Minewarfare & Diving Magazine - 2002 edition

50 YEARS OLD!

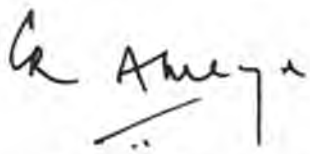
CD Branch in the 21st Century

Editorial

This year marks the 50th anniversary of the Clearance Diving Branch, and it is a great privilage to be in command of the Diving School at this stage of the innings. Much has changed in this half century, both politically and technologically. However, what has not changed is the mine threat, it remains highly dangerous, and dealing with this complex threat is as demanding as ever.

Minewarfare is a hazardous business, although this aspect is never mentioned and more often than not is taken for granted. This is partly due to the training, which is second to none, but more importantly to the courage, skill and ingenuity of the Clearance Diving and Minewarfare community. Successes in Suez, the Falklands, the Persian Gulf, the Adriatic and more recently in Macedonia are testimony to this outstanding professionalism.

The consideration and intergration of Minewarfare in Joint operations today, is as important as it was in the early days of the Cold War 50 years ago. To disregard this would be, at the very least, madness, at the worst of grave peril to our security.



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FOREWORD

by Captain L Sym RN

I am delighted to have been asked to write the Foreword to this latest edition of the Minewarfare and Diving magazine. I took up the post of Captain MFP on 29 November 2001 and am aware of how important this magazine is in keeping community members up to speed with the developments abroad in these warfighting areas of today's Royal Navy.

Whilst there is much going on at present in terms of warfare and equipment support and development, I must leave these subjects for others to write upon as I have been asked to explain some of the changes to the command and control arrangements of the MM, PP and Diving organisations.

We live in a fast changing world. My appointment indeed is a part of the change process of the Royal Navy as it introduces its new Fleet HQ organisation - Fleet First. The new organisation departs from the previous Type Command structure and is founded on functional groupings: Resource Management, Force Generation and Force Deployment.

Fleet First formally stands up in April 2002 but there will be, and already is, a gradual transfer of authority in advance of this date. I now work to DFOSF (Commodore R S Ainsley ADC) who will become COMPORFLOT on 11 March 2002. He will have command of the First and Second MCM Squadrons and the Fleet Diving Squadron. MCM 3 will come under CAPFASFLOT from that same date. The Northern and Southern Diving Groups will remain part of the Fleet Diving Squadron. While there are also changes to the arrangements for the FPS and PBS; I will not go into these here. Put simply these squadrons will remain based as at present and will continue to have some OC responsibilities through me to COMPORFLOT.

In terms of Warfare, Engineering and Programme support, the previous Commodore MFP divisions responsible for these areas have transferred across to either the new Fleet HQ at Whale Island, or to Northwood. In most cases the same personalities exercise the same responsibilities in terms of the MM, PP and Diving communities, but these posts now sit alongside their wider Fleet (DD/FF, S/M and RM) equivalent. I look upon this as an excellent chance for the MCM and Diving communities to let the rest of the Fleet see clearly the high standards of professionalism and dedication we exercise as we go about our business!

Despite the demise of the Type Commanders there is a need to ensure that the professional ethos and spirit generated by the Type Command is not lost. It is important that the

various strands of the Fleet have identifiable heads of a profession and to that end, each component arm of the Fleet will be represented by a "Head of Fighting Arm". The Head of Fighting Arm for Surface Ships will be COS (Warfare), Rear Admiral A K Backus OBE (known as Rear Admiral Surface Ships), supported by Captain MFP as his specialist adviser for MM/PP and Diving issues. Under this remit, and in some other ways, I will continue to keep a close interest in non-Portsmouth based MM, PP and Diving organisations.

In my short time in post, I am already aware of, and have been very impressed by, the professional ethos and community spirit abroad in the MCM and Diving communities. I know that the last 12 months included a host of challenges to the leadership, management and professional skills of many of you reading this magazine. The successful Argonaut deployment and the calm and professional way the Diving community has coped with the CDBA restrictions post last July's tragic incident are but 2 examples of how well you have done.

I would ask that you maintain the high standards for the future, and I believe that, as you do so this will stand you all personally, and the MCM and Diving communities as a whole, in good stead as we settle into the new Fleet First organisation with the additional visibility this will bring us.

MESSAGE FROM THE ED

Lt Cdr Chris Baldwin RN

Greetings to all readers from your new editor. I took over from Jonathan Lee in March 2001 and during my very comprehensive handover, was presented with the 'MAD Pack', with the words "Hang on to this Chris, no point sending it back to the registry". In the finest traditions of the Service, I consigned said pack to the bottom of in-tray (well at least it helped to create the impression that MWTAC is always busy!). But just before the end of the summer term, I actually managed to get to the bottom of my in tray (something I hadn't achieved throughout my sentence, I mean appointment as a PWO!) and thought "Ah! No material for the next issue of MAD has arrived. Why not? - because I haven't sent the calling notice - bugger!". Well, managed to get the signal out to as many people as I could, but the only response was from C J Davies (girlie swot) which was promptly lost in Dryad's internal mail ether. Second plea for help and was rewarded with some material care of Rob Hoole. Still not enough though, time to resort to blackmail tactics – so I started phoning round all the people in the branch, about who I had any dirt on (which as you can imagine was considerable), with a thinly veiled threat, that if I didn't receive something in print from them, I would then have to use said information in some sort of reader's wives section. Naturally, as most MCD/MWs are shy retiring creatures this did the trick, though there were one or two exceptions who actually wanted to be ritually humiliated! Anyway we got there in the end and may I thank most sincerely all those people who contributed to this edition of MAD. As I mentioned it is a special year as we celebrate the 50th anniversary of the formation of the Clearance Diving Branch more of that in the magazine. As one would expect, there are well laid plans for a suitable amount of ceremonial to mark the occasion, (thanks to the usual Branch centurions) and I'm sure you will be contacted by Rob or Frank at some point. To any CDs, MWs and anyone else who reads MAD, please feel free to send anything throughout the year which you may think is of interest, without your input there will be no magazine! I would like to introduce some extra items such as a 'Where am I now' section, which I hope could link some old comrades together. If there is anyone out there with a burning desire to change anything else, please feel free to take over as Editor! I look forward to hearing from you.

Finally, it is with great sadness that I have to report the loss of some dear friends both young and not so young, to the MAD community. Over the last year family, friends and former colleagues have had to pay their last respects to Messrs. Brebner, Murray, Silcock and Kelly.

SWO1

CMFP SWO1 – LT CDR PAUL JONES

Whilst not wishing to bore the readers with all the seemingly endless meetings / briefings / working groups and associated staffwork that I get involved in, I will try and submit a few informed and interesting snippets on the key achievements over the last 12 months, as well as a few topics that are 'bubbling under'.

MCMTA ACCREDITATION

Although this has taken many different 'guises' over the years, it has been acknowledged that the process of checking the operational capability of our MCM Tasking Authority (the MW Commander's operations team) is imperfect and long overdue for an overhaul. Unlike ship OSTs which run along a tried, tested and dedicated work-up programme, it was impossible to assess MCMTA caps and lims within a similar programme. Although opportunities to visit and 'accredit' Squadron staff are taken during exercises and JMCs, each exercise scenario is unique and often places completely different demands upon the MCMTA – it would be unfeasible to conduct a lengthy staff covered 'work up' without disrupting the exercise itself. It was decided that the accreditation process should be similar to a 'staff sea check' – a CMFP- nominated Accreditation Team (SO1, SO2, CPO(MW) and CY) would spend 48 hrs checking that the MCMTA has the required staffing, equipment and training levels to support MW operations within a joint force environment. A draft 'check off list' was produced and trialled successfully with MCM2 at JMC 012. This documentation will soon be available to all Squadron Staff, Advanced MW Course and will be incorporated into FCD 14.

CONFIDENCE LEVELS

"Ninety five percent confident that no more than two mines are left in this route"
"What..this route? What about this other route?"
"Same...and the same in this anchorage box..and the same in these boat lanes"
"So how many mines remaining altogether then?"
"Well,...er...I'm ninety five percent certain that no more than two mines are left....I think!"

Confused? Well, as a minewarfare specialist I always had a problem understanding this concept and it becomes even more confusing (and frustrating) when we try and explain this to the CTG / CTF. They want to hear what the risk to their assets are, and the operations officers of our minehunters want to know what clearance levels they need to achieve (we all know that exploratory ops CL 95% T=2 is approximately 63% clearance....so why not just task 63% clearance!).

The UK lobbied the NATO Working Group in 2000 and it was unanimously agreed that RISK levels should be the means of reporting MCM effort achieved up the reporting chain, and that effort required by the MW Commander can be tasked to the MCM assets using clearance percentage levels.

A presentation by the UK was given to the MW Conference in Ottawa June 2001 and it was agreed that Eguermin (ABNL Minewarfare School) will revisit the MCM EXPERT algorithms to allow this change of doctrine to occur and will raise their findings at the next MW Working Group. In the meantime, UK MCMTAs have already begun the process of shelving confidence level reporting and tasking.

What does this mean at the front line? Well, MW Cdrs should at last be able to consult with Maritime Component Commanders to determine a 'target' minimum Risk level (based on intelligence / threat / environmentals / assets / time and so forth) and units could be tasked to conduct initial exploratory operations to achieve a 63% clearance level (for example). All MW assets will have to calculate and report residual risk throughout the task and ensure that factors incorporated into the DARE algorithms are accurate (more on this later).

This fundamental change in doctrine will require further refining and explanation, but hopefully the 'black art' of minewarfare effort tasking and reporting will be less confusing.

MCMTA ANALYSIS CELL

Why are we looking at incorporating a mobile analysis cell into the MW Cdr's MCMTA? Some of the reasons include:

a) Recent PC (Percentage Clearance) trials conducted during NATO exercises have confirmed that different minehunters from various nations can be sent to hunt exactly the same small stretch of mined route and come up with completely different figures for bottom type, mine burial etc and thereby arrive at significantly different RISK levels. Some of these figures can be simple errors (% mine burial is a common mistake) and can be missed by the MCMTA Staff. The Analysis Cell can help identify these errors and also advise on 'default' settings to aid in more accurate RISK assessments (eg mine burial is zero unless sea bed conditions change significantly / ship count is 1 based on intelligence etc) and ensure that these are reflected in tasking signals.

b) During live operations, MCM units will be check ranged in theatre using a mobile multi-influence range, Threat Mine Simulation System (TMSS) data will be re-evaluated, Weapon Practice Assessments will be conducted. All of this activity can be achieved in a relatively short space of time immediately prior to deploying into a mine threat area / minefield (and updated during Operational stand-offs) and provides the MW Cdr with a 'snapshot' of his units' caps and lims and can also serve to provide confidence in your own ship systems and Self Protective Measures. The Analysis Cell will coordinate this effort and incorporate findings into the MCM plan. Portions of the above have been achieved successfully during Exercises ARABIAN GAUNTLET 2000 and SAIF SAREEA 2001 and are not limited to MMs (FF/DDs can take advantage of these analysis tools in theatre).

c) With Communication Support Systems capability improving and the likelihood of Additional Military Layers (AMLs) providing the MW Cdr with improved access to environmental intelligence and 'reachback' facilities to UK, the Analysis Cell can use these tools to assist the MW assets in optimising equipment performance.

The current team of SANO / ASANO have already deployed to Exercise SAIF SAREEA (Oman) to assist the MCMTA and are likely to be a feature of further deployments to potential 'hot spots' such as the Gulf to progress this in theatre, near real time analysis capability.

MCMFORNORTH 2002

For those few that do not know, HMS DUMBARTON CASTLE has been fitted out to fulfill the role as the MCMTA platform for NATO MCM Force North from May 02 to May 03. The UK Commander of this NATO force, currently programmed to deploy to USA and CANADA, will be Cdr Adrian Cassar.

SWO1 POST CHANGES

At the time of publication, my post will have been filled (for a 3 month period) by Lt Cdr Graham Collins, whose recent experience as a staff officer from COMUKMARFOR will have proven invaluable in progressing UK MCM integration into Joint Force operations. This post should now be filled permanently by Lt Cdr David Bence, previously Staff warfare Officer (Comms) on F4's staff. Although he will face a new challenge of moving into the new Fleet First regime in HMS EXCELLENT during the Spring 2002 period, I am sure he will enjoy the job as much as I did.

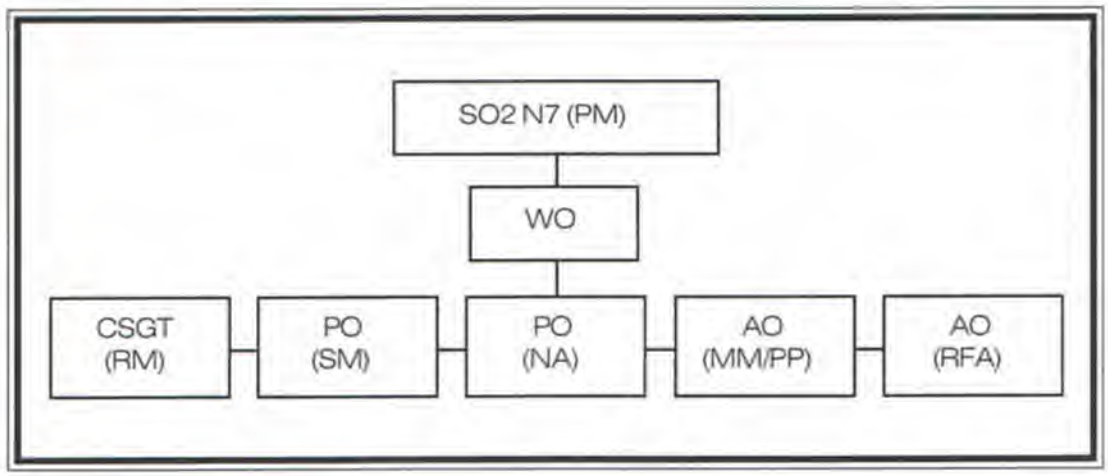
PRISM (OC)

Warrant Officer Pete Cawsey

For those who have spent the past six months or so in the far-flung corners of the world, it may surprise you to hear that I relieved Tony Mulrain in November 2000 as the PRISM OC Information Manager. (Yes I did come kicking and screaming all the way down to Portsmouth!).

PRISM is now being used on 37 "platforms" (30 ships and 7 Diving Units) and, I like to think, a good two-way flow of information has been established between the users and the office here in Lancelot Building. All training and "help-desk functions" is done from here. The door is open and the telephone is always there; (answered by myself or Jacqui (her official title is OCIM Assistant – but I can honestly say she was/is the Subject Matter Expert for many months after I joined (and she probably knows more than me today!)). We welcome the opportunity to chat and help out where required.

As a result of Fleet First, my post has been end-dated 31 March 2002. PRISM (OC) responsibilities will transfer to the Performance Measurement Cell with the following proposed structure:



A TNA study is currently being conducted with a view to the training being formalised as part of a career course or as a separate PJT (watch this space).

As part of the Fleet First rationalisation, a PRISM (OC) data viewing system will be incorporated into the secret domain of CHOtS and this will allow all those with access and permissions to view the current OC of any unit.

OPERATION WAVE KNIGHT 2 – 27 JULY 2001

Lt Cerl Schünmann RN, OiC NDU1

INTRODUCTION

In February of this year, BAe Systems requested, via the Defence Procurement Agency, the services of Northern Diving Unit 1 to remove the port and starboard After Poppets from the recently launched RFA WAVE KNIGHT at Buccleuch Dock, Barrow-In-Furness. The After Poppets were designed to support the vessel during her conventional launch but had been assessed by her Naval architect as presenting a stability and hydrodynamic hazard that would need removing prior to her first voyage to Glasgow in August. After receiving approval from SofD to commit assets to the project, WO(D) Dave Morris and I travelled to Barrow to conduct a task appreciation dive on the hull of RFA WAVE KNIGHT. Given the quantity of steel and the often difficult access required, the extent and complexity of the task became only too clear and our initial estimation of 3 weeks to complete the task was swiftly revised to 4. The acquaint dive was followed by a logistics planning meeting with the Auxiliary Oiler management team with the formal acceptance of the task arriving shortly thereafter.

PLANNING/TRAINING

Given the magnitude of the project, a great deal of planning ensued and large quantities of stores and equipment were either ordered or begged/borrowed/stolen (Diving Units concerned please delete as necessary).

As BROCO was the cutting equipment of choice, it seemed prudent to conduct a tool training period in June at Tarbert using FDT IRONBRIDGE (YOYO) as the support platform. The DDS BROCO Instructor in attendance, L/Cpl Al Dunnett, couldn't fail to be impressed with the team's initial artistic interpretation of the instruction to, "cut clean, straight lines" by opting for more of a 'small child's crayon drawing' style. However, by the end of the week all involved were capable of cutting 1" steel plate to the required accuracy and speed (or perhaps L/Cpl Dunnett was just being tactful).

OPERATION WAVE KNIGHT

Thus, at the beginning of July, the team of 15 augmented by personnel from NDU 2 and SDU's 1 and 2 travelled to Barrow to begin the task. After setting up the dive site under the direction of CPO(D) Terry Heald and positioning YOYO on a catamaran beneath the stern of RFA WAVE KNIGHT, the task began in earnest with 3 waves of 3 divers (wearing KMB 17) per day. Needless to say progress was initially slow but quickly increased in pace as routines were refined. Each After Poppet consisted of a row of vertical vanes supported at the base by a horizontal deck plate. The 20 vertical vanes on each side were removed from aft to for'd in sections of less than 1 tonne. Each vane was supported by an enclosed floatation bag, 1 ˚ tonne chain hoist, kevlar strop and 5 tonne shackle prior to cutting and each vane took approximately 6 hours to remove. When each section had floated free, it was towed by the floatation bag to FDT IRONBRIDGE and lifted onto the adjacent catamaran. When sufficiently loaded, the catamaran was towed away by BAe Systems personnel, unloaded by jetty crane and returned. When a sufficient number of vanes had been cut away, the deck plate was removed in sections using the same method.

During the project, the BROCO provided a slow and rugged yet entirely satisfactory cutting capability and the prototype Plasma Arc cutting equipment was trialled during the second week with the assistance of SEO(D), SSA DTech and SALMO (South).

Sunday was designated the rest day each week so, unsurprisingly, all involved ensured that the R & R was truly appreciated by spending the majority of Saturday night shaking a mean hoof on the 'Gaza Strip' as it is affectionately known by the locals; try and picture 5 or 6 absolutely heaving Joanna's in a row and you get the general (albeit fairly disturbing) idea.

Midway through the task there was a team changeover to allow another wave of personnel the opportunity to participate and so the pace slowed again while the members of the new team familiarised themselves with the task. Inexplicably, the previously glorious weather closed in for the second 2 weeks and so the advice to the new joiners to bring shorts, shades, factor 30 etc seemed ill-founded and Gortex sadly became very much de rigueur.

All involved were affected to differing degrees by the not infrequent, minor but irritating electric shocks inherent to BROCO, an uncontrollable outbreak of 'KMB neck' and Unisuits sponsored by Tetley's (preventing leaks was impossible due to the jagged edges that remain after BROCO cutting). However I am sure that I can speak for the entire team in stating that this was more than made up for by the simple fact that it was an extremely professionally satisfying and enjoyable project (and Saturday night in Barrow-in-Furness is a weapon-grade run ashore!).

FDT IRONBRIDGE provided an invaluable service throughout Operation WAVE KNIGHT. Simultaneously supporting 3 KMB 17 divers operating BROCO cutting equipment and pneumatic tools as well as providing the craneage to lift large sections of steel suspended under commercial diving enclosed floatation bags onto a catamaran, she proved the ideal platform to enable the project to run efficiently and safely and highlighted the worth of a heavy-duty diving workboat for detached UWE use.

CONCLUSIONS

Operation WAVE KNIGHT was completed after 3680 hours of UWE and 20 500 minutes of diving time with approximately 40 tonnes of 1" steel removed. A benchmark UWE venture for NDU1, it was enormously rewarding for the team to autonomously progress the WAVE KNIGHT project from inception to successful realisation. The Operation also afforded all participating personnel with the opportunity to gain invaluable and comprehensive underwater cutting, pneumatic tool-work and slinging expertise which can be directly applied to the field of UWE within the RN environment.

BLUE GAME 01

by Lt Cdr C M Baldwin

Exercise BLUE GAME 01, a major NATO Exercise conducted between 23 April and 11 May 01 in the Skaggerak and Kattegat, was a great surprise to me having had little exposure to Mine Warfare since my days as Jim of INVERNESS and those Part IV(Kyles Guardship)Trials. But I having joined DRYAD as MWTAC, after my appointment as PWO(A) in MARLBOROUGH, Steve Field quite rightly thought I needed some revision. So I got nominated to augment BG, as part of the Norwegian CTG's Staff embarked in HNoMS HORTEN (former Norwegian Royal Yacht - if you see me in the bar one day, ask me about the giant wooden hippo!) I was not too sure of my ToR but what the heck, having just completed the AMW Course I felt totally prepared. I was actually the only Brit on the Mine Warfare Staff, which also boasted one Norgie Cdr, 2 Danish L/Cs and 2 German Lts. It was obvious that the Danes were going to be a lot of fun, because they immediately pointed out the 'Slang Board' on one of the Ops Room bulkheads. "You can put down any English Slang verds you vont on there Kris, so that we are knowing vot you are meaning". Half an hour later the small A4 sized notice had been turned into a mini-'Jack Speak' Stateboard. Everyone agreed that 'I'm going to my scratcher for some zeez, give us a shake when scran is on.' was by far the most useful phrase they were introduced to.

I had joined HORTEN at the start of the second week of BG and was plunged straight into the C2 of an MCM operation. I will never forget hearing the question from Commander Berkhau - "Do you know how to use MCM Expert?" and after confidently replying in the affirmative thinking "Oh Christ! Now what did Jonathan Lee tell us about it". It was actually great to put into practice all the things you've just learnt so soon after being taught, something which does not often happen in the RN. Interestingly enough subsequent analysis of the use of MCM EXPERT in BG revealed considerable gaps in knowledge. Significantly, MCMFORNORTH and the French MCM force did not use EXPERT at all. Also when using DARE for residual risk reporting, it was apparent that evaluation of non-uniform effort had been entered into DARE software. This is not a valid input for DARE.

The role of CTG afloat as a concept, worked relatively well, but as usual in the MCM discipline, the whole operation was let down by comms. Relying on the broadcast for signal traffic was never going to work and as expected priority signals began to take longer and longer to arrive as the backlog built up. By the time BG entered the final phase MCMREPs from the 6 CTUs were taking 14-15 hours from despatch to receipt. Also DISTAFF gave us the task of running a mine recovery tote - which would have been fine if we'd had comms with the mine recovery vessels. With only 3 on watch at any one time trying to keep all the stateboards up to date was a nightmare!
The 6 CTUs working for the CTG comprised MCM3 based in Kristiansand, MCMFORNORTH, a BE/NL MCMV Force, a German MCMV Force and CD Teams including a USN Mammal Team with both Mk4 and Mk7 systems (dolphins - only in America!). MCM Forces were operating in 2 mine threat areas, one off the southern Norwegian coast and the other off the northern Danish coast. Overall 240 mines or decoys were laid in the exercise area. Each CTU was allocated responsibility for an area and had TACON for tasking MCM forces accordingly. Success was varied, but 140 or so mines were accounted for which for relatively short period of operations and allowing for diversions, mis-laid mines, un-huntable bottom types and use of alternative routes was not a bad effort. The mammals performed very well and found all contacts in their allotted areas. Only the poor old Poles failed to locate anything.
Another 'interesting' phase occurred when COMSTANAVFORLANT took over as CTG, with the Norwegian CDRE, embarked in HORTEN, becoming Mine Warfare Co-ordinator with delegated TACOM of MCM CTUs. Given the comms situation this was a risk but in practice did not really affect operational C2. (Though reliance as usual fell on the cellnet backup for realtime SITREPs). MCM3 was rather concerned with the signal from the CTG, after aggression had been declared, authorising ships to 'Engage all aircraft in self defence.'!!!!

Working a 6 on - 6 off watch routine (including alongside in Aalborg!) was a drag as it always is - I prefer an 8 hour watch, better for sleep and personal admin. But there was never a dull moment and though it did not satisfy all individual unit aims BG has certainly grown in stature since the days of BOLD GAME and BLUE HARRIER.

Over 70 ships from 15 NATO nations took part, including 26 MCMVs and 3 Minelayers. 2 B52s also participated laying a mine line in the exercise area. MCM3 got the chance to work with a coastal SSM battery providing ASuW protection. The MCMVs played a key part in the ROE escalation and their vulnerability to the German FACs was particularly noticeable. It was great to see the OPFOR FACs using their own minefields to great advantage, both in testing NATO resolve prior to aggression and also once the shooting started. The resources available in the Exercise was the 'surprise' I mentioned at the start - along with the surface units there were German TORNADOs, Norwegian and Danish F16s, various Helo detachments including MERLIN, RN and RM LYNX and 2 submarines, one of which conducted a minelay operation. A USN P3 ORION and the Norwegian stealth ship SKJOLD were the icing on the resources cake. On completion of the exercise the MCM participants headed for Fredrikshaven for some well earned RnR. Fortunately I survived unscathed that night despite eating the most revolting hotdogs in my entire life - assured by my Danish colleagues to be the 'Best Dogs in the World' - and returned to the Pompey via Esjberg - Aberdeen - Leeds - Southampton. A great experience and an enjoyable exercise which has given me a much needed Mine Warfare review.

The Royal Navy Clearance Diving Branch 1952 - 2002

by Lt Cdr Rob Hoole

Golden Jubilee of the RN Clearance Diving Branch

On 7 March 2002, the RN Clearance Diving Branch will celebrate the 50th Anniversary of its formation and there will be several events during the year to mark this Golden Jubilee occasion. This article is intended to provide a little background information on the development of diving in general, explain how the Clearance Diving Branch came to be formed and describe its activities to date.

The Development of Diving

According to Sir Robert Davis's book, Deep Diving & Submarine Operations, archaeological excavations have revealed mother-of-pearl inlays dated as early as 4500 BC which must have been gathered by breath-held divers. Although this is the earliest indication of man's first technique for underwater work, there are many other examples of early attempts at diving, both military and commercial. For many years, an Assyrian frieze (900 BC) in the British Museum was thought to depict an underwater warrior breathing air from a goatskin lashed underneath himself. However, closer inspection reveals this to be a flotation device kept inflated via a breathing tube by the user – the world's first example of water wings!

Several authors refer to abortive attempts at diving throughout the earlier part of the first millennium but it was not until Becker (1715) that a working personal diving apparatus was demonstrated in London with a diver reportedly staying under water for about an hour. In 1754, Dr Richard Pococke's Travels in England contains an account of divers engaged in salvage operations on a man of war off the Needles who were supplied with air from the surface and worked underwater for 5 minutes at a time. In 1783, the Encyclopedie Methodique refers to similar operations on the wreck of the HMS Royal George at Spithead.

Later designers of theoretical (and largely problematical) diving apparatus included Freminet (1772), Forfait (1783), Pilatre de Rozier (c.1783), Klingert (1797), Burlet & Sardou (1798), Forder (1802), Fullerton (1805), Drieberg (1808) and James (1825) who designed the first self-contained diving dress provided with a supply of compressed air although it does not seem to have ever been developed or tested.

In 1819, Augustus Siebe introduced the first pattern of his diving dress and helmet. The original form was known as the 'open' dress and consisted of a brass 'hard hat' helmet, equipped with a viewing port, attached to a jacket reaching to the waist. The helmet was supplied with air under pressure from a pump on the surface and could escape freely at the diver's waist. In 1837, Siebe modified his original 'open' dress by enclosing the diver (apart from his hands) in a waterproof rubberised canvas suit to which the helmet was attached. This was known as Siebe's 'closed' dress and was to become the world's Standard Diving Dress, the most widely used diving equipment until World War II. In a modified form, it can still be found in use throughout the world.

In 1866, the first self-contained open-circuit (breathed air exhausted) breathing apparatus was designed by Frenchmen Benoist Rouquayrol and Auguste Denayrouze. This was a demand regulator system mentioned by Jules Verne in his classic 'Twenty Thousand Leagues Under the Sea'. This book, written in 1869, described the apparatus and its use in a conversation between Captain Nemo and Professor Arronax.

In 1878, the first practicable self-contained closed-circuit (breathed air recycled) breathing apparatus was designed by Henry A Fleuss, an English merchant seaman, in association with Siebe, Gorman & Company. This consisted of a watertight face mask connected by a tube to a breathing bag, a copper cylinder of air compressed to 39 atmospheres and a chamber of CO_2 absorbent (rope yarn soaked in caustic potash) through which the air was breathed. Fleuss's diving set was used successfully during work in

flooded collieries in 1880 and by Alexander Lambert in his famous exploit in saving the flooded Severn Tunnel in 1882. In collaboration with Fleuss, R H (later Sir Robert) Davis modified this equipment to produce the Siebe, Gorman 'Proto' and 'Salvus' breathing sets used by British, American and other Allied armies for mining, tunnelling and other military operations during the First World War. Subsequently, these designs led to the Davis Submerged Escape Apparatus (DESA) that was intended not only for submarine escape but also for work on the sea bottom and about ships' hulls.

In 1943, the development of a self-contained open-circuit breathing apparatus was re-visited by a French naval officer, Commander LePrieur. His design used a tank of compressed air but did not include a demand regulator. The diver was thus forced to spend much of his time manipulating a valve to control his air supply. This, coupled with a short endurance, severely limited the practical use of the equipment. In 1943, two other Frenchmen, Captain Jacques-Yves Cousteau and Mr Emile Gagnan successfully demonstrated a set with an improved demand regulator and high pressure air tanks and this became the first truly successful open-circuit self-contained diving apparatus. Thus, the 'aqua-lung' was born as used by the Royal Navy and thousands of SCUBA (Self-Contained Underwater Breathing Apparatus) divers to this day.

Military Diving

The first recorded military diving occurred in 1838 when a Royal Engineer, Colonel Pasley of the School of Military Engineering at Chatham, undertook to demolish the wreck of a collier blocking the Thames fairway at Tilbury. After unsuccessful attempts to place explosive charges using the diving bell from the Naval Dockyard, Pasley trained a number of his soldiers in the use of the diving equipment. Having first tested the concept himself, he became the first Service diver on 28 April of that year. Within a short period, charges had been successfully laid by divers of the Royal Sappers and Miners and the wreck was demolished. Between 1839 and 1844, Army divers under the command of Colonel Pasley conducted salvage operations and then disposed of the wreck of HMS Royal George which was posing a menace to navigation at Spithead. During this period, Colonel Pasley evaluated a number of different types of diving equipment and, in his final technical report, recommended the use of Siebe's diving dress for 'public service'.

HMS EXCELLENT's Connection

Having persuaded the Navy of the advantages of Siebe's diving equipment over the unwieldy dockyard diving bell, Colonel Pasley subsequently detached Lance Corporal Jones, Royal Engineers to HMS Excellent to train a party of 13 petty officers and seamen in its use. Subsequently, RN diving became the responsibility of the Gunnery Branch at Whale Island while Army diving continued to be the responsibility of the Royal Engineers.

HMS VERNON's Connection

HMS Vernon, the name eventually given to the shore establishment, was originally that of a hulk anchored in Fountain Lake. Initially a tender to HMS Excellent, it was used for Torpedo and Mining training from 1872 but became an independent command on 26 April 1876 when it moved to Portchester Creek to become the home of the Torpedo Branch. On 1 October 1923, HMS Vernon (or 'The Vernon' as it came to be known) was established ashore on the site of the old Gunwharf (now the millennium development known as Gunwharf Quays) where Mining, Whitehead [torpedo] and Electrical departments were formed. During the First World War, work was concentrated on torpedo trials and training and the research and development of anti-submarine devices and training in their use as well as mines and all matters electrical.

During the Second World War, HMS Vernon became responsible for mine disposal and mine countermeasures. Her officers and scientific staff achieved several coups involving the capture of mines and the development of countermeasures. One of the earliest of these was the rendering safe and recovery of the first German magnetic mine (Type GA) at Shoeburyness on 24 November 1939. For this deed, Cdr John Ouvry was decorated

with the DSO by King George VI at a ceremony on HMS Vernon's parade ground on 19 December 1939. Others decorated at the same time for this, and other tasks where mines were rendered safe for recovery and examination, were Lt Cdr Roger Lewis (DSO), Lt J E M Glenny (DSC), CPO C E Baldwin (DSM) and AB A L Vearncombe (DSM). Of particular note, these were the first Royal Naval decorations of the war.

In June 1940, the first attempt to render safe a ground mine by divers was made in Poole Harbour, Dorset. A diving unit from HMS Excellent, supported by divers trained in Rendering Mines Safe (RMS) techniques from HMS Vernon, successfully removed the fuze from a Type GC mine underwater although the mine exploded as it was towed inshore. For his central role in this task, Able Seaman Diver R G Tawn was subsequently awarded the DSM. On discovering the skill of HMS Vernon's mine technicians, the Germans placed booby traps in some mines. One was fitted with a small explosive charge that detonated when the mine was stripped in the mining shed at HMS Vernon on 6 August 1940 causing the deaths of 1 officer and 4 ratings and serious injuries to other personnel. Following this, mines were stripped and examined at a nearby disused quarry that was nick-named HMS Mirtle (short for Mine Investigation Range).

Various sections of HMS Vernon were dispersed to sites throughout the country following heavy air raids, one of which demolished Dido Building and killed 100 people in a single night. On 3 May 1941, the main part of HMS Vernon was evacuated to Roedean Girls' School at Brighton (Vernon(R)) where bell pushes on the dormitory bulkhead were purportedly labelled 'Ring for a mistress". Other sites included Havant, Purbrook, West Leigh, Stokes Bay, Hove, Dartmouth/Brixham, Helensburgh, Edinburgh and Port Edgar.

Although many naval divers were trained at HMS Vernon in Rendering Mines Safe (RMS) procedures as members of the Mine Recovery Section during the Second World War, it was not until 1 October 1944 that responsibility for naval diving passed from the Gunnery Branch, still based at HMS Excellent, to the Torpedo Branch based at HMS Vernon. This brought Minewarfare (both mining and mine countermeasures) and Diving under the same organisation for the first time. Owing to the wartime evacuation measures, a new diving school and experimental station known as Vernon(D) was set up at Brixham on 27 Oct 1944. The RN Superintendent of Diving, responsible since 1942 for the Admiralty Experimental Diving Unit based at Siebe, Gorman and Co, Tolworth, Surrey and for the coordination of diving training in addition to research and development, moved to Brixham together with HMS Tedworth, the RN Deep Diving Tender. Almost immediately, Vernon(D) became overwhelmingly occupied with the training and support of 'P' (Port Clearance) Parties (Naval Parties 1571-1575 and 3006) until 1 October 1945 when the organisation moved back to HMS Vernon proper at Portsmouth.

On 10 October 1946, the Torpedo Branch divested its Electrical responsibilities to the recently formed Electrical Branch and merged with the Anti-Submarine Branch to form the Torpedo and Anti-Submarine (TAS) Branch. Hence, the TAS Branch assumed responsibility for naval diving. HMS Vernon remained the home of the TAS Branch until the Summer of 1974 when it was devolved to HMS Dryad prior to the formation of the Operations Branch in early 1975. Training in Diving, Demolitions and Minewarfare, along with Naval Control of Shipping and, for a time, Seamanship, continued on the site of HMS Vernon even after it ceased to be an independent command on 31 March 1986 and was renamed HMS Nelson (Vernon Site). In 1987, the establishment was renamed HMS Nelson (Gunwharf) and briefly became Headquarters for the Commandant General Royal Marines before his move to permanent accommodation on Whale Island. In November 1995, Minewarfare training was shifted to the School of Maritime Operations (SMOPS) HMS Dryad. Diving training, together with the Superintendent of Diving, the Fleet Diving Headquarters, the Fleet Clearance Diving Team and the Portsmouth Area Clearance Diving Team moved into new accommodation on Horsea Island and the old Vernon establishment closed its gates for the last time on 1 April 1996.

Full Circle

Following a long period when Royal Naval diving training (and latterly Army diving training) was based on the same site at HMS Vernon and its successors, it is now conducted

at the Defence Diving School, Horsea Island and is back under the auspices of HMS Excellent where it all started. Thus, naval diving training has come full circle. The Army's diving training tank at Horsea is even named after Colonel Pasley to commemorate the important role he played in instigating military diving.

Naval Diving

Today, there are two types of diver in the RN: the Ship's Diver, who can be of any rank or specialisation and is trained to use self-contained open-circuit compressed air diving apparatus to search the ship's bottom for explosive devices or perform simple underwater engineering tasks; and the Clearance Diver (CD) who is a specialist trained in the use of all types of service diving equipment including closed circuit mixture breathing apparatus to perform deeper diving, Explosive Ordnance Reconnaissance (EOR), Explosive Ordnance Disposal (EOD), salvage operations and complex underwater engineering tasks.

Clearance Diving

Clearance Diving takes its name from the operations carried out towards the end and after the Second World War to clear the ports and harbours of the Mediterranean and Northern Europe of unexploded ordnance and booby traps laid by the Germans. This work was undertaken by RN Mine and Bomb Disposal Units and later by Port Clearance Parties or 'P' Parties, two of which (Naval Parties 1571 and 1572) went into action soon after D-Day to clear the vast quantities of unexploded ordnance and general debris left after the Allied invasion. They were joined later by other 'P' Parties including NPs 1574, 2444 and 3006, many of which had Dutch and Commonwealth naval personnel. Work in the European theatre continued well into 1945 when a total of 6 'P' Parties were involved. Members of RN Mine and Bomb Disposal Units, and later, 'P' Parties, were among the most highly decorated of the war. While the Mine and Bomb Disposal Units suffered many grievous casualties, not a single member of a 'P' Party was lost despite having cleared the ports of Cherbourg, Caen, Dieppe, Le Havre, Boulogne, Rouen, Calais, Ostend, Terneuzen, Zeebrugge, Bruges, Flushing, Amsterdam, Rotterdam, Hamburg, and Bremen. 60 mines were cleared at Bremen alone. Lt Cdr Lionel 'Buster' Crabb was one of those involved in clearance operations in Italy having seen success against the limpet mines placed on ships in Gibraltar harbour by Italian charioteers operating from a ship interned across the bay in Algeceiras harbour. On 19 April 1956, he was to disappear in mysterious circumstances when the Soviet cruiser Ordzhonikidze brought Kruschev and Bulganin to Portsmouth.

Other naval organisations that made a contribution to the CD Branch include:

Standard Divers. These 'professional divers' of pre-war days were trained at HMS Excellent. Among other things, they carried out much research and experimental work in conjunction with eminent scientists such as Sir Robert Davis of Siebe, Gorman and Professor J S Haldane for the furtherance of diving knowledge. Officers and sailors, mainly from the Gunnery Branch, became Qualified Deep Divers. For some time after the war, they served in the Fleet as Clearance Divers but gradually they were phased out or transferred to the CD Branch.

Admiralty Experimental Diving Unit. The AEDU was formed in 1942 under the command of the first RN Superintendent of Diving, a submarine officer from HMS Dolphin, Lt Cdr (later Capt) W O Shelford. The unit was based at the Tolworth, Surrey works of Siebe, Gorman and Co Ltd and a close partnership was formed during the war years. Here, all the diving equipment was developed for human torpedoes (chariots), midget submarines (X-craft), mine recovery parties and, later, for the 'P' Parties. An exhaustive programme of human experiments was conducted on oxygen diving and other physiological problems associated with diving with Professor J S B Haldane (son of J S Haldane) acting as the adviser. AEDU continued to perform its work at HMS Vernon until shortly before its closure.

The Mining Department and the Mine Design Department of HMS Vernon. During the Second World War, the Mining Department was set up under the Director of Torpedoes and Mining at the Admiralty with responsibility for the recovery of enemy mines,

both above and below water. Rendering Mines Safe (RMS) teams were also responsible for the disposal of unexploded mines. Recovered mines were exploited by the Mine Design Department to discover how they worked and, thereby, how they could be swept or countered.

Landing Craft Obstacle Clearance Units. The 'LOCKUs' were a vital part of the D-Day invasion forces in Normandy and they laid the foundations for the beach clearance techniques that are used today. Those remaining after the war were eventually incorporated in the Clearance Diving Branch.

Naval Bomb Disposal Teams. These were set up under the Directorate of Naval Ordnance during the Second World War to discharge the Royal Navy's responsibility for dealing with unexploded bombs on its own property.

X-Craft and Chariot Crews. These belonged to the Submarine Branch but the crews were required to train as divers. Much of the work devoted to their training and to the development of their equipment was conducted by AEDU and contributed to the diving techniques and equipment in use today. X-Craft, with divers embarked for cutting through defensive nets and attaching limpet mines, attacked the German battleship Tirpitz in Norway in September 1943 and were also used successfully in the Far East. British charioteers operated in the Mediterranean and the Far East.,

With the end of the war, Vernon(D) at Brixham was closed on 1 Oct 1945 and the 'P' Parties moved their headquarters to HMS Vernon but only for a short period. It was decided to integrate the 'clearance' divers more closely with the mine countermeasures establishment at HMS Lochinvar in Port Edgar on the Forth and this is where the members of the last 'P' Party (NP 2444) were sent in March 1946 after having cleared Dunkirk. In the meantime, HMS Vernon became the centre for Deep Diving and AEDU moved here from Siebe, Gorman at Tolworth. Something of a division then sprang up between the deep divers at Vernon (the 'Steamers') and the Clearance Divers at Lochinvar (the 'Corkheads').

Formation of the Clearance Diving Branch

In 1950, a Home Station Clearance Diving Team was set up and other Clearance Diving Teams were soon established to support the Mediterranean Fleet and the Far East Fleet. In 1951, clearance diving training moved from Lochinvar to Vernon and a new Clearance Diving School was established combining the training of clearance divers with that of 'deep' divers. This school also took on the new task of training Ships' Divers so that every ship had a properly equipped air diving capability under its own Diving Officer to conduct ship's bottom searches and undertake simple underwater engineering tasks. The Clearance Diving (CD) Branch was officially formed under Admiralty Fleet Order (AFO) 857/52 on 7 March 1952 although a training nucleus had been set up some 2 years earlier to take advantage of the few remaining men with wartime experience. These officers and ratings had, in the main, qualified as Shallow Water Divers trained to use the Sladden 'Clammy Death' diving dress and oxygen breathing apparatus. They were joined by other officers and ratings Qualified in Deep Diving (QDD). On 25 February 1966, the Minewarfare and Clearance Diving (MCD) Branch was formed for officers. Those officers already qualified as CD and TAS automatically became MCD Officers while those qualified only as CDOs undertook a conversion course to be trained in Minewarfare, until then, the prerogative of TAS Branch officers. TAS (UW) and (UC) ratings continued to perform Minewarfare duties until 1975 when the Minewarfare (MW) sub branch of the Operations Branch was formed together with the Diver sub branch. In 1981, the MCD Branch took over responsibility for demolitions training from the Sonar (ex-TAS UC) sub branch of the Operations Branch.

Deep Diving

In June 1948, HMS Reclaim entered service and was to be the RN's deep diving tender for the next quarter of a century. Almost immediately, she grabbed the world's headlines

when, within two months of commissioning, Petty Officer W Bollard claimed the world deep diving record at 535 feet. She went on to undertake several more headline grabbing tasks by finding, and often assisting in the deep salvage of various submarines (including the Affray in April 1951), aircraft, helicopters and weapons lost during trials. On 12 October 1956, Lt G A Wookey dived from HMS Reclaim to set a new deep diving record of 600 feet in Sor Fjord, Norway. The CD branch retained a deep diving capability using the venerable Deep Diving Trials Tender HMS Reclaim, the short-lived Seabed Operations Vessel HMS Challenger and the chartered Seaforth Clansman as saturation diving platforms for NP 1007 until the late 1980s when naval deep diving was abandoned because it became more cost-effective to use commercial resources when required.

Other Achievements

The CD Branch has been kept active throughout its existence. The Mediterranean CD Team undertook the clearance of WWII ordnance in Grand Harbour, Malta. During Operation Rheostat in 1974/5, the Fleet Clearance Diving Team worked with RN MCMVs to clear the Suez Canal of ordnance and other military debris following the Arab-Israeli 6 Day War. The final tally included 209 tons of TNT bombs of various sizes, about 800 anttank and anti-personnel mines, 6,000 rounds of ammunition and 70 various missiles. During Operation Hemicarp in 1977, RN CDs co-operated with their US counterparts to clear ex-US and Japanese WW II ordnance from the waters of Tarawa and Tuvalu in the Gilbert and Ellis Islands. On a more peaceful note, 35 RN CDs worked with 18 Egyptian divers in 1977/78 to shift 16,000 tons of mud and 320 blocks of stone during the movement of important Egyptian monuments submerged by the construction of the Aswan Dam to a site replicating Philaeon Agilkia island.

CD teams worked in particularly arduous conditions conducting bomb and mine disposal during Operation Corporate in the Falklands in 1982 and in the Red Sea during Operation Harling in 1985. In 1987, they cleared Iranian mines in the Gulf of Oman and in the Persian Gulf during Operation Cimnel. In 1991, they were back in the Persian Gulf during Operation Granby, this time clearing hundreds of Iraqi mines laid off the shore of Kuwait.

Most recently, CDs embarked in RN minehunters were involved in Operation Allied Harvest (the clearance of allied bombs jettisoned in the Adriatic during the Bosnian and Kosovo conflicts) in 2000, and Operation Cleanex (the clearance of wartime ordnance in the Baltic) in 2001. Today, CD units remain busy around the country conducting explosive ordnance disposal, usually of wartime ordnance washed up on the beach or hauled up by fishing vessels, complex underwater engineering tasks on ships and submarines, search and recovery operations and many other tasks as well as providing Military Assistance to the Civil Powers (MACP) for such tasks as Improvised Explosive Device Disposal (IEDD) and Maritime Counter Terrorism (MCT). Clearance diving elements are also embarked in mine countermeasures vessels (MCMVs) as an integral part of the weapons system for mine disposal. Perhaps uniquely in the RN, members of the CD Branch perform their hazardous wartime role of dealing with live ordnance on a daily basis even in peacetime. Happy Birthday!

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To Render Safe by Lt Colin Churcher MBE RN
The Hidden Menace by Lt Cdr Maurice Griffiths GM RNVR
Mine Warfare Vessels the Royal Navy – 1908 to Date by Lt M P Cocker ARHistS RNR
Forecastle to Quarterdeck by Lt Cdr Harry Wardle RN
HMS VERNON – A Short History from 1930 to 1955 by Cdr E D Webb RN

THE APPOINTERS COLUMN

Introduction

Having taken over the DNOAX(SEA) appointing desk from Lt Cdr Tom Russell in June 2000 (and having just about recovered from the shock!), the Editors call for MAD MAG articles seemed a timely reminder to up-date you all on the state of your branch. Overall, the XSEA appointer is responsible for managing the careers of some 240 officers of which well over 50% are MCD/MW specialists (Lt Cdrs and below) with the remainder comprsing a small group of PT officers and a much larger number of more senior "SALT HORSE" officers.

State of the Plot

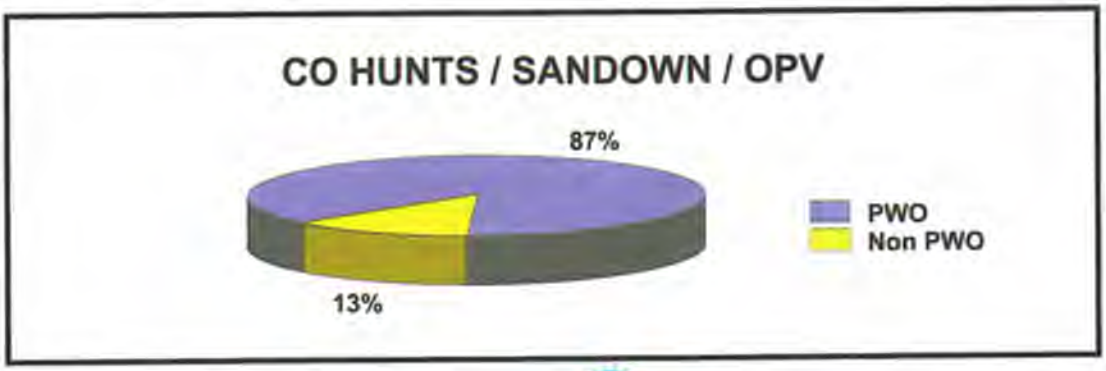
The current state of the MCD/MW plot is as follows:

Rank	Requirement	Strength	Over/Under Bearing
S/Lt/Lt	101 (65)*	62	-38%
Lt Cdr	46 (27)*	77	+40%
Cdr	15 (6)*	29	+93%

* - Figures in brackets show requirement to fill specialist posts. The overall requirement includes both X-Any (eg PWO) and Common Appointments (eg ISC/ACSC).

So what do the figures tell us? Firstly, it is obvious that we have a continuing and significant shortage of Lts (MCD/MW). This is principally due to the reductions in the recruitment/training pipelines of the early/mid 1990s working through the system and a slightly higher than normal PVR rate from the branch in recent years. The shortfall is particulalry noticable at the 2nd tour (MM/PP XO) level and has resulted in the extension of a number of appointments and the loss of some broadening opportunities before PWO Course. A further concern is the ratio between the full MCD officer and his MWO only collegues. The ideal balance (75% MCD/25% MWO) has been distorted in recent years to in around 48%/52% today in favour of the MWO and has led to a lack of diving specialists on 3 hulls. All is not doom and gloom however and although the figures may appear alarming there is no reason for panic as the shortages are being carefully managed to minimise turbulence. In addition, the problem is well understood within the NMA and a number of proposals (additional courses, changes to MCD selection/training procedures) are currently being staffed which should improve matters over the next few years.

At the Lt Cdr level, numbers are extremely healthy with the branch currently in surplus by approx 31 officers. Of the overall number some 2/3rds are PWO qualified with the remainder employed within deep specialist appointments. However, appointing opportunities reduce tremendously as officers without the wider warfare skills become more senior and the following diagram clearly illustrates, yet again, that the surest way to Command remains the PWO route.



Finally, the very healthy numbers of officers in the specialisation at the Commander level shows not only that most have been selected for and are being employed to use their wider warfare and staff skills but also great opportunties to gain promotion within the Service (31 SO1s from 77 SO2s ain't bad!!). In addition, MCD/ MWO officers (both junior and senior) have been much in evidence in this years promotion signals:

To Lieutenant Commander (WEF 1 Oct 2001)

Lieutenant A T F Kerr Royal Navy	(Dryad Ex FOST(MPV))
Lieutenant G J Wilson Royal Navy	(SDG Portsmouth)

To Commander (WEF 30 June 2002)

Lieutenant Commander B D Thompson Royal Navy	(FOST(MPV))
Lieutenant Commander B Mair Royal Navy	(Cdre (MFP))
Lieutenant Commander C J Davies Royal Navy	(NMA Portsmouth)

To Captain (WEF 30 June 2002)

Commander N Stanley Royal Navy	(COMUKMARFOR)
Commander P Burrell Royal Navy	(NMA NERTA)

(Although ETM by Branch Commander Burrell is also a fully qualified MCD Officer)

Staff Training

Almost all Lts will undertake the RNISC which, along with the ACSC, is now completed at the Watchfield Site (Shrivenham). In general the course is provided as part of the package leading up to PWO Course for those officers remaining main stream or as the precursor to your first Staff appointment for those remaining as specialists. The limitiations on numbers (24 X places per course with 5 courses per year) inevitably mean that some flexibility is required by all parties. For the more senior on the plot, the CNOA remit is to provide formal staff training to 45% of officers on selection to Commander. Put another way, over half of all RN officers selected for promotion are unlikely to be ACSC qualified and with only 24 places allocated to the RN for each ACSC competition is strong. However, over recent years the branch has taken its fair share of places available with 4 officers selected during 2000 either for the ACSC or an equally attractive foreign alternative.

Length of Appointments

As a general rule of thumb, most appointments will run for 21-24 months (sea) or 24 - 30 months (shore), with the exact timing depending on a range of factors including ship/unit programmes, provision of a suitably qualified relief, attainment of OPS and the availability of desired follow on appointments. In short, we prefer not to be too rigid with ERDs. Every appointment is subtly different and will require different considerations to be taken into account.

Loan Foreign Service Appointments

For the size of the specialisation the are a large number of LFS and/or Loan Foreign Service appointments available. It is fair to say the the numbers of opportunities to serve abroad have reduced over the past few years as the inevitable cost saving measures bite into the Personnel Exchange Programme (PEP). However, more recently we have seen a trend towards the deletion of positions with both the USN and Commonwealth Navies to free funding for the establishment of additional posts with our European allies, something that is expected to continue into the future. As it stands the following specialist positions are available overseas:

Country	Location	Appointment Type	Rank/Spec
Australia	Sydney/Sea	MCMV XO	Lt/MCD or MW
USA	Washington	Diving (UWE)	Lt*/MCD
USA	Indian Head	EOD	Lt/MCD
USA	Corpus Christi	COMINEWARCOM	Lt Cdr/MCD or MW
Canada	Toronto	Experimental Diving	Lt*/MCD
Saudi			Lt Cdr/MCD or MW
France	Toulon/Sea	MCMV XO	Lt/MCD or MW

For anyone in "plot-land" expecting to relieve Billy "Wee Jock Mc Plop" Kerr in Halifax, then I am afraid to say that this position was lost in the latest round of amendments to the PEP and no replacement will be sent when Bill returns in mid 02.

Commanding Officers Visits

Periodically your Commanding Officer will visit Victory Building to discuss all the members of their teams, so please make sure that you keep both them and your appointer fully up to date with your career aspirations and hopes for future employment. It is only by maintaining a healthy dialogue between CO, appointer and individual that I and my collegues can effectively manage your careers. Our crystal balls are without doubt state of the art but occassionally need an old fashioned written input to function effectively!!

LASS

This continues to be an emotive subject. All appointers will attempt to do what they can to give LASS when it is due but periodically there may well be occassions when no LASS is possible without jeopardising specific appointments or ship/unit programmes. Whilst fully recognising the difficulties, the message is try and take as much of your LASS during your appointments to avoid later disappointment (BR 8587 Art 0304a refers)

And Finally

Since taking over from Tom, I have found the job of managing your careers the most worthwhile, frustrating, rewarding and difficult appointment I have had in the service (remember explosives only high order once - people every 5 minutes in a difficult interview). Highly trained(!?) we try not to put square pegs into round holes (often anyway) but service requirements, constraints such as course failures/PVRs and the unexpected such as medical downgradings often conspire against us. For your part, keep your appointer fully informed of any changes in personal cirumstances and your short, medium and long term career aims and aspirations. Without your input "the fog of war can be thick indeed" and your dream appointment to a Faslane based MCMV (come on I know you are out there somewhere) could suddenly become an unwelcome 3 yr married accompanied exchange appointment with the Australian Navy - and we wouldn't want that would we.....

ROYAL NAVAL RESERVE

LEAVING THE REGULAR SERVICE?

If the answer is yes, have you considered a part time career serving in the MINEWARFARE BRANCH of the Royal Naval Reserve?

The commitment is two weeks continuous training per year plus an evening most weeks and the occasional weekend. Reservists receive naval pay and travelling expenses plus an annual tax free bonus which is currently up to £1,050.

Entry into the RNR is up to 45 years for both ex-RN Officers and Ratings. For further information, contact your nearest Reserve Training Centre or the Directorate of Naval Reserves, Room 028, South Terrace, HM Naval Base, PORTSMOUTH, PO1 3LS.

ROYAL NAVAL RESERVE
PROFESSIONAL MINEWARFARE COURSE

Q: How do we provide RN MCMVs with well trained and motivated RNR ratings?

A: Train RNR MW ratings on the RN OM2 course!

Simple to say but not easy to deliver yet, earlier this year, the first reservists have successfully completed the new RNR Professional Minewarfare Course at SMOPS in parallel with their RN counterparts.

The courses are fundamentally identical to the OM2 and the LOM courses, but because of the time constraints for RNR students, the challenge has been to adapt a significant percentage of classroom instruction and practical sea assessments to weekends without compromising the quality of training. The course planning process was spearheaded by Lt Cdr David Fearnley MW1(R) and Lt Lee Thorne, Reserve Training Officer and negotiation between SMOPS Minewarfare section to design and implement a high quality, credible and practical training package.

The outcome has been six weekend training modules delivered by RNR Officers and Senior Ratings at SMOPS, two sea weekend periods onboard HM Ships Chiddingford and Middleton and consolidated by the students joining the appropriate RN OM2 and LOM candidates for the final two week completion, examination and practical assessment. During this final key phase, integration between the RN and RNR was holistic, uniform and seamless and both reservists who sat the whole programme – AB(MW) Paul Adams (HMS Calliope) and SEA(MW) Neil Robinson passed the standard and achieved highly commendable results. In late October three RNR Ratings successfully completed the first ever LOM fortnight again in SMOPS alongside their RN Counterparts.

So what may be evaluated from the RNR Professional Minewarfare Course? It has been a bold move and indicates a milestone for both RN and RNR minewarfare wherein junior rates have the opportunity to develop into modern minewarfare operatives and provide an essential input into operationally deployed RN MCMVs. The course also illustrates genuine integration between RN and RNR lead training at SMOPS with a practical training package which has developed through the closest possible communication with the end user coupled with a real perception of the end user requirements. This augers well for the long term future of the RNR minewarfare branch and will be of real benefit to deployed lean-manned MCMVs.

Initial reports from Sea indicate that the professionally trained RNR Ratings are proving to be a valuable additional manpower resource, who are capable of quickly reaching OPS for their Rate. The RNR Minewarfare Training Group is currently working on, again in close co operation with the MW Section SMOPS, the development of the Assistant Operations Officer (OPS(A)). An RNR Lieutenant who will assist the Operations Officer during MW Operations.

FLEET DIVING UNIT 2 (FDU2) – OP BESSEMER

1. 5 members of FDU2 deployed to Op Bessemer to conduct EOD tasking between 22 Aug 01 and 12 Oct 01. The 5 men who deployed became part of 49 Field Squadron (EOD) RE, commanded by Major Mark Daubney RE. 36 Engineer Group, of which 49 Sqn were the EOD force, were commanded in theatre by Colonel AC Sheppard MBE RE.

2. On arrival in theatre FDU2 members were split into one 4 man EOD team (led by PO(D) Stewart) with OIC FDU2 taking a place as SO3 (RN) EOD at Brigade Headquarters. The arrangement worked very well with the team conducting a mixture of stand alone EOD tasks and providing EOD force protection and other duties as required. OIC FDU2 worked in the EOD Cell at Brigade as well as providing EOD Recce and advice to both Brigade and Battle groups (UK, Fr, or It) as required.

3. Op Bessemer was unique in its clearly defined area of responsibility. The key to the success of the Operation were Weapon Collection Sites (WCSs) of which 9 declared Sites were planned and executed. The variety of weapons handed in at these sites, and more significantly their condition upon being surrendered, could very easily have led to a major explosive incident occurring. This could not only have caused death or serious injury to NATO forces, but could have done so in front of the world's press and caused serious harm to the fragile peace process in the Former Yugoslav Republic of Macedonia (FYROM). It was the responsibility of the EOD personnel deployed to WCSs to ensure EOD safety was maintained and all weapons were destroyed in an appropriate manner.

4. OIC FDU2 acted as Weapons Custodian at 2 WCSs. This appointment was to ensure correct accounting and packing of all weapons deemed safe to transport to the destruction area at Krivolac. All weapons not safe (of which there were many) were destroyed on site. The Custodian then travelled with all weapons to Krivolac where they were formally handed over to the Greek Forces. FDU2's EOD team took part in the same 2 WCSs and assisted in the destruction of many items including a T55 MBT which could not be moved from its position.

5. Although the WCSs were the main EOD event during Op Bessemer there were other EOD duties to perform. Reactive EOD tasks were plentiful and gave all EOD operators valuable experience in a unique environment. Operations were limited to those items of

unexploded ordnance that posed a threat to the Op Bessemer mission. All other items either reported to EOD teams or recce'd on the ground were recorded and will now be dealt with by NGOs with whom FDU2 had the task of liaising with during the last week of the Operation. FDU2 also provided 14 days of Immediate Response Team (IRT) cover, remaining at 15 minutes notice to deploy by air or road in assistance of a minestrike or similar incident.

6. Overall, FDU2's deployment was a success. Integration with the Army, in particular the Royal Engineers, was achieved without major problems. Relationships have been forged, particularly with 33 Engr Regt (EOD), that will be maintained to the mutual benefit of both organisations. 49 Field Squadron were thoroughly professional in all aspects of the Operation and gave FDU2 the latitude to work unsupported whilst always making them feel part of the EOD Force. Their support, as the support of FDU2's rear link organisation, was much appreciated.

A Kiwi PO (EW) life on a Hunt

Lee Kempthorne POEW RNZN

In early February while on my Petty Officer command course the school W.O announced that they were short of people for Long Look 01. After a period of 24 hours thinking I decided to throw my name in the hat. To my shock and dismay I was informed, "Pack your bags". Added to the shock was the swap was to be with a LOM (MW), at least that got the warfare part right.

So in late May we mustered at RNZAF Whenuapai for the flight to OHAKEA, this was to be the first part of a long trip, and the flight started the way the rest of the trip to the trip to the UK was to be...Delayed. Eventually we made it to Ohakea. A quiet night at my parents place in Wanganui followed in which the final orders for presents were placed. After consigning these to the proper filing cabinet (read rubbish bin), it was back to Ohakea to board the plane to Sydney to meet up with the Aussies returning to their convict past. Without delay we found out that the plane would be delayed for a couple of hours.

Sydney "party town" of Australia. A chance to meet up with the RN personnel heading to NZ. After telling them of the great time they would have in NZ, we watched them depart. Oops, forgot to tell them they would have to sing at their welcoming at the Naval Base, they'll find out. Right Kings Cross here I come. Yup, nothings changed. Sydney Airport, plane delayed. Seven days later depart in comfort on the RAF Tristar. Overnight in Singapore, hour stopover in Muscat. Landed Brize Norton at some stupid o' clock in the morning. A quick clean up, breakfast and a briefing. Finally, on my way down to Portsmouth.

Joining the ship on the Sunday gave me the chance to unpack, find my way around and settle in. On the first working day I had my first meeting with the captain and met the rest of the crew. From there it was a big learning curve. And it started with MCMG week, and a week of day running. After observing the double o and team sweep, launching of the Pap. I decided to take a chance and get involved, more fool me, I had volunteered for the C.I.S. All I can remember is a lot of wire and floats. To this day I am still unsure of what happened. However when I get home it will have done in a force 10 gale.

Leaving the minewarfare side it was time to learn what life on fish meant:

- Lots of alcohol at the fish fest.
- Wishing I hadn't drunk whilst climbing around the fish hold.
- That fishermen have some very colourful terms when placed on verbal caution.
- The value of a good stand off.
- That dead fish are just as ugly as live ones.

The rest of the learning curve has been the transit up the Manchester shipping canal, the coctail parties and the joys of defence watches. The various port visits. That the RNA loves the chance to meet and greet RN ships that arrive in their ports. So after nearly four months onboard I am now looking forward to going home, back to a land of just one accent. So before I start dreaming about the third summer therre is just this last bit to go.

There are a lot of people to thank for this opportunity to try life in a Hunt class, my thanks go out to Lt Cdr Mark Hart for allowing the exchange to go through, to the ship's company of the Mighty 34 for their warm welcome and patience as I adjusted to the RN way of life. Also thank you to the senior rates mess onboard for their hospitality. I save my biggest thank you to CPO (MW) Dave "Bungy" Williams for his guidance and support throughout my time on Middleton.

In summary my visit to the Middleton has been a great experience, I have enjoyed my time in the UK on this my OE and no doubt will try to find another way up here, but first I have to experience the hardship and disappointment that is Hawaii on my way home.

Mine Clearance Operations Estonia 2001

By SLt George Welsh RN HMS PEMBROKE

If it's November, it must be MCM1 in the Baltic! Following the success of MCOPLAT 00 in the Gulf of Riga in November 2000, this year saw operations moved northward to Estonia.

Mine Clearance Operation Estonia 01 (MCOPEST 01) took place between 5-16 November 2001 in the Gulf of Finland in the approaches to the Estonian capital, Tallinn. UK participation in MCOPEST 01 was intended to increase RN Operational Capability in live MCM operations, enable gathering of route survey data, and enhance mutual understanding of tactical and procedural matters. MCM 1 provided a Tasking Authority for a multi-national Task Unit with engineering support from FSU 01. 24 hour manning for the Tasking Authority was provided by RNR Minewarfare and Communications specialists from the following Reserve Training Centres: EAGLET, CAROLINE, SCOTIA, KING ALFRED, WILDFIRE, VIVID AND FLYING FOX. At sea, HMS PEMBROKE and HMS PENZANCE provided the UK national involvement, whilst HMS BRIDPORT participated as part of MCMFORNORTH.

RN involvement in MCOPEST contributes to OUTREACH, a programme of bilateral defence co-operation activities between the UK (MOD) and those of our Central and Eastern European Partners. The involvement also complemented the Partnership for Peace (PfP) programme, a NATO initiative to promote defence co-operation between NATO and partner nations. Other nations that participated in the operation were Sweden, Belgium, the Netherlands, Denmark, Lithuania, Latvia, Germany and Norway. A total of 24 MCMVs and support vessels participated together with a Norwegian Clearance Diving Team.

As a result of the extensive mining of the Baltic Sea and coastal waters off the Baltic States during both the First and Second World Wars, all manner of ordnance including torpedoes, depth charges, bombs and sea-mines are scattered on the sea bed along the approach routes to Tallinn. It is estimated that 80-100,000 mines in total were laid, the vast majority of which were cleared soon afterwards. Despite the post-war clear up operations, the residue of buoyant mines together with countless bombs, rockets and missiles still remain. This was exacerbated by the dumping of Soviet ordnance during the Cold War era.

During and immediately after both World Wars, these were possibly the most heavily-mined sea areas in the world, and though major mine-clearance operations were mounted in the early 1920s and again in the late 1940s, the area remains an ordnance-rich environment. It is impossible to determine exactly how many mines were laid as few records were kept and even less have survived. The main protagonists were the Russians and the Germans together with contributions from the Finns. Even French and Dutch mines, captured by the Germans in 1940, were laid in the Tallinn approaches.

Most mines laid in the Baltic were buoyant (moored) mines and those that were not swept have now sunk. The emphasis is now upon clearing mines and other explosive/hazardous items left on the seabed. Efforts to clear this menace, which poses a residual threat to fisherman, shipping and trade, have been taking place since 1995. The MCMVs were tasked with identifying and countermining any ordnance found in the approaches to Tallinn.

MCOPEST 01 began for the RN back in February, when the Estonian Navy first extended the formal invitation to the UK to participate in a live Mine Clearance Operation. For the ships themselves, the operation began at a Pre-Sail Conference (PSC) and port visit

1st-3rd November in Visby, which is in the Island of Gotland, Sweden. Extreme weather conditions made for a lively passage and a challenging entry into Visby harbour. Only 50% of the Task Force made it to Visby as planned and MCMFORNORTH (including HMS BRIDPORT) were among those delayed. Due to sail on the 3rd and transit to the area of operations, the task force was delayed in Visby because of the weather. Departure was staggered, with the last of the units (including HMS PENZANCE and PEMBROKE) finally sailing from Visby on the 7th and transiting to the area of operations with the intention of going directly on task.

Even when all of the units finally made it into the area, the weather failed to improve. Conditions remained out of limits for operations and with the weather steadily worsening, the decision was made to bring all of the task units alongside on the Friday afternoon. Although MCM achievement was limited, this period did enable a good working relationship to be established with the Swedish-run CTG and the other CTUs. At the end of the first week, the Task Force had successfully located 36 mines/ordnance within the assigned areas.

An Off-Task period had already been planned to take place in Tallinn on 10th-11th November. Primarily to take on fuel, water and stores, the stand-off also enabled the Commanding Officers and representatives of the UK ships HMS PENZANCE, HMS PEMBROKE and HMS BRIDPORT to attend a Remembrance Day service and conduct a wreath-laying ceremony. The principle wreath-layer was HRH Prince Michael of Kent KCVO in his capacity as Honorary Commodore RNR, who was in Tallinn to visit the large RNR contingent providing support for MCOPEST 01 both ashore in the TA and at sea in the MCMVs. HRH's visit also included a morning at sea onboard HMS PENZANCE, in company with HMS PEMBROKE, to witness mine counter measures operations before touring the shore side facilities and speaking with members of the RNR.

The units returned on task on the 13th until 16th to complete the areas previously assigned. With morale high following the stand-off in Tallinn, the units were all eager to get back on task, and the only problem was the weather, as it looked unlikely that it would hold out until the completion of task. Who suggested conducting mine counter measure operations in the Baltic in November?!

Yet the poor weather did not prevent the objectives of the operation being achieved. The significant UK MCM presence afloat and ashore contributed to all levels of the operation. This, combined with the high and favourable media profile, have re-emphasised UK's commitment to PfP process within the attending Forces, with the Estonians and within the region. The presence of MCMFORNORTH was also seen as significant. The Estonians remain very pro-UK and very pro-RN; memories of their war of independence of 1918-1920 and the RN's significant contribution to their victory are still fresh.

THE 16th RN DIVERS' GOLF CHAMPIONSHIPS - 2001

The Royal Navy Divers' Golf Championship continues to go from strength to strength and this year, the Competition's sixteenth, was no exception.

During Mediterranean weather conditions, the Championship saaw a record 126 entrants play te 36 holes at Southwick Park Golf Club. After nearly ten years, Lt Tug Wilson regained the top prize with a score of 155 over the two rounds. Hot on his trail was CPO (D) A J Wheeler who, with a score of 152 came runner up.

Fullerton Sherwood Stableford Champion was PO(D) W Sharp and ex CPO(D) E Pattinson and ex AB Diver K Keable scoring 77 and 75 points respectively.

The Crookhorn Steelers won the Solent Divers Team Trophy, and PO(D) W Sharp and ex leading Diver S Silcox won the pairs. Commander Tony Podmore was the Guests 1st Division winner, and ex Lt Cdr J Coggins won the Veterans Trophy.

The day culminated in barbecue, prize giving and disco. The prizes were presented by Cdr Chris Ameye of the DDS, and the raffle helped raise £300 for AB Diver Eddie Silcox who regrettably died this year.

Many thanks to everyone who helped once again make this year's event a total success, and in particular, CPO(D) A J Wheeler, PO(D) Trevor Orton and ex Leading Diver Pincher Martin.

Organisers wish to thank the following for their continued sponsorship: Haskel Energy Systems, Solent Divers, Cerleton Technologies Inc, MSI Defence Systems Ltd, Molecular Products, Divex, David Williams Engraving, O'Donnels Bar Oban, Key Transport Services, Vic Andeerton Repairs.

Below are the individual winners.

INDIVIDUAL TROPHY/PRIZE WINNERS - 2001

Clearance Divers		Score/Points
RN Divers Golf Champion	G Wilson	151
Runner Up	A J Wheeler	152
Fullerton Sherwood Trophy		
Stableford Champion	W Sharp	84
O'Donnels Bar 1st Division		
Stableford Winner	E Pattinson	77
Runner Up	J Coggins	76
Carleton Trophy 2nd Division		
Stableford Winner	K Keable	75
Runner Up	S Coltman	71
Projex Veterans Champion	J Coggins	35
Mick Fellows 'Pairs Shield'		
Pairs Champions	W Sharp/ S Silcox	144
Runners Up	GWS Martin/G Wilson	137
Cliff Hares Lowest Aggregate		
Par 3's Trophy	S Fitzjohn	41
The Divex Trophy		
(Best 21 H'capper)	R Mcabe	183

Clearance Divers		Score/Points
The Gibson Technology 'Hackers' Trophy	A Kirby	N/A
Nearest the Pin 2nd Hole	G Wilson	
Longest Drive 1st Hole	A Brown	
Guests		
RN Divers Guests Champion	S Mayes	146
Runner Up	M Walker	156
Guests 1st Division Stableford		
Winner	A Podmore	78
Runner Up	M Weeks	72
Guests 2nd Division Stableford		
Winner	C White	82
Runner Up	D Slade	72
Lowest Aggregate Par 3's	A Cadwallader	33
David Williams Wooden Spoon Trophy	M Lawrence	31
Nearest the Pin 15th Hole	A Brown	
Longest Drive 13th Hole	M Sissons	
All Competitors		
Solent Divers Team Trophy	The Crookhorn Steelers E Pattinson, C White, S Mayes, B Martin	239
Runners Up	Always in it! C Hughes, WSharp, G Wilson, K Wilkins	227
Charity Hole Nearest The Pin 7th (Gallon of Whiskey)	D Povey	
Nearest The Pin 12th (special prize)	R McCabe	

SOUTHERN DIVING GROUP NOMINAL ROLE - NOV 01

SDG HQ

Lt Cdr R D (Dougie) Bell
WO(D) A A (Lawry) Lawrence
AO - Ms Lynda Walsh

SDU 1

Lt Lewis Page
CPO(D) Paul Leader
CPO(D) P (Paddy) McCabe
CPO(MEA) A (Tony) Heaton
CPO(MEA) Phil Hodge
PO(D) Pete McHugh
PO(D) W (Billy) Bean
PO(D) Dan Archer
LD Chris Bryan
LD Jim Dimond
LD G (Nobby) Hall

SDU 2

Lt Tug Wilson
CPO(D) Cliff (Abbo) Coulson Bonner
PO(MEA) Phil Maw
CPO(MEA) G (Pincher) Martin
CPO(MEA) R A (Bob) Close
PO(D) S (Mac) McKeever
PO(D) A J (Jess) Owen
PO(D) K N (Kev) Wilkins
PO(D) John Meekin
LD D B (Buck) Taylor

SDU 1
LD A (Soony) Liston
LD D (George) McCarthy
LD D (Punky) Bernitt
LD T (Sid) Lawrence
LD K (Satch) Satchwell
LD D (Big Jonah) Jones
LD G (Burt) Lancaster
D1 Nigel Froude
D1 C (Chisel) Hawken
D1 R (George) Jewitt
D1 Jase Stayt
D1 Andy Gledhill
D1 M J (Leo) Leeman
D1 M (Jan) Cocking
D1 C (Tex) Marshall
D1 Sharrock
D2 Simon (Happy) Day
D2 D J Mallafre
D2 Towers
Boatman - Mr Ed Baxendale
Boatman - Mr Tony Mathieson
Electrician - Mr Tony Ravenscroft
Storeman - Mr Tony Williams

SDU2
LD Andy Lonsdale
LD Jase Dawson
LD A (Tonks) Tonkinson
LD N (Mac) McPherson
LD Chris Betts
LD Dean Rushworth
D1 John Pearson
D1 P (Dutchy) Holland
D1 Bas George
D1 Jim Green
D1 M (Jim) Bond
D1 G (Danny) Sorby
D1 R (Doc) Halliday
D1 Andy Coulson
D2 Pete Cooper
D2 Daz Adams
SA Adam J Hollamby
AA - Ms Sarah Day
Boatman - Mr Jim Devlin

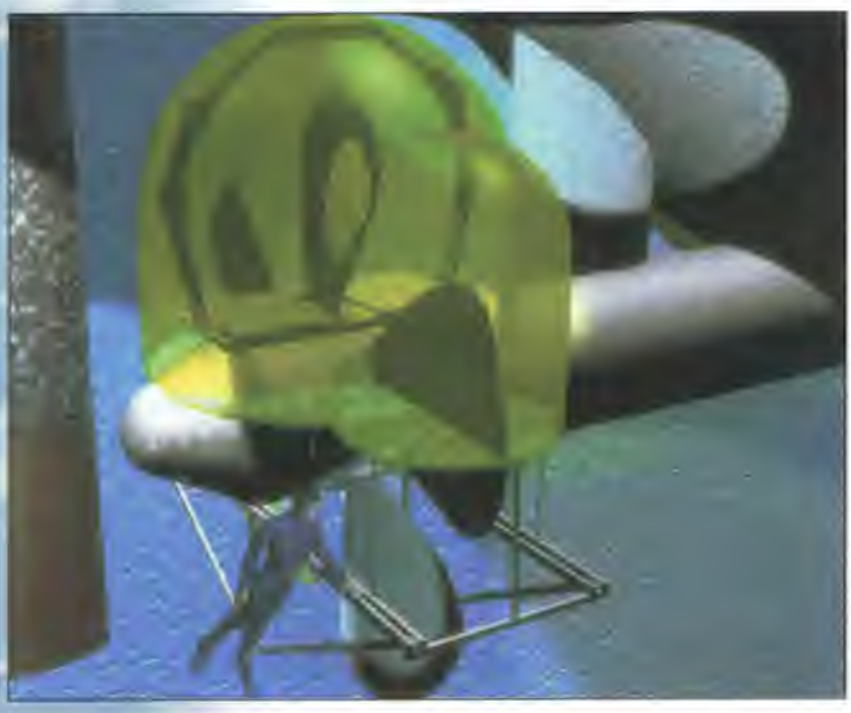
THE BIG ONE – SOUTHERN DIVING GROUP GETS HMS CAMPBELTOWN HOME

Lt Cdr Dougie Bell RN CO SDG

1. On 5 September 2001, whilst transiting the Southern approaches to Tromso, Norway HMS CAMPBELTOWN ran aground. The initial Ship's assessment reported that the use of both shafts had been lost. On the Starboard hub approximately 30% of 4 blades and 50% of the fifth blade had been lost. On the Port hub the top 150 millimetres of all 5 blades had been curled aft with some material loss also.

2. CinCFleet tasked SFM Devonport to lead on Underwater Engineering (UWE) repairs to CAMPBELTOWN whilst alongside in Tromso. Subsequently the Southern Diving Group (SDG) deployed a Battle Damage and Repair (BDAR) team along with a complete habitat Controllable Pitch Propeller (CPP) blade change outfit in order to replace the blades on the Starboard shaft. This task set a precedent for changing 5 CPP blades in the dry environment of a habitat, on an RN FF/DD deployed abroad – we think!! The Port shaft was to be 'cut and dressed' by a commercial team from F J Marine Services as time was a major constraint. They needed our hydraulic grinder/cutter to achieve it....., but that's another story. Incidentally to cut away approximately 30% of each blade and 'dress' all 5 of them came to about £45k and to change them cost SDG about £83k. Compare that with £100k to dock, £20k per day when docked and another £100k to undock. Oh and don't forget to add the price of the actual job conducted in the dock too! I now really wander what sort of finish the Frigate IPT considers that 'dressing' achieves. Not as smooth as a twosy's trapping lines, that's for sure.

3. SDG's team arrived in Tromso, within 30 hours of being ordered to move, on Saturday 081930B Sep 01. The habitat, associated tools, and diving equipment arrived on the berth on Sunday 091445B Sep 01, with the task commencing at 092100B Sep 01. A formal survey of both propellers was conducted in order to verify the intended repair action, prior to commencement of the main task. A full survey report and an underwater video were then passed to a representative from Lipps Engineering, who had been contracted to cut and dress the Port shaft blades (sub contracted to F J Marine Services).



4. **Habitat.** The detailed plans and specifications for the Royal Navy's habitats are well documented and it is not intended to replicate them here. Put simply, habitat is constructed from rubberised canvas, with the whole of the inflated assembly being restrained around the subject blade by an anodised aluminium frame, as illustrated in Figure 1. Designed and manufactured by F J Marine services of Birkenhead, 2 habitats were procured for changing CPP blades on Type 22/42 FF/DD. Incredibly, the company was allegedly not provided with Ships' drawings and as a consequence the habitat plans were drawn from scaled up photographs.

Figure 1 – Picture of Generic Habitat.

Although not usually a problem, the habitat bag was found to be more than a little tight around the larger skew type blades pulling it tight across the trailing edge of the horizontal blades – good job there were not too many 'skew type bodies' to be fitted into their

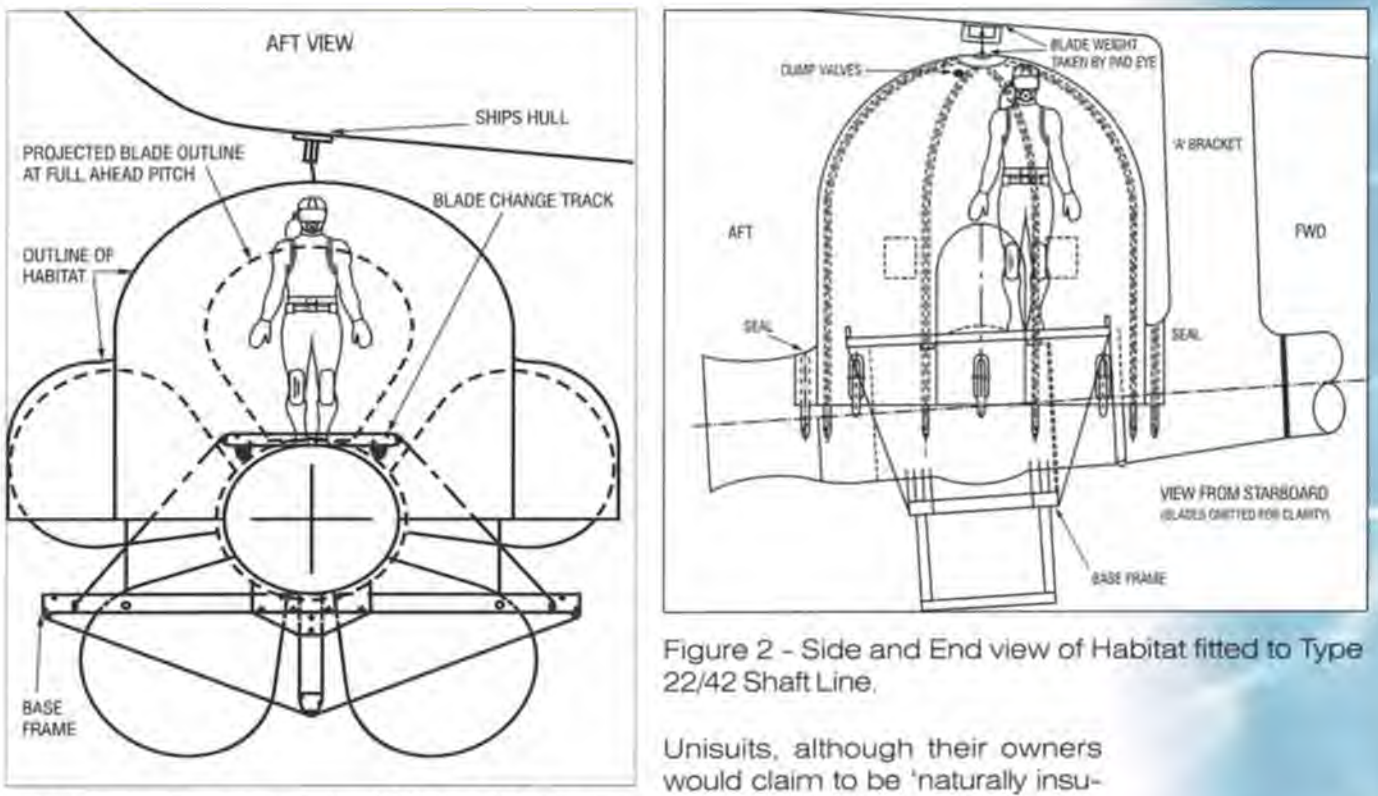


Figure 2 - Side and End view of Habitat fitted to Type 22/42 Shaft Line.

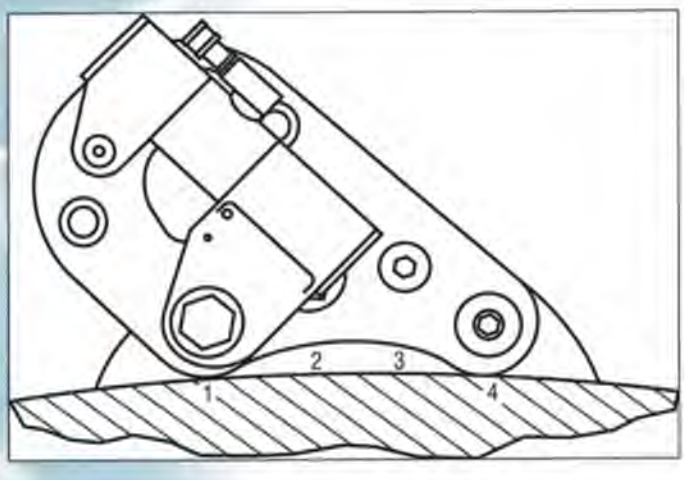
Unisuits, although their owners would claim to be 'naturally insulated against the elements of Norway'. This necessitated turning the top blade a few degrees off Top Dead Centre (TDC), which subsequently complicated the process of lowering the replacement blades.

5. Mechanically the habitat is simple enough to assemble and from a diving perspective it can be easily rigged by 2 divers in the appropriate conditions. However, experience of using habitat to conduct multiple CPP blade, particularly skew blade, changes in the RN is limited, and there is no formal documentation or detailed instructions to support the employment of the equipment. Further, the CPP blade change BR is badly out of date and contains no information regarding the use of habitat at all. However, once the habitat had been rigged fully (once or twice) all of the snaggets were ironed out, familiarity grew and the rigging/de-rigging times dropped considerably. The brunt of the work in torque up/down of the CPP blade retaining bolts (8 per blade) was conducted with the Headley Purvis Hypurmate CT6/ CT11 accessory – although you may be able to find one or two 'Manual Monsters' somewhere in the team.

6. Conduct of the task inside the habitat was more cramped than would usually be the case. This was principally due to the extra dimensions of the skew blade as well as a function of the severe distortion to the blade tips. Vicious sharp edges left many suit punctures and made a fine job of lacerating a pair of LD fingers when a frozen-up air panel indicated a potential requirement for urgent 'abandon habitat'. Described as stimulating, it seemed more than a little hairy to me as I returned from yet another local purchase shopping run for UW light bulbs. Interior work was monitored by the diving supervisor via a 'standard' Simrad Osprey video camera system suspended from the centre of the habitat's dome and attached to what became widely accepted as the 'lawry plate'. Although a satisfactory palliative, the picture afforded by a 'fish-eye' type lens would have improved the oversight of the work and monitoring of safety considerably.

7. **Communication.** Communications within the habitat are essential. However, the current practice of the diver putting his face in the mask, in order to use the built in communications system was considered to be unacceptable. In any case the ESDS (hardwire) communications were found to be inferior to the DTWC fitted to SABA. The only method of summonsing the diver to answer his calls was by flashing of the habitat lighting system; not good when the light has failed; out leatherman for yet more light repairs. In the event, experimentation with NBCD sound-powered (bleeper) phones found them to work very effectively, until of course they became contaminated with

water and oil, much to poor old WEO's disgust (we only trashed 9 or 10 of them!!). This then rendered them useless, in spite of all our efforts to waterproof the equipment. Surprisingly, hand held NAVICO VHF radios, as suggested by Jim Dimond, worked particularly well at a depth of 3 metres (inside the habitat). Alas, since he embarrassed the boss (who pooh poohed the idea thus forcing him to subsequently eat his hat, which was not lined with mars bars Sonny!) he will not be recommended for a Herbie Lott on this occasion). By being water resistant the radios were found to be much more robust than the sound powered telephones. Nonetheless, use of the radio also took the divers hands away from their work, hence a waterproof hands-free, 2-way communications system is currently being sought – any ideas?



8. **Hedley Purvis.** The Hypurmate CT6/ CT11 is built by Hedley Purvis. Unsurprisingly is known colloquially as the 'Hedley Purvis Gear' and it is in essence a portable hydraulic torque wrench. Capable of applying 6000/11000 lbs per foot of torque from pressures of 1000 psi on the M64 ((fine) - for those interested in detail) blade bolts, it is powered by a lightweight air-driven pump. Assorted sizes were employed including the CT6 and CT 11 models. The CT 11 is pictured in Figure 3 below demonstrating a bird's eye view of the equipment tightening up number 1 bolt on a CPP blade. I confess that it does, however, lack any real animation in this particular pose.

Figure 3 – Hedley Purvis CT 11 Tightening No 1 Bolt.

9. The Hedley Purvis, HP or 'pervert' also currently lacks formal directions for use, particularly when attempting to integrate its use inside the habitat, although the manufacturer's instructions were available. The Hedley Purvis worked extremely well and proved to have good reliability, in spite of prolonged and heavy use. This was ably demonstrated when one bolt (Bolt No 4 on Blade No 4 and pictured in Figure 4) alone took 32 hours to remove. The whole thread was subsequently found to be rusted up, but only after it had spent 18 hours constantly under 11 000 lbs/ft of Hedley Pervert torque, with the drive head well and truly welded on to the CPP blade (twice!). For its sins, the forever-entwined couple of driver and bolt will be ceremoniously halved, chromed and mounted presumably to be viewed with the appropriate level of disdain until it is no longer recognised for the trauma that it caused.

Figure 4 – The Bolt and its Associates.

10. **Personnel.** Initially a fifteen man strong team (which was considered to be the minimum number, required for a 2 shift, 'round the clock' operation) was flown out to Tromso. A subsequent review of task progress and the requirement to provide rolling standoffs to both watches led to a second tranche of 6 divers being ordered to join the main party. The following personnel made up the team:

- CO SDG - Lt Cdr Dougie Bell (Top Cover & Stbd Watch)
- SEO(D) FDS - Lt Nick Hughes (Technical Project Manager)
- WO(SDG) - WO(D) Lawry Lawrence (Stbd Watch 2nd Wave)
- CPO(D) - CPO(D) Paul Leader (SDU 1)(Port Watch Supervisor)
- Port Watch - PO(D) Mac McKeever (SDU 2) (Stbd Watch 2nd Wave)
  LD Mac McPherson (SDU 2), LD Ash Ashworth (SDU 1),
  D1 Johnny Frisbee (SDU 2) (2nd Wave),
  D1 George (Can I be the Pilot Pet?) Jewitt (SDU 1),
  LD Chris Betts (SDU 2), D1 Nige Froude (SDU 1),
  LD Dave McKenna (SDU 2)(2nd Wave)

- Stbd Watch – LD Sonny Liston (SDU 1), LD Jim Dimond (SDU 1), LD Chris Bryan (SDU 1) (2nd Wave), LD Tonks Tonkinson (SDU 2) (2nd Wave), LD Dutchy Holland (SDU 2), D1 Doc Halliday (SDU 2)
- ME Support – CPO(MEA)Tony Heaton (SDU 1) (Stbd) CPO(MEA) Phil Hodge (SDU 1) (Port)

10. The second wave arrived in Tromso on Wednesday 121930B Sep 01. Flights for both waves were from Heathrow to Tromso via Oslo, although 3 personnel from each wave had travelled to Heathrow earlier in the respective mornings, from Inverness. They had all left the Kyles of Lochalsh at 0330A, where SDU 2 had been conducting WT. It has to be said that it was a miracle that any of the Kyles lot got anywhere at all. The Boss rushed out of the Hotel front door in order to intercept (what he thought was) the imminent transport. It was, but the hotel door slammed shut behind him, trapping his bags inside. Nothing that a leg-up through an open window could not recover the situation from though. It being very early Saturday morning, the People Mover's atmosphere needed a constant flush through - cheers Doc. The second wave was close to being grounded indefinitely by the September 11 fracas, but several hours of telephoning around (just in case!) by Lawry established that flights to Norway were relatively unaffected. Miraculously they turned up bang on time, which was as well because after travelling all day they went straight into their respective watches.

11. **Narrative.** The task commenced in earnest at 092100B Sep 01, with a formal video survey. The conduct of the survey was directed by SEO(D), but under the diving supervision of the CPO(D)/PO(D) on watch. This arrangement worked well and achieved a quality product, which was subsequently praised by Lipps's propeller surveying specialist. Although there was a good 5 knots of tidal stream off the berth, diving conditions proved to be excellent with superb water visibility (standfast the odd massed attack formation of dockyard zeppelins as the local factory ashore pumped bilges). There then follows a long diatribe of Narrative, which is fully recorded in the Report of Proceedings (ROP), for those that feel inclined to track down a copy.

12. Suffice to say that all 5 of CAMPBELTOWN's severely damaged Starboard shaft blades were changed by SDG in less than 13 days. All this in spite of a tear in the habitat that was stitched up by the seaman specialist and covered with pusser's black maskers (can't beat it for quality repairs), a fast degrading non-skew type blade sling, under-sized habitat; adjacent ships sailing without notice, a cold move, disembarkation of the helicopter, dockyard zeppelins, continuous battle to maintain communications and of course that blasted infamous bolt. Diving operations were maintained around the clock, in 2 watches throughout the period. In spite of the setbacks, the fifth and final blade change was fully torqued up, without incident by 221600B Sep 01, less than 18 hours after the previous blade. The shaft was handed over to the Ship's team for an overnight hub flush. Although there were some hitches inboard, with the setting up and conduct of the flush through this had been achieved by mid-day and the bolt caps replaced. The whole task was eventually completed by 231600B Sep 01. The project presented more than its fair share of difficulties. However, with imagination and improvisation the team was able to adapt to the circumstances and overcome all of the hurdles (Clint eat your heart out).

13. **Conclusions.** There were many conclusions to be drawn from this major UWE, née BDAR task. Regrettably several of the lessons were old and had to be re-learned despite the efforts of those who had walked the path before and made up supervisor's cribs. They were invaluable and like the proverbial taxidermists model, we would have been stuffed without them. There is evidence to suggest that many recommendations have been made previously, but few had been incorporated into the appropriate literature. I have alluded to many of them already but again you will find detail in the ROP. As ever the real work starts after the task, but I would like to wind up by thanking all of the lads involved in the task. In particular Paul and Kev who did more than there fair share of worrying to get the job done. Now where's that draft statement of user requirement?

HABITAT - SPEAK

HABI-SPEAK	FROM	TO	TRANSLATION
Are you sure this bag fits the ship?	Diver	Surface	We may have this on the wrong way round.
These blades don't appear to be very damaged/leaking oil.	Diver	Surface	We're on the wrong shaft.
We've had a discussion and have come up with a good idea.	Surface	Diver	We're bored because we're not in the water so we've decided to dive by proxy.
I think the habitat may be starting to leak again.	Diver	Surface	Can't any of you up there remember to keep at least a whisper of air going into this bag?
You sound tired, do you want a break for a while?	Surface	Diver	Get this useless **** out of the water so we can crack on.
Send us down another wrench the ratchet's jammed on this one.	Diver	Surface	We've dropped the original spanner.
Show us on the camera.	Surface	Diver	We don't beleive you.
Wow - a pink octopus!	Diver	Surface	This ARDROX is good stuff!
This SIKAFLEX is tricky stuff isn't it?	Diver	Surface	I can't make this stuff come out the end of the nozzle because I haven't cut the tip off.
These chain hoists are crap.	Diver	Surface	I don't work out much anymore and I'm knackered.
Does DENZO tape smell?	Diver	Surface	There's a suspicious brown substance floating inside the habitat.
Send us another speaker the connection's loose on thhis one.	Diver	Surface	I've just dropped the speaker in the water despite you carefully packing it in 2 layers of plastic.
We may have to reduce numbers on site tomorrow.	Surface	Diver	While you,ve been 'in', a better foreign job has come up and we've elected the current topside crew to fly out without you.

MARITIME WARFARE CENTRE UPDATE

By Lt Cdr Rob Hoole

Introduction

In a way, this is a hauling down report for me because I am due to retire from the RN in early 2002 after 31 years including 26 years as an MCD officer. And yes, I am still an 'in-date' diver. For the past 5 years, I have been the Minewarfare & Diving Operational Analysis desk officer (MW OA) at the Maritime Warfare Centre (MWC).

The Maritime Warfare Centre

For those unfamiliar with our organisation, MWC was born in Oct 95 out of the Maritime Warfare Development Centre (MWDC) at Gosport (formerly the Operational Evaluation Group (OEG), then Fleet Operational Analysis Section (FOAS) at Northwood) and the Maritime Tactical School (MTS) in HMS DRYAD, Southwick. In due course, all of MWC will be collocated with other parts of CINCFLEET in HMS EXCELLENT as part of 'Fleet First' but, for the time being, it straddles two sites: one at Southwick and the other at Portsdown.

The Southwick site, accommodated in HMS DRYAD, is home to the Director MWC (Capt Dick Twitchen RN) and a joint staff, comprising mainly of SO1s, who perform:

- Maritime and joint warfare training.
- Concept and doctrine development.
- Support to operational command and control.
- Defence Diplomacy.

The Portsdown site is accommodated within a compound at the QinetiQ Technology Park on Portsdown Hill (familiar to many as the former site of ASWE). It is complemented with a mixture of Naval, MOD scientific, DSTL, QinetiQ and civilian contract staff who perform:

- Tactical Development, defined as: "The production of new or modified tactics and procedures in order to improve the collective performance of units, platforms, weapons and sensors by employing ...evaluation, analysis, studies, seminars, modelling, education and considerations of human factors" or, less formally, "Enabling the Fleet to fight smarter."

- Operational Analysis, defined as: "The application of scientific methods to military problems" or, less formally, "Using scientific methods to prove the blooming obvious."

MWC works directly for the Deputy Fleet Commander at Northwood and is tasked via ACOS(W) and N7 Division although day to day business is conducted with Type Commanders including Commodore MFP. Our mission statement is: "To enhance and evolve the maritime contribution to operations". Currently, our main attention is focussed on:

- Operations in the Littoral.
- Maritime Contribution to Joint Fires.
- Maritime Battlespace Management.

Minewarfare Activities

In 1999, MWC issued the report of a study examining the UK MCM capability required to support the Maritime Contribution to Joint Operations (MCJO) in light of the post Cold War requirements of the Strategic Defence Review (SDR). This report provided a baseline of UK joint MCM capability, especially in the littoral, and identified certain shortfalls. As a result, the MW Tactical Development desk officer at the time, Lt Cdr Adrian Blakey, devised a tactic called GRAND PRIX, which has since appeared as a FOSF Green Paper.

This is aimed at providing faster and more effective MCM during Advance Force operations by minimising the area requiring MCM coverage prior to an amphibious operation.

The GRAND PRIX tactic presented a useful framework for studies aimed at overcoming the shortfalls identified in the previous study. The Minewarfare team at MWC has, therefore, been investigating ways to improve MCM operational capability by developing tactics to use our systems more effectively and by exploring simple and cost-effective short term solutions to bridge the capability gap until new systems are procured. Although the classification of this publication prevents going into detail, several studies have now been completed and we have tested our ideas through a combination of trials and exercises. Reports have been published and new tactics developed as a result. Recent studies have included:

- **Amphibious Areas Dimensions:** This study was conducted in association with CDA (now DSTL) Winfrith and provided algorithms for calculating the minium widths of channels and overall dimensions of areas requiring MCM effort to enable units of an amphibious force to manoeuvre and perform their roles in the presence of a given mine threat. A PC tool is being developed to automate the planning of these channels and areas according to the types of ships, mine threat and depths involved and then present them on an electronic chart for adjustment and promulgation.

- **MM Self Protection:** In the littoral, MMs are likely to have to operate up-threat in waters suspected of having been mined where a close escort might be impractical. MWC has examined possible hard-kill measures including Man Portable Air Defence Systems (MANPADS) to reduce MM vulnerability to missiles, aircraft and fast-attack craft. Trials are continuing. The employment of soft kill measures by a slow moving platform such as a MM is complicated by the need to achieve sufficient separation from a chaff bloom or floating radar decoy. In association with DERA (now QinetiQ Portsdown West), we have looked at ways to overcome this problem and have developed some promising new concepts including pre-laid expendable static decoys and remote-controlled active decoys.

- **MM Data Links:** To improve MM situational awareness and their data transfer capability, MWC has identified and conducted trials of secure portable lightweight data link systems, some of which use the internet protocol. These studies have shown the feasibility of providing MMs with a receive-only link picture with the added facility to receive and transmit digital files including imagery and text. This work has now been taken up by the Links Integrated Project Team (IPT) for further investigation.

- **Minesweeping Guinea Pig and Surf Bridge Techniques:** The Very Shallow Water (VSW) environment and the Surf Zone pose particularly challenging problems for conventional MCM. In association with DERA (now QinetiQ) Bincleaves, WC has investigated alternative methods to deal with anti-invasion mines including xpendable remote-controlled Guinea Pig sweeps based on Rigid Polyurethane Foam (RPF) pontoons manufactured in situ. These could be fitted with simple acoustic and magnetic generators to deal with influence mines and suspended chains to counter contact mines. If linked together, several of these energy absorbent pontoons could form a bridge across the SZ to minimise the risk to vehicles and personnel disembarking from landing craft. It is hoped to build and trial a half-scale technology demonstrator if sufficient interest is shown by the MCM Equipment IPT. RPF could also be sprayed onto the beach to form a solidified energy-absorbing blanket or used to fabricate 'instant' roadways, runways, shelters or crater filling according to need.

- **Divers' VSW MCM System:** This is a long term study conducted in association with DERA (now QinetiQ) Alverstoke. It is aimed at quantifying the Explosive Ordnance Reconnaissance (EOR) and Explosive Ordnance Disposal (EOD) performance of VSW MCM Clearance Divers using conventional jackstay seabed search methods and measuring the improvement offered by modern underwater navigation and sensor systems. As a bonus, such systems offer potential for covert operations and MWC has assisted in developing Standard Operating Pro cedures (SOPs) and Concepts of Operations (CONOPS) for VSW MCM search operations.FDU2 has been fo-

cal to this project and has achieved improved search rates using a hand held sonar purchased by MWC in conjunction with an underwater acoustic tracking system during various trials and in Exercises KERNEL BLITZ 01 and LINKED SEAS 01. QinetiQ is integrating the navigation and sonar systems with a head-up display to enable mission planning, track-following and diver input of contact positions for download on return to base. Such tracking systems might also be used for the navigation of landing craft through 'swept' channels or remote-controlled platforms used as guinea pig sweeps or surf bridge pontoons.

- **MCM Environmental Data:** The collection, collation and dissemination of environmental data is crucial to the conduct of effective MCM operations. Historic route survey database information may not always be available for MCM operations in the littoral and MWC has performed various studies, in association with DERA (now QinetiQ) Bincleaves, DNSOM and other agencies, into the environmental data requirement and methods for its collection, fusion and dissemination. These methods may involve drawing on Rapid Environmental Assessment (REA) or using long range Unmanned Underwater Vehicles (UUVs) to capture data and send it back for processing.

- **CIS Operations:** MWC commissioned DERA (now QinetiQ) Bincleaves to produce a report on the tactical use of the Combined Influence Sweep (CIS). This included the production of A and B values on CD ROM for use in the MCM EXPERT Planning and Evaluation tool. We are also developing our capability to exploit the Versatile Exercise Mine System Mark 2 (VEMS2) to examine our influence minesweeping capability and have played a role in several significant trials recently.

- **Airborne Littoral Mine Detection:** This study, conducted for MWC by DERA (now QinetiQ) Portsdown West, examined less-expensive options for detecting shallow-laid mines from the air. The Spectral Differentiating Imaging Technique(S D I T) system is the modern digital version of Demon Camera and shows potential as a cheap alternative to the expensive US Magic Lantern system.

- **MCM Performance Matrix:** MWC has issued this simple back pocket guide to the Fleet. It provides a rough guide of minehunting coverage speeds for HUNT and SANDOWN Exploratory and Clearance operations for various bottom types and clutter densities.

- **MCM Risk Directives:** Previously longstanding MCM risk directives have proven too rigid for modern day MCM operations in the littoral such as the recent disposal of live ordnance in the Adriatic and the Baltic. As a result, MWC has issued the UK Compendium of MCM Risk Directives and has received favourable feedback from the Fleet.

- **MCM ROE:** Rules of Engagement (ROE) and the implications of international law for maritime operations are more prominent now than at any time in history. As a result, MWC is publishing a report on this subject with particular regard to MCM operations. The need for MCM Risk Directives to be consistent with authorised MCM ROE is given particular emphasis.

We have also conducted trials of Sonar 2093 in the ASW role during recent JMCs and details of this tactic can be found in FOTIs.

Future Plans

As well as progressing our studies of MCM operations in the littoral, we hope to continue to develop our expertise with VEMS2 and exploit its capabilities far more. MWC has also been involved in the MCM Balance of Capability Studies for Sonar 2193 and the Replacement Influence Minesweeping System (RIMS). We hope to follow this involvement by participating in the trials of these systems when they appear, explore their capabilities and advise on how they can be employed to best effect.

Contacts

Whilst our main contact with the Minewarfare and CD community is via Commodore MFP and the Superintendent of Diving, we are always happy to provide advice, receive feedback and learn of new developments which may affect our studies. Contact us at MWC(P) on BT (023 9221 plus ext) or Military network (93 821 plus ext). The current MW team at MWC comprises:

Lt Cdr Mike Leaney	MW Tactical Development Desk Officer (MW TD)	Ext 2182
Lt Cdr Rob Hoole	MW Operational Analysis Desk Officer (MW OA)	Ext 2229
Mr Jeff Chapman	MW OA Scientific Support (MWS OA)	Ext 2230

Cdr Dougie MacDonald, another MCDO, is the Assistant Director (Training) of MWC but continues to take a particular interest in MCD matters.

Maintaining fitness under field conditions can be facilitated by using everyday items as improvised weight training equipment - Big Arms!

Any other ideas for suitable captions for this and other material should be forwarded to SWO MCD, Warfare Officers Training Dept., Maritime Warfare School, HMS DRYAD.