployment, and undertook a large number of route maintenance tasks across the JOA, and well as ground preparations for ECI and TDA (Temporary Deployed Accommodation, built by contractors), and a number of other tasks.

70 Gurkha Fd Sp Sqn completed one of the most challenging engineer logistics tasks faced by the Corps in many decades. The squadron completed it after a very rapid deployment to a challenging environment, in less than half the build up time of Op GRANBY yet with much more materiel, and then recovered much back to the UK. It operated in a Joint Force and C2 structure untested on operations or even properly on exercises, in a coalition environment, and it succeeded, but not without some very significant challenges. The location of the squadron was dreadful; it increased travelling times, gave rise to significant weather and ground problems, and hampered communications. Poor communications resulted in confusions and delays when managing and controlling materiel, and increased the time for the promulgation of decisions. Deploying at 35 per cent of sapper WFE significantly increased the workload of the squadron (in particular the resources specialists) to a point that was not sustainable, and resulted in a reactive posture for the majority of the deployment. The requirement for the 3rd line engineer logistic squadron to also act as a 2nd line sub unit for the JFLogC engineers had not been appreciated, and the possibility of doubling up as the 2nd line engineer logistic unit for the LC stretched the squadron immensely.

Finally the C2 status of the 3rd line engineer logistic squadron requires further work and development in order to avoid it being pulled in more than one direction, to avoid conflicting priorities and effort and to ensure that any future operations start from a better understanding by all parties concerned.

Memoirs

LIEUTENANT J B BRADLEY MBE

Born 17 June 1911, died 19 May 2003, aged 91

JAMES Bottomley Bradley was born at Stalybridge in Cheshire where his father was in the cotton trade. He was educated at Arnold House, Llandulas, Oundle and Christ's College Cambridge, where he read engineering. He was commissioned into the Corps in 1940 and after a spell as a Class Officer at RE OCTU, was posted in May 1941 to 287 Fd Coy, arriving with them in Singapore thirty days before it fell to the Japanese. After capture, he spent 14 months in Changi PoW Camp before being cattle-trucked north through Malaya to Ban Pong, 60 kilometres west of Bangkok. From there, as part of "F" Force, he and the others started on the 300 kilometre death-march to Sankurai Camp in Northern Thailand to work on the infamous Burma – Thailand Railway. Conditions there were so appalling that that it was decided that a small party should try to escape and alert the International Red Cross to the frightful treatment and atrocities being committed against the allied prisoners. Jim volunteered to be one of the ten who were chosen. Colonel Mike Wilkinson who later died of exhaustion during the attempt led the party. It was understood that if any of them became a casualty, they would be left to die alone. They escaped on 5 July 1943 and after seven weeks of wading up rivers, fighting their way through the increasingly dense jungle, coping without food and any medical support, they were taken in by Burmese villagers. By now, only five of them remained alive and soon after that, they were "sold" to the Japanese by the headman. After ruthless interrogation, the group were taken from camp to camp, each time having pits dug for their execution. They were saved from death by a very brave Japanese-speaking British officer who reduced the last Camp Commandant to tears by pointing out the disgrace the Emperor would feel if these (by now only four) brave men were executed. They were sent to Singapore and at their trial at Raffles Court on 26 June 1944, they escaped the usual mandatory death sentence, but instead they were each sentenced to eight years solitary confinement. Due to their poor state of health however, they were sent to the hospital at Changi Prison where they remained until the end of the war in August 1945. In 1949 he had a chance encounter in London with a fellow ex-POW from the camp from which he had escaped. This man was shocked to hear that Jim had not been honoured and so, being someone in authority in the War Office, he ensured that for his part in the escape attempt, Jim was appointed MBE. Jim accepted the award, but played it down to the extent that his second wife did not know about it until she read about it in *The Times* obituary!

After the war, Jim went into farming, running a stud farm, a Jersey herd and a fruit farm, retiring to Midhurst and then Winchester. He bore no malice towards the Japanese and felt that one must look to the future with friendship and mutual understanding, and learn from the mistakes of the past. He was openly critical of those ex-PoWs who turned their backs on the Queen and the Japanese Emperor during the latter's visit to London in 1998, feeling they had abandoned the dignity the prisoners had tried to maintain during their incarceration.

Jim achieved two Silver Weddings during his life, having had two marriages of 33 years each. In 1936 he married Lindsay Walker who died in 1969 and with whom he had a son, and in 1970, he married Lindy Corfield with whom he had a son and a daughter.

POMC

COLONEL D E THACKERAY OBE
Born 21 June 1918, died 25 June 2003, aged 85.

DENIS Edward Thackeray was born on 21 June 1918. Diminutive in stature but large in heart and brainpower, he was educated at Warwick School followed by the Merchant Venturer's Technical College at Bristol. By then he had become an indentured apprentice to the Bristol Aeroplane Company where he was appointed to the personal staff of the Chief Engineer, Sir Roy Fedden. Meanwhile, he had joined the Territorial Army so was granted an emergency commission and embodied into the Forces at the outbreak of war in 1939. As part of the BEF, he was evacuated safely from the continent in 1940 free to return with the BLA on D Day 1944. An early switch moved him to join Colonel Frank Nottingham in 13 AGRE as Staff Captain. This Group was formed to control the engineers within 1st Canadian Army, both Canadian and British. Bridging and road construction were the main tasks throughout the campaign, which included the bitter winter of1944/45 spent in Holland south of the River Maas. It was during that winter that Denis' supreme administrative expertise and initiative showed itself. The thatched cottage which housed the Headquarters was totally destroyed in an early morning fire, but by that evening, he had not only arranged alternative accommodation for all, but had composed a Court of Enquiry, which just required the "witnesses'" signatures to complete! Many years later this properly documented report set out what happened to the satisfaction of the Dutch authorities. Also during this time, it was announced that Denis was amongst a small number selected for a regular RE commission to maintain the Corps strength after the closure of the RMA Woolwich. The immediate benefit was that regular officers received their basic pay in advance, whilst others didn't get their money until the end of the month!

With the end of the war and the disappearance of 13 AGRE, Denis found himself as a Staff Officer in Austria based in the delightful town of Graz. Here his position allowed for benevolently allocating leave passes to such exotic places as Vienna and Trieste. Peacetime soldiering was catching up on him. Interspersed by attendance at the Army Staff College and the Joint Services Staff College, he took his turn as a regimental second-in-command in BAOR and CO of a TA regiment in the UK. Most memorably, he had a tour as a Garrison Engineer at that time, for it had been decreed by the powers-that-be that no one could hope to become a Chief Engineer without "Works Experience". To help other following in his wake, Denis wrote for *The RE Journal* (the first of three), an article entitled *"Teach Yourself to be a Garrison Engineer"*. The salient message, which he had always followed successfully, was "Get out of the office and meet your clients". The second article, continuing his personal themes, told in great detail the range of the arm contribution to the aftermath of the disastrous floods in Devon and Somerset in1952. In his conclusion he wrote "*Quick and methodical staff work resulting from mutual confidence cemented the whole. Enthusiasm, cheerfulness and energy completed the structure"*. That certainly summarized Denis' contribution. For his third article he wrote as the CO of a TA regiment to describe what happens in the remaining 363 days of the year after that splendid publicity exploit illustrated copiously in *The Sapper*. Just how valuable is the work of the small regular element in keeping the reservists in touch has been fully recognized in recent years.

Somewhere along the line Denis was selected for no discernable reason to be a Training Adviser to the Burmese Army (perhaps it was

his size). Anyway there is no doubt he filled the role as effectively as ever. His final appointment in uniform was a plum job that he relished to the full. As a Senior Liaison Officer in Washington, he covered all engineer equipment. This was an area in which the UK was on equal terms with the USA and in which it was important that good relations should continue. Denis saw that it did. He was on first name terms with everyone that mattered, from PAs to the Chiefs of Staff. It was in many ways a fine climax to a full military career. His contribution had been officially acknowledged by a Mention in Despatches, and MBE and an OBE. He had been asked to participate in virtually the whole width of Sapper fields of activity – except perhaps parachuting – he might never have come down to earth!

Leaving the army did not mean the end of his working life. He was quickly picked up by Trust Houses Ltd to be Technical Services and Project Manager at the Grosvenor House, Park Lane. During his four years there, he supervised its £3M renovation. Moving to The Rank Hotel Company in a similar role, his remit widened to cover luxury hotels in Paris, Brussels, Italy, Sardinia and Tenerife. This post was a similarly splendid end to his extended civilian career.

Finally retired to Warminster, he was soon adopted as the accepted leader of the neighbourhood. His personality and capabilities were as truly recognised there as in his many roles in and out of uniform. His beloved wife predeceased him, but his two supportive daughters and their several children survive him.

PJMP

Memoirs

MAJOR E H JAMILLY

Born 28 March 1923, died 18 July 2003, aged 80.

EDWARD Higham (Ted) Jamilly was the first son of Lydia and David Jamilly of Golders Green, London. He attended Wessex Gardens and Highgate Schools and left in 1939 aged 16 having passed all his examinations and taken a full and active part in school activities. That summer whilst visiting the USA and Canada, he was offered a place at Columbia University's School of Architecture. The outbreak of war however determined that he should return to the UK.

Back in London, he lived through the Blitz, attending The Regent Street Polytechnic's School of Architecture in term time. During the holidays he would often accompany builders around his father's estate. He also attended Horsham School of Art and worked for West Sussex County Planning Department.

In 1944, after being awarded his Diploma in Architecture, he was commissioned into the Corps as a Second Lieutenant. He was posted to India where in 1946, he was appointed the Education Officer in the headquarters of the RE Depot at Secunderabad. His main tasks were running 'Introduction to India' courses for new arrivals and pre-release courses for officers and soldiers preparing to return to civilian life. In 1947, by now a Major, he was posted to Poona near Bombay and joined the GHQ Planning Team at Ranchi where he was able to use his skills as an architect. His remit was ground reconnaissance, site planning and layout design for two Cantonments. These were to house approximately 45,000 and 1000,000 inhabitants, and were estimated to cost approximately 10 and 24 crores of rupees respectively. Edward and the team under the CRE, Lt Col W F Anderson, was also involved in finding a suitable site to build a new army headquarters and also the Kanchi Dam Project.

By now, he had already met his future bride, Anne Merrick, and following a two-year engagement they were married at the Pardesi Synagogue, Cochin, India. It was after this he discovered he was too young for Army Marriage Allowance! They returned to the UK after Edward was demobbed and lived successively in London at West Hampstead, Rayner's Lane and Willesden Green.

He was employed by Alistair MacDonald and soon became his partner. When Alistair retired in 1987, Edward became sole Consultant Architect to the practice. The work he undertook included: Brunei State Hospital, Ashford Town Centre, schools, colleges and many houses and flats in Greenwich, Brent and Maidenhead. He also designed over 50 shops for Ernest Jones and David Morris, including boutiques in Selfridges and Harvey Nicols. He was the long standing Consultant Architect to the Victory Services Association and Club and the Royal Scottish Corporation amongst others.

Edward was also a meticulous and skilled researcher and writer on subjects that pivoted outwardly from Architecture and Judaism and gave his time freely to such bodies as The Anglo-Jewish Art and History Exhibition Committee, the RIBA Library Committee, the Working Party on Jewish Monuments (as Chairman) and the English Heritage Places of Worship Panel.

He was married to Anne for 55 years and nursed her through a protracted illness until her death in March 2002. He is survived by his daughter Nicolette (Nicki) Landau.

NL

BRIGADIER R F SEMPLE MBE MC

Born 26 January 1922, died 31 July 2003, aged 81.

A FEW eyebrows might have been raised in January 1969 when the taciturn but compelling Colonel Semple was appointed to command the SAS Group, as he had never served with either the regular or a Territorial Army unit of the Regiment. But the end of the Indonesian "confrontation" with Malaysia in 1966 left 22 SAS Regiment looking vulnerable to a Ministry of Defence cut of at least a squadron to save money, so an "outsider" was thought best to establish and argue the case for retention of what was essential.

Semple was a six feet four inches tall Airborne Forces Engineer with a sound operational and varied staff record, as well as a reputation for unemotional and strictly objective thinking. But he had scarcely begun his analysis of what the future might demand of the SAS, when the almost bloodless coup in the Oman resolved the issue and led to his association with the Oman and the new Sultan Qaboos that was to extend well beyond his British Army service.

The rebellion by the tribesmen of the Dhofar province of the Sultanate of Oman had begun in 1965, but after the British withdrawal from Aden in 1967 it was encouraged and supplied with arms by the Marxist regime in South Yemen across the common border. In 1970 Sultan Qaboos requested British help in dealing with this problem and Semple sent the newly appointed CO of 22 SAS, Lieutenant-Colonel John Watts who had operated in the Oman in 1957, to see what was needed. This led to at least one SAS squadron being continuously deployed in Oman and the secondment of selected British officers and senior NCOs to the Sultan's Armed Forces.

Semple was promoted brigadier and appointed Director SAS in July 1969. As his contact with the Sultan developed with the increasing British involvement in the Dhofar campaign, so the value and significance of his advice to Whitehall increased. It came as little surprise, therefore, that on completion of his term as Director SAS, he left the Army ahead of his retirement date to become Director-General of Administration in the Omani Department of Defence and a member of the Sultan's National Defence Council. He continued in this post until most of the Dhofar rebels had changed allegiance to the Sultan's cause, which brought the rebellion to an end in 1976.

Roderick Ferguson Semple was born in Aberdeen, the son of a local GP. He was educated at Aberdeen Grammar School and University, graduating with a Civil Engineering degree in 1941. He volunteered for the Airborne Forces and, on commissioning into the Royal Engineers in July 1942, joined 591 (Antrim) Parachute Squadron RE. (His height made it awkward for him to move about in the confined space of an aircraft, so he always jumped first).

He landed in Normandy in the early hours of D-Day to take part in the 6th Airborne Division's seizure of the sector east of the Orne. 591 Squadron's task was to clear the poles and other obstacles the Germans had placed on potential glider landing strips. This work was hindered by stiff enemy opposition and absence of the squadron commander and second-in-command, who had dropped wide of the DZ. Semple took command and cleared the strips in time for the gliders arrival. It was a near run thing and the brief citation for his Military Cross "for his efficiency and devotion to duty" probably understated the matter, as he would have preferred. He served with the same squadron during the rest of the Normandy battles and in the Ardennes.

At the end of the war in Europe, he transferred to No. 3 Parachute Squadron RE at notice for the Far East and invasion of Japanese-occupied

Malaya. The atomic bombs on Hiroshima and Nagasaki obviated that requirement, so Semple accompanied 6th Airborne Division to Palestine, where the Jewish terrorist campaign had already begun. On his return to England in 1947 he worked with the methods of instruction staff at the newly opened RMA Sandhurst.

The Airborne Forces won him back in 1950, when he became adjutant of 131 Parachute Engineer Regiment of the Territorial Army. After Staff College, Camberley, he went to Germany as chief logistics officer 5 Infantry Brigade, but was back commanding 9 Independent Airborne Squadron RE in 16 Parachute Brigade by January 1957. This led to an unusual assignment in Jordan.

Following the 1958 rebellion in Iraq, which overthrew the Government of King Faisal II, the Jordanian Government requested British assistance against a perceived threat from Baghdad. At first this looked like vindication of an initiative Semple had taken in 1953 to find a route across the Sinai peninsula to Al-Aqabah but – in the event – 16 Parachute Group, including his squadron, was flown out to form a defensive position across the approach to Amman.

Semple was subsequently Chief of Staff of 16 Parachute Brigade, served with the British Army staff in Washington and the US Combat Development unit at Fort Belvoir before commanding 131 Parachute Engineer Regiment RE of the Territorial Army. He was appointed MBE after his service with 16 Parachute Brigade and received the Order of Oman in 1976.

His wife Olivia predeceased him. There were no children.

WO1 A W PULLEN

Born 4 August 1907, died 31 August 2003, aged 96

WO1 ALBERT William (Bert) Pullen passed away on 31 Aug 03 after a short illness. He was attested into the Corps as a Boy Bugler at Great Scotland Yard London, on 19 July 1922 aged just short of 15 years. He had reported to Brompton Barracks the day before on 18 July in time to witness HRH The Duke of Connaught unveiling the Royal Engineers War Memorial in Pasley Road. After boy service, his main trade was Printer, Compositer and Machine-minder. He was posted to Germany in 1927 and to Ireland in 1928 to Crosshaven, just outside Cork City where he spent two and a half years working on the South Ireland Defences. During his time there, he met his wife Catherine, a local seamstress and married her in 1934. He later spent nearly four years in Hong Kong. He worked for the Corps all his life, being Editor of *The Sapper* magazine for thirty years. He was also devoted to the Roman Catholic Church, having converted to catholicism when he married Catherine. Earlier this year, Bert was honoured by Pope John Paul II when he awarded him the *Bene Merenti* Medal for "*being outstandingly deserving in Christian affairs*". At the same time, he was also selected to be one of the recipients of the Royal Maundy and was presented with the money by HM The Queen in Canterbury Cathedral.

SP JEB

LIEUTENANT COLONEL K STEWART

Born 22 September 1913, died 19 August 2003, aged 89.

KENNETH was the youngest son of Owen and Florence Stewart. In 1932 he was awarded a scholarship to read chemistry at the Royal College of Science, which led to his obtaining a PhD in 1936 in chemical research into the oxidisation of silicon hydride. In these four years, Kenneth was also a keen sportsman and a member of the RCS and Imperial College athletics team, becoming president in 1936. It was also in this year that he was awarded a years scholarship for research at the Institut Für Physikalische Chemie at the University of Hamburg.

Returning to the RCS, he took up a post as a junior lecturer in the Physical Chemistry faculty where his work included a research programme into chemical warfare agents. In response to the call for specialists, he volunteered for military service in 1939 and was eventually commissioned into the Corps as a Technical Officer (Chemical Warfare). After training, he was posted to the Far East. On arrival he was involved in demolition surveys of bridges in Calcutta. After some abortive journeys to Gauhati in Assam and a short period in Simla, he ended up at Southern Army HQ in Bangalore. In 1944, he was posted to HQ Allied Land Forces, South East Asia (ALFSEA) at Barrackpore near Calcutta. His work here consisted of trials to determine whether napalm bombs and portable flamethrowers could be used effectively against defensive positions in the forests.

Returning to the UK in 1946, Kenneth accepted the grant of a regular commission in the Corps in the rank of Captain. Within a few weeks he was posted to the USA to serve as War Liaison Officer with the US Army Chemical Corps. This two-year post was followed by a two-year course at the Military College of Science. This subsequently led him to entering the nuclear weapons field, working at the Atomic Weapons Research Establishment (AWRE), and taking part as a team leader in the atomic weapons trials in Australia in 1952/53. This was followed by another period in the USA in Washington DC as the MOD Liaison Officer, but this time in atomic warfare matters. He returned to the UK in 1956 and continued his military career in the Army Element at AWRE, retiring with the rank of Lieutenant Colonel in 1958.

He continued at AWRE as a civilian, concerned with warhead safety and direction of related aerosol studies. Through his own studies and his successful collaboration with US scientists, he was the leading British authority on the potential hazards of nuclear weapon accidents. He led the UK contribution to a series of joint UK/US large scale tests to study both the dispersal and biological hazard from such accidents. He continued to play a major role in nuclear weapon safety until his retirement in 1978.

Kenneth died on 19 August 03. He was the beloved husband of the late Olga and a devoted father and grandfather. He will be greatly missed.

JW

CAPTAIN T S ABBOTT

Born 17 September 1919, died 9 September 2003, aged 83.

THOMAS Stanley Abbott was known as "Stan" or "Bud" Abbott both during his service, and later civilian career.

Raised in York, he was educated locally, having won a scholarship, and was an achiever both scholastically, and as a sportsman. He became a keen member of his local scout troop and progressed to the status of King's Scout. His rugby career started when he joined the Heworth York Club, later becoming a player of some distinction.

After enlisting in the Corps in September 1937, he trained as a Topographical Surveyor (Railway) and qualified as a Class 1 tradesman.

The onset of war saw him in France with the BEF, involved with various L of C tasks, until the force was ordered to withdraw. Stan and his section were diverted towards the Brest peninsular, and were embarked at St Nazaire on the ill-fated HMT *Lancastria,* which was sunk whilst at anchor with great loss of life, by German bombers on the 17 June 1940. Stan was one of the few to survive, and being a strong swimmer was instrumental in saving two of his comrades.

Survey work at the new Cairnryan Military Port at Stranraer; setting out jetties, piling etc, followed, until 1942 when he was posted to the South of England to carry out hydrographic surveys to identify areas for the assembly of the Mulberry Harbour sections prior to their being towed to France as part of the invasion of Europe.

In 1943, WOSB, commissioning, and a posting to North Africa followed in quick succession. This was followed by the invasion of Italy, where much work was done repairing and replacing bridges, and reopening tunnels in the L of C.

During this time he served first with 160 Rly Constr Coy, and from mid 1944, with 10 Rly Constr Coy. He was awarded a Mention in Despatches, a Commendation for Gallantry, and promotion from Lieutenant to Captain. He was also honoured by having one of his bridges named "Abbott's Bridge".

He returned to the UK in 1946, converted to a Short Service Commission, and became a survey instructor at Longmoor. In 1948, he became Permanent Way Officer with Northern and Scottish Commands, and in 1952, was posted to BAOR for railway construction and maintenance.

His uniformed service ended in 1956, when he joined the British Rail District Engineer's Office in Doncaster. He was involved in the upgrading, and realignment of part of the East Coast main line, including the bridge over the River Trent at Newark, later becoming involved with the fabrication of permanent way welded rail lengths. When he retired from British Rail he was pleased to receive a high level testimonial that "he had run things in a military style and thus avoided labour problems".

To commemorate the 50th anniversary of the sinking of HMT *Lancastria*, he was instrumental in the design and fabrication of a mounted brass memorial plaque to the memory of those members of the Transportation units who died in that catastrophe, and had it erected in the church at Leconfield, (which is furnished with the fittings and stained glass windows from the old Longmoor Garrison Church), where it was dedicated at an REA Service on the 15 September 1991.

Until his death he served the York and District Branch of the REA as Branch Secretary, a post he held for many years. A robust, kindly friend to all, and greatly missed, particularly by Kathleen, and grandson Carl.

JER JHH KS

Correspondence

LIEUTENANT COLONEL E E N SANDEMAN OBE

From: Mrs A B O'Hagan

Sir, – With regard to the memoir for Lieutenant Colonel E E N Sandeman published in the August issue, I was concerned to see that no mention was made of his wife Dorothy and also that it said that both his daughters survived him.

Dorothy pre-deceased Ernald, but during her lifetime, was always a great support to him. Sadly, their daughter Barbara pre-deceased them both, so Jane is the sole survivor. Yours sincerely – Heather O'Hagan.

We are pleased to put the record straight – Ed.

BRIGADIER R F "FERGIE" SEMPLE MBE MC

From: Brigadier (retd) J H Hooper OBE

Sir, – My first squadron after commissioning was 9 Indep AB Sqn commanded by Ian Lyall Grant with Fergie as his 2IC – a formidable team which scared the pants off the subalterns. He led a team of ten of us in four jeeps across the Sinai Desert to find a route to a natural harbour on the west coast of the Gulf of Aqaba. The idea was that if a force needed to be sent to Jordan without going through Israel, it could be sent via this route using landing craft. Whilst we were on the mission, General Neguib kicked out King Farouk. We knew nothing about it and got fired on when using the latter's name as authority to proceed when we approached a desert fort! It became clear we would have to complete the mission on foot. The team split in two, and Fergie's half, including me, found a way down the escarpment. We did the recce and then rested, although I spent most of the day in the water taking down details of the beach. Halfway back up the escarpment all but myself collapsed through lack of water. I got back to Base Camp and sent out a rescue party. They came back hours later having failed to find the team. Having sufficiently recovered, I went back out with them carrying water. This time we did find them, but to this day, I remember the terrific rocket I received from Fergie for not supplying salt tablets with the water and in consequence, in several years of desert soldiering, I have never forgotten the importance of salt. Yours sincerely – John Hooper.

THE MAJESTY OF THE MOUNTAIN

From: Lieutenant (retd) G P Webb

Sir, – Does anyone remember a restaurant run by "Boris" in Kathmandu in the '70s? His main offering was Borsch, a vegetable soup, in respect of the Buddhist tradition.There were few places to eat, unless you could afford the American "Oberwi Jobel" whose name I have forgotten.

Flights around Everest left every morning from Kathmandu in an Indian Airlines 'plane just struggling to lift in the thin air over the surrounding hills of the Nepal Basin. But only on foot can one appreciate the majesty of the mountain! Yours sincerely – Geoff Webb.

GEOLOGISTS PREPARE THE WAY

From: Major R I L Dow

Sir, – On the 25 Jan 03 the Geologists of MWF (V) were tasked by HQ LAND to provide information on the geology and hydrogeology of Iraq. In particular, information was required on water supply options, sources of aggregate and the geology of the regional terrain.

Work started almost immediately and involved carrying out a literature and map search of published and unpublished information, meeting with hydrogeologists from the British Geological Survey and talking with a hydrogeologist based in Kuwait.

By the 4 Feb 03 a large database of information had been gathered. The information was very wide ranging and included geological and hydrogeological maps, technical papers, and a PhD thesis. This data was reviewed, assimilated and a detailed report prepared which was issued to HQ LAND and 521 STRE (WD) on the 10 Feb 03.

The report was divided into sections on the regional geology, geotechnical issues and hydrogeology. Each section included maps, drawings and tables of data that could easily be used in the planning of construction activities or the development of water supplies.

Typical of the information that was included in the report is summarized below:

- The locations of existing quarries were identified and an evaluation of the suitability of aggregates for different

uses was undertaken. The data was presented in a simple table that included an aggregate rating system.
- Typical ground bearing pressures were identified for different soil types and different geological units of Southern Iraq. This information is important, for example in locating temporary airfields.
- The report included an evaluation of the main groundwater sources in Kuwait and Southern Iraq and provided information on the main aquifer, the depths to groundwater, water quality and likely requirements for well construction and water treatment.

The report was provided in both hard and electronic copy and became a valuable planning tool that allowed critical information to be fed into the planning process prior to the start of operations in Iraq. Yours sincerely – Robbie Dow.

THE DEFENCE – DO WE THINK WE CAN STILL DO IT?

From: Major (retd) T Le M Spring-Smyth

Sir, – I am always pleased when the *Journal* arrives. There is always something of interest. The following is therefore a nit-picking quibble! I refer to Bill Slim's remark re demolitions quoted on page 101 of the August 2003 *Journal*. It was made to Maj Gen J G Smyth VC MC Bt. I know that Jackie Smyth was sacked by Wavell after the bridge disaster since he came from the Yorkshire branch of the Smyth family and I come from the Irish branch. My ancestor Sir Richard Smyth left Beverley in Yorkshire when he was appointed by the first Queen Elizabeth to put down the rebel Irish in Cork. Both branches have the same crest and almost similar shields. Until recently I received rent from Cork.

Jackie got his VC with the Sikh Regt in France in 1915. I think as a Lieutenant. Another member of the Smyth family was Field Marshal The Lord Gort VC, Irish branch. My father used to refer to him as Cousin Gort, known in the Army as Fat Boy!

Ironically SMYTH in Ireland is pronounced SMITH, but Jackie was a SMYTH.

Coincidentally the SPRINGS were sent to Ireland from Suffolk to put down the rebellion of the Earl of Desmond. They accompanied Sir Walter Raleigh who based his fleet at Port Youthal and stayed at Ballymatry House, the family seat, just six miles up the road.

After the Sittang Bridge disaster the doctrine of the Close Bridge Garrison emerged, not before time I guess.

My time in Burma was fortunately spent when we were winning especially lucky as a member of a Beach Group Fd Coy – saved by the Bomb! Best wishes – Tom Spring-Smyth.

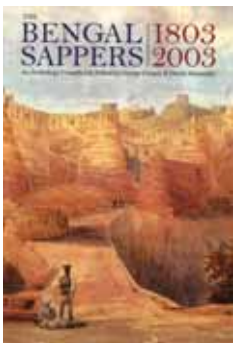
1st COMMONWEALTH DIVISION

From: Colonel (retd) V S Hannay OBE MC

Sir, – My article in the August issue of *The Journal*, "Engineers on The Hook", stated that the 1st Commonwealth Division was formed in July 1952 with the CRE being Colonel F M Hill. In fact the Division was formed a year earlier on 28 July 1951. Major General A J H Cassels was GOC, the CRE was Colonel E C W Myers and the IORE was Major I C Stuart to whom I am indebted for pointing out the error. Colonel Hill relieved Colonel Myers as CRE during 1952. Yours sincerely – Spencer Hannay.

Reviews

THE BENGAL SAPPERS 1803 - 2003
AN ANTHOLOGY COMPILED AND EDITED BY
GENERAL SIR GEORGE COOPER GCB, MC, DL
AND MAJOR DAVID ALEXANDER



Published by the Institution of Royal Engineers, Brompton Barracks, Chatham. ME4 4UG. Price £18.00 incl p&p, hardback, 336 pages, illustrated. ISBN 0-903530-24-4

LORD Canning once said "…there never was a more able, zealous, reliable body of English gentlemen brought together under any government than the Corps of Engineers of Bengal". This slightly extravagant praise could be challenged; one could think of at least two bodies of English gentlemen in particular who might want to do so. All the same, this book certainly impresses. It is what the sub-title says, an anthology of contributions, collected over recent years and skilfully crafted by the editors into a delightful book.

They had a wealth of material from which to choose, and painfully reject: personal recollections from both peace and war. Inevitably however there were gaps, particularly in the early history, so the editors have turned author to fill these and make a coherent, readable narrative. The contributions have been arranged broadly chronologically, the first two sections dealing with the essential background and history to the end of 1918. The centre section, about a third of the book, comprises recollections of peacetime soldiering based in Roorkee and off-duty activities between the wars. Diverging from the chronological approach the frontier wars are treated together in one section. There then follow accounts of the Second World War, post-war activities and the build-up to Independence. The book ends with a glimpse of post Independence Roorkee as well as of the Bengal Sappers' successors in Pakistan.

All this comes together in a most attractively produced volume with a striking cover depicting the fortress of Ghazni from a watercolour by the hero of the assault on that place in the First Afghan War, Henry Durand. The quality and interest of the illustrations and maps maintain this high standard.

But it is the stories that win the prizes in the end. Many of them are posthumous; at least thirteen of the contributors died some years before publication. Those of the "Travels in the Great Mountains" vividly stir the imagination with their acute observation, their sense of a tantalising vastness:

Alas! No time to go there [having run out of leave], *no time to dip our hands in Indus water, but if we had, there would have been still another rocky pass, still another peacock-coloured distance, still another shining range of hills – Karakoram, Tien Sha, Kuen Lun – names to dream of. One needs another life…*

Inevitably there is nostalgia suggesting a vast adventure playground where shooting for the pot was routine and tigers and snow leopards were enemies that had to be controlled. But the underlying attitude conveyed is one of respect; respect not only for nature but also for people and their customs and beliefs.

Respect is also the impression one gains from the accounts of the many wars in which the corps was engaged. Respect for the leadership that inspired men to loyalty against the run of the tide in the Mutiny, respect for the initiative of so many individuals engineering in remote frontier regions, respect for the selfless courage of men fighting in the ghastly conditions of the trenches in a totally alien environment and climate, respect for the ingenuity that gained such admiration in many theatres of war – and it is easy to forget some of these such as Malaya, Italy, Greece, Indonesia as well as the big scenarios of the Western Front and Burma. These are serious matters made the more readable by way of the personal anecdotes, told with engaging wit and a light touch. The spirit of the special contribution that the Bengal Sappers have made to the Royal Engineers comes across unmistakably.

Only a short print run has been made of this book. Anyone who is minded to add a copy to their collection would be well advised to acquire their copy now. They will not regret it.

GWAN

DILEMMAS OF THE DESERT WAR "THE LIBYAN CAMPAIGN 1940-42"

MICHAEL CARVER

Published by Spellmount Publishers.
MGA 190 Shaftesbury Avenue,
London. WC2H 8JL.
Price £14.99.
ISBN 1-86227-153-4.

FIELD MARSHAL Carver's summary of the Desert campaigns was brilliant in its original edition, but it is even more formidable as a *tour de force* since he refashioned it, shortly before his death. It has been improved both by the benefit of 60 years hindsight and by the additional facts which have come to light in the meantime. Carver's continued dedication throughout his life to the widest study of all Defence matters has, in this reader's opinion, led to the volume achieving a broader perspective than most.

The maps are clear and accurate, especially the last one illustrating the final break-out from the Alamein position, a series of operations presenting as much complexity to cartographers trying to illustrate them, as indeed they did to the formation commanders, who did their best to carry them out in the "fog of war" and the actual dust of the battle.

I am sure that every reader will be delighted with the choice of photographs, selected with great care from the huge resource of both Allied and Axis collections; many are well known, others are rarely seen. The scholarship of the whole work is ably supported by clear notes in the Appendix, many of unusual erudition, and the Index is comprehensive even though printed in very small font!

It is not surprising that most of the actual facts recorded have been published previously, but I find them assembled here in a very readable way, supporting each other, as they do. However, some readers, like myself, may be surprised by the revelations about personal relations between various generals; in particular this applies to Ritchie's post-war feeling of being so badly let down by Auchinleck.

It had long been a mystery to me how the situation changed in a matter of hours. Suddenly the enemy grabbed the initiative and his tanks were everywhere, with no one apparently knowing what was actually happening. Formation commanders were replaced, thousands of our men were killed and captured, and the great Eighth Army appeared to be routed, driving "helter skelter" in headlong retreat for hundreds of miles back to the semi-prepared Alamein defensive position, leaving every one desperately short of sleep.

In these chapters the author patiently unravels the complicated pattern of complacency, ineptitude, even jealousy among the formation commanders, which brought disaster to an Army which had by then been swollen to include many individuals new to the Desert, and potentially good units who were insufficiently battle-trained. The Field Marshal emphasizes that the old hands in the Indian Divisions, the New Zealand Division, the Armoured Car units, and various others did well, but many others were badly led. Subsequently, in mid summer, the loss of Tobruk gave everyone a big shock, and rarely have the detailed circumstances been so well explained as they are in Chapter 7.

The book describes the four months at Alamein, where Auchinleck successfully fought the first battle to prevent the Germans continuing their progress to the Nile. His later offensive efforts failed and he was replaced by Montgomery, who won the defensive Alam Halfa battle soon after his arrival. The author explains all this lucidly and goes on to take the reader through every phase of the enormously complicated and very bloody break-out lasting about a fortnight after the famous opening artillery barrage.

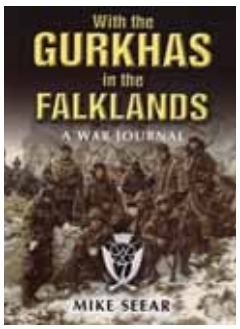
The Field Marshal's final chapter, called "Wash Up", summarizes most of his conclusions concerning the whole two-year long Desert Campaign. Much of it applies to war as a whole, such as the tendency he mentions for Engineers to be allotted their tasks too late. This chapter is worth careful reading on its own if necessary, even if all the historical parts of the book are somewhat neglected. One highlight is Carver's analysis of how little may be achieved, even on the longest day.

These were the concluding thoughts of a great soldier, who rose spectacularly to senior rank as a fighting commander, and throughout his life remained devoted to the profession of arms.

JC

WITH THE GURKHAS IN THE FALKLANDS (A War Journal)

MIKE SEEAR



Published by Leo Cooper – an imprint of Pen & Sword Books, 47 Church Street, Barnsley, South Yorkshire. S70 2AS. Price £19.95. ISBN 0-85082-916-6

THIS is a book written very much from the heart, and very much about Gurkha Infantry – 7th Duke of Edinburgh's Own Gurkha Rifles in particular – by an officer seconded to that Regiment during the Falklands Campaign. As a front line participant with 7 GR, Mike Seear's account of the war is not only fascinating but, at times, very moving. As Operations Officer, he had an overview of the war as it affected not only that Battalion, but also the whole of 5 Infantry Brigade. This gives his account a particularly interesting perspective, as do the subsequent interviews with Argentineans and Falkland Islanders. In some ways too, the book attempts to redress what the author felt was a lack of press coverage during the War: the Battalion was not allocated one of the 27 accredited Task Force journalists and hence, perhaps, received a rather poor deal in terms of press and TV coverage. As Mike Seear was also the Battalion's public information officer during the war, he had always felt that redressing this balance was in some way his responsibility. Perhaps inevitably too, because he concentrates on the Battalion's actions, there is little mention of the Royal Engineers activities bar the attached 9 Para Squadron sappers.

The MOD, HQ UKLF, and Northwood Convolutions that led to such a strangely composed formation being deployed, are not touched upon directly; but the repercussions become apparent in the telling. As the remaining original battalion of 5 Infantry Brigade after 1 and 3 Para had been taken by 3 Commando Brigade, 7th Gurkhas were arguably the best prepared and trained battalion in that Brigade; yet they were never to have the chance of closing with the enemy, although the defeat of the Argentineans had much to do with the imminent threat of this happening. The extraordinary psychological effect of Gurkha troops on the Argentinean Forces has been well recorded elsewhere. The apparent failure to capitalise on their skill and professionalism was unfortunate and gallingly frustrating for 7 GR who felt rightly that they carried the standard for the whole Brigade of Gurkhas and their continuance within the British Army. "Cometh the hour, Cometh the man" and certainly in Colonel David Morgan they found a cool, experienced and respected leader who so managed his battalion as to counter its frustrations by ensuring that it did all that was asked of it, and showing that it could clearly have done so much more if it had been given the chance. This was the first time a Gurkha unit had been involved in a major all arms conflict since World War 2 and the author makes clear how well they coped with it. In the final analysis, theirs was a remarkable achievement that confounded their critics and paved the way for future major Gurkha deployments.

The author's self-revelatory style certainly makes for absorbing and somewhat uncomfortable reading although it may surprise those used to the more tight-lipped accounts by veterans of previous major conflicts. As a result one finishes the book tinged with sadness at the war's malign effects on the author's personality and family relationships. He reminds us powerfully of the unique spirit of comradeship, understanding, and soldierly compassion of a regiment in battle; incomprehensible to those outside it. Unfortunately, once the war is over, the magic is broken and the withdrawal of its protection leaves individuals often cruelly exposed. Certainly, the book, in its very personal way, is an exemplar of this phenomenon.

In writing this book, Mike Seear has not only written of Gurkhas in battle, but of the human situation in adversity. Recommended reading.

JNBS

Explanation of Abbreviations Used in This Journal

AB . . . . . .Airborne
ACE . . . . . .Allied Command Europe
ACSA . . . . . .Allied Cross Servicing Agreement
APOD . . . . . .Airport of Departure
AOR . . . . . .Area of Responsibility
ARRC . . . . . .Allied Rapid Reaction Corps
ATRA . . . .Army Training and Recruitment Agency
AWRE . .Atomic Weapons Research Establishment
BD . . . . . .Bomb Disposal
BGE . . . . . .Battle Group Engineer
BPC . . . . . .Battle Group Planning Course
CA . . . . . .Concentration Area
CAD . . . . . .Computer Aided Design
CPA . . . . . .Coalition Provisional Authority
CR2 . . . . . .Challenger 2 Main Battle Tank
CS . . . . . .Close Support
CW . . . . . .Chemical Warfare
DEG . . . . . .Divisional Engineer Group
DFID . . .Department for International Development
DI . . . . . .Deep Interrogation
DLO . . . . . .Defence Logistics Organisation
DTI . . . . . .Department for Trade and Industry
DTL . . . . . .Deep Trench Latrine
DOB . . . . . .Deployed Operating Base
DWR . . . . . .Duke of Wellington's Regiment
ELG . . . . . .Engineering Liaison Group
EPW . . . . . .Enemy Prisoners of War
FARP . .Forward Ammunition and Refuelling Point
FCO . . . . . .Foreign and Commonwealth Office
FET . . . . . .Force Equipment Table
FFR . . . . . .Fitted for Radio
FP . . . . . .Force Protection
FRS . . . . . .Fellow of the Royal Society
GS . . . . . .General Support
GSG . . . . . .Geographic Support Group
HD . . . . . .Humanitarian Demining
HOC . . . . . .Humanitarian Operations Centre
HRST . . . . . .High Risk Search Team
ICSC . . . .Intermediate Command and Staff Course
IMAS . . . . . .International Mine Action Standards
IMATT . . .International Military Advisory Training Team
IRC . . . . . .International Red Cross
ISD . . . . . .In-service Date
JFLogC . . . . . .Joint Force Logistic Component
JHF . . . . . .Joint Helicopter Force
JOA . . . . . .Joint Operational Area
KCMG . . .Knight Commander of the Order of Saint Michael and Saint George
LASS . . . . . .Lead Air Support Squadron
LCCA . . . . .Land Component Concentration Area
LIS . . . . . .Landmine Impact Survey
LLG . . . . . .Logistic Liaison Group
LoC . . . . . .Lines of Communication
MBT . . . . . .Main Battle Tank
MCF . . . . . .Military Construction Force
MCM . . . . . .Manning and Career Management
MEF . . . . . .Marine Expeditionary Force *(US)*
MITC . . . . . .Mines Information Training Centre
MNB . . . . . .Multi-National Brigade
MRE . . . . . .Mine Risk Education
NCHQ . . . . . .National Contingent Headquarters
NGOs . . . . . .Non-Governmental Organisations
NTM . . . . . .Notice to Move
OCTU . . . . . .Officer Cadet Training Unit
OFFP . . . . . .Oil For Food Programme
OGDs . . . . . .Other Government Departments
PE . . . . . .Peace Establishment
PET . . . . . .Professional Engineer Training
PJHQ . . . . . .Permanent Joint Headquarters
PPP . . . . . .Public Private Partnership
PQE . . . . . .Professionally Qualified Engineer
PWGF . . . . . .Prisoner of War Guard Force
QDG . . . . . .1st The Queen's Dragoon Guards
RAH . . . . . .Regulating Area Headquarters
RCA . . . . . .Royal Canadian Artillery
RCAF . . . . . .Royal Canadian Air Force
RCS . . . . . .Royal College of Science
REYC . . . . . .Royal Engineer Yacht Club
RSOM .Reception, Staging and Onward Movement
RTCH . . . . . .Rough Terrain Container Handling
RUC . . . . . .Royal Ulster Constabulary (Now The Police Service of Northern Ireland (PSNI)
SATCOM . . . . . .Satellite Communications
SBA . . . . . .Sovereign Base Area *(Cyprus)*
SDR . . . . . .Strategic Defence Review
SOTR . . . . . .Statement of Training Requirement
SPOD . . . . . .Sea Port of Departure
STRE(BP) . . .Specialist Team RE (Bulk Petroleum)
TD . . . . . .Tactical Doctrine
TFHE . . . . . .Tactical Fuel Handling Equipment
TIF . . . . . .Theatre Internment Facility
UKAC . . . . . .United Kingdom Air Contingent
UKNCHQ . . .United Kingdom National Contingent Headquarters
UKSPC(G) . . . .United Kingdom Support Comand (Germany)
UNPROFOR . . . .United Nations Protection Force
USMC . . . . . .United States Marine Corps
WFE . . . . . .War Fighting Establishment
WMD . . . . . .Weapon of Mass Destruction
WOSB . . . . . .War Office Selection Board

Please note: The above abbreviations are those which appear within articles published in this edition of the Journal *and where authors may not have explained them. They are printed for the benefit of our many foreign and non-military readers.*
Appointment abbreviations (which appear on the first page) can generally be found in the back of The Royal Engineers List.

This must continue, but to a lesser extent, to allow room for a new emphasis that allows a CRE (Wks) to train separately for the unique challenges facing specialist engineers on large scale operations.

infrastructure support contracting.
- Contract management structures on operations should be simple and clear to all.

appointments. Perhaps some of my successors in Military Works Force will also have the opportunity to be a CRE for a short period.

Finally, my profound thanks to the staff in HQ RE LAND, those who deployed and those who had to remain in UK. An enormous amount of work was done to prepare for the operation and provided an excellent framework for deploying units and staff. A big vote of thanks also to Lt Col David McIlroy, hiding in his bunker in J4 Infrastructure at PJHQ.