# THE ROYAL NAVAL ENGINEER OFFICERS' CONFERENCE 1982

## NAVAL ENGINEERING AND ENGINEERING MANPOWER IN A PERIOD OF COST CONSTRAINT

The Engineer Officers' Conference was held at the Royal Naval Engineering College, Manadon, on 30th April 1982. The theme of the Conference was 'Naval Engineering and Engineering Manpower in a period of Cost Constraint'.

A short speech of welcome by CAPTAIN G. G. W. MARSH, O.B.E., A.D.C., the Captain of the College, was followed by the opening address by VICE-ADMIRAL SIR TED HORLICK, K.B.E., the Chief Naval Engineer Officer. Seven papers were presented at the Conference and the programme included opportunities for questions and informal discussion of the topics. These were as follows:

'The Financial Scene' by MR. D. E. J. JAGO, Assistant Under Secretary of State (Naval Staff).

'The Planner's View of the Navy's Future' by CAPTAIN J. B. KERR, R.N., DN Plans.

'Logistics—Stores and Spares Support' by MR. K. J. PRITCHARD, DGST(N).

'The Manpower Scene' by a DNMT(E) team headed by CAPTAIN H. W. YOUNG, R.N.

'The X/WE Development Group' by CAPTAIN P. R. H. COLLISON, R.N. and CAPTAIN R. H. C. HEPTINSTALL, R.N., DNMP.

'Appointing' by CAPTAIN J. A. STEPHENSON, R.N., DNOA(E) and team.

'Material Aspects of the Ships, Aircraft, and Submarines of the Fleet' by CAPTAIN A. K. POTTER, R.N., DES(N) and team from DG Ships, DGW(N), and DGA(N).

The Conference concluded with a closing address by the Chief Naval Engineer Officer.

The addresses, papers, and summaries of the discussion sessions are given below, necessarily condensed in some cases to conform to the security classification level of this publication.

## OPENING ADDRESS BY THE CHIEF NAVAL ENGINEER OFFICER

VICE-ADMIRAL SIR TED HORLICK, K.B.E.

I am sure that most of you would prefer to discuss the excitement of the moment rather than the relatively arid problems of tomorrow. On the other hand none of us, I hope, is naïve enough to imagine that the Falkland Islands Operation is going to mean that the days of arbitrary cuts, cash limits, and all the rest have gone for good. Of course they haven't, and when this business is all over we are going to have to pick up the scattered pieces very carefully if we are to make the best of our still limited resources in the future.

I therefore make no apology for proceeding with this Conference as originally planned. You will find throughout the day plenty of material on

which to cogitate in the various presentations, and certainly enough I hope to stimulate some lively question sessions.

Before we plunge into the Conference proper, I think it is appropriate to make some specific mention of where we have got to in the Falkland Islands Operation; I don't mean from a political so much as from a technical point of view.

Many of you have no doubt had fragments of the action but I should like to highlight some of the more notable achievements thus far. I think I can give you enough good news to convince you that the Navy is still the kind of outfit which can react smartly when the occasion demands, that we still have a measure of public support, and that there are still quite a few chaps around who are not afraid to work all the hours God made when the opportunity arises.

(CNEO then gave examples and details of a wide range of ship conversions, weapon and communication equipment updating, shipbuilding and acceptance involved in setting up the Task Force).

We will be hearing later from MR. PRITCHARD, Director General Stores and Transport on the subject 'Why Stores are not Always Available'. To get our Task Groups away on time, massively stocked up in the way they were, has entailed round-the-clock working for a great many of his staff. It has also meant that numbers of them have had to deploy with the ships to Ascension to set up a transit organization there, all at very short notice. Four days ago Ascension became one of the busiest airports in the world, surpassing even Chicago!

Finally, having made reference to the large number of people here at home who have buckled down to the business of setting up this operation in the South Atlantic, let us never forget the chaps at the sharp end. Up to the end of last week CND has issued some 5600 draft orders in support of the operation and although many of them were pierhead jumps, every man joined his ship in time. The shortest notice was 3½ hours for one rating, extended from 2 hours by embarking him by helicopter from Portland as his ship went down the Channel. Commander-in-Chief Fleet has told me that he is very pleased with the low level of OPDEFs in the Fleet during this period, and that says much for all concerned.

Obviously, there will be many lessons to be learned from this operation but it would be premature to discuss them at this stage. So now to the main business of today, which has two objectives. The first is to give you the background information, not only on our concept of operations, but also the financial system we are obliged to work within, so that you are better equipped to appreciate its advantages and limitations. With costs figuring so large in all out plans for the Navy of the future, none of us has any right to be ignorant of how our finances are managed.

The second objective of today is to get you thinking about the relationship between procurement of new equipment on the one hand and upkeep and support of it on the other. You will see demonstrated why it is usual at a very early stage in a project to get committed to very heavy through-life support costs. Working within a cash limit means that support in these circumstances can swallow up all our funds, leaving little to spend on new equipments. Given a particular technology, there is relatively little opportunity to make major savings in any particular phase of an equipment's life. This is not to say that worthwhile savings cannot always be found, but it does mean that if we are to transform the relationship between procurement and support costs, we may have to be thinking in terms of radically different hardware.

I have also asked DNOA(E) and DNMT(E) down to fill you in on the manpower scene, again to enable you to be better informed of the implications of the Defence Review from their point of view.

# THE FINANCIAL SCENE

## Summary of the paper presented

BY

MR. D. E. J. JAGO
*(AUS(NS))*

*The System*

Money can be used as a measure of value at a particular moment, e.g. business accounts at the end of the financial year, or as a measure of value of what is produced or consumed over a period of time. It is the latter which is used as the method of defence expenditure control and planning in this country.

The Government's system of controlling and planning public expenditure is the Public Expenditure Survey System operated under Treasury chairmanship by a committee known as PESC. The PESC cycle is annual, beginning each spring and covering the new financial year and the next three thereafter. The estimated expenditure is set against forecasts for the economy over the same period; permitted levels of expenditure are decided by Ministers and the whole package, including allowance for inflation, is presented to Parliament in spring the following year.

The MOD input to PESC is the ten-year long-term costing (LTC) for the Department, divided into five target headings, Navy, Army, Air Force, Procurement Executive and a small miscellaneous target heading. The naval LTC process starts in March with assumptions of the size and shape of the Fleet, manpower, refit, weapon development, and ship deployment cycles, etc. that are required to meet the assessed threat within available resources.

After Board approval in April the assumptions are turned into costings on a cash flow basis over the next three months, no allowance being made for further inflation. In September, each Board Member holds meetings to scrutinize his expenditure programme and bring it within target. The Board then approvess the full ten-year programme and passes it, via the Central finance staffs, to the Treasury.

The LTC is therefore how we contribute to PESC, divide the MOD budget between target headings, plan priorities and contract timings, etc. for the Department, and it tends also to be a compromise between a bid and plan for executive action.

Supply Estimates look only one year ahead. They are started in April and reach the Treasury by December—two or three months earlier than the LTC, whose shape may be affected by the decision taken on the estimates. After approval within the Treasury they are presented to Parliament and published in February or March.

Prior to April 1979, Supply Estimates were presented at constant prices and needed supplementary estimates later on to cover price and pay increases. Since then, however, they have included an allowance for inflation over the coming year. In theory they are not varied but in practice over the past three years cash limit reviews have been possible. FIG. 1 shows how the naval budget of the Supply Estimates for the past year is spent.

Why therefore, with all this detailed system of programme control have we constantly been beset by financial problems for as long as we can all remember, and particularly with an administration publicly committed to a real annual growth of 3 per cent. in the defence budget? As the June 1981 Defence White Paper (Cmnd 8288) indicates, the objective is to ensure that the 1985/86 financial provision should be no less than 21 per cent. higher, in real terms, than actual expenditure in 1978/79.

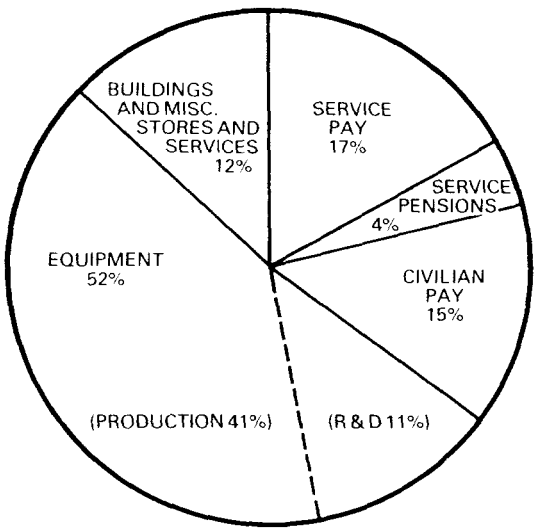


FIG. 1—NAVY BUDGET: 81/82 ESTIMATES

Bearing in mind that it may take ten or even fifteen years from its conception for a sophisticated weapon system to enter service, two points are relevant. Firstly (FIG. 2), actual defence expenditure over the past twenty years has fluctuated about the same broad level. Secondly, during the same period Warsaw Pact expenditure has roughly doubled and now occupies 13 per cent. of their overall expenditure, compared with 5 per cent. in the U.K. In response to this, U.K. defence planners have turned to increased sophistication in weapon systems and maintenance of key front-line force levels. Withdrawal from overseas commitments and concentration on NATO areas has limited defence spending and allowed for a narrower range of capabilities and this can be seen from the reductions in the 1966 and 1974 Defence Reviews on the graph.

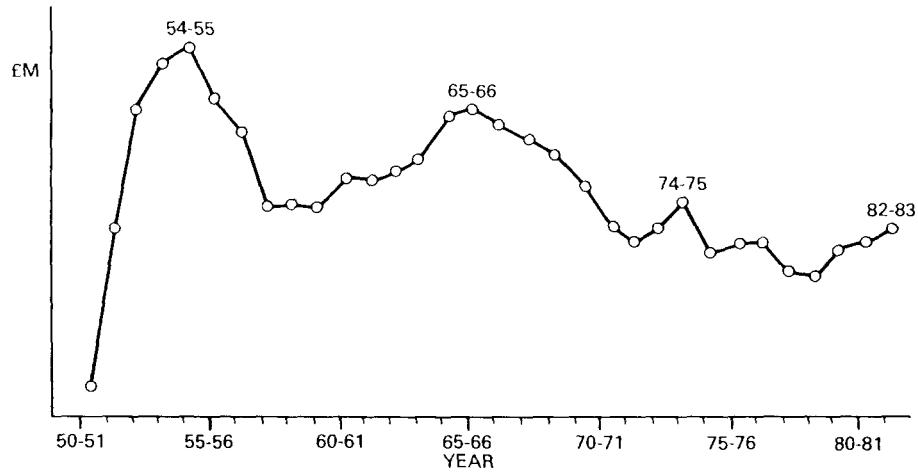


FIG. 2—DEFENCE ESTIMATES (AT CONSTANT PRICES)

During the early 1970s, before the 1974 Review, it became more and more difficult to keep within the yearly financial ceiling. Despite the dampening down process of the Defence Review, successive LTCs still tended to expand until, in 1981, a further deep re-appraisal was rendered necessary.

Faced with the increasing threat, what are the main causes of unprogrammed expenditure? Firstly, there is the pressure of real generation-to-generation cost growth, currently running at 6 per cent., or double the short term projection for Defence Budget growth. TABLE I shows the broad pattern of cost growth broken down into individual equipments. Secondly, the relatively buoyant U.K. defence industry is experiencing higher-than-average inflation. This resulted in a 3 per cent. bid to the Treasury for additional relief last year which unfortunately came too late in the financial year for the funds to be deployed in the light of an across-the-board review. Thirdly, and most dramatic of all, has been the ability of industry to undertake work at a faster rate than expected in the recent period of recession. The Air Systems part of

TABLE I—*Generation-to-generation equipment cost growth*

| *Type* | *First Generation* | *Next Generation* | *Cost Growth Factor* |
|---|---|---|---|
| Frigate | Leander | Type 22 | 3 |
| Aircraft | Hunter F6 | Harrier GR1 | 4 |
| Trainer Aircraft | Gnat Mk1 | Hawk | 1½ |
| Helicopter | Wasp Mk1 | Lynx Mk2 | 2½ |
| Guided Missile | Sea Cat | Sea Wolf | 3½ |

the equipment vote suffered the most marked increase. Industry has repeatedly failed in the past to live up to its forecast development and production achievements, leading to a worrying series of underspends so that large sums were being lost to defence. In consequence, a system of 'central block adjustment' was developed whereby LTCs were trimmed centrally to reflect industry's traditional inability to meet its targets, and originating from a view that, on past experience, industry would not recover lost ground. FIG. 3 shows that large funds were involved in this block adjustment and the Outturn line shows that Air Systems project estimates should have been reduced by 20 per cent. in 1977/78, 1978/79, and 1979/80 to avoid an underspend. The Estimate line shows the adjustment made, but notice what happened in 1980/81 when U.K. defence industry managed a spectacular growth rate and the requirement for a block adjustment plummeted. This rate, nearly 20 per cent. as compared with 3 per cent. in previous years, threatened to continue and its effect was very considerable on the MOD's budgetary position last year and for future years because of the contraction of the block adjustment to a minimal level of 2½ per cent. in each of the first five years of LTC82. The team, headed by MR. REEVES, set up to investigate the overspend, recommended action which resulted in the moratorium. A similar picture, albeit less dramatic, occurred in the Sea Systems area.

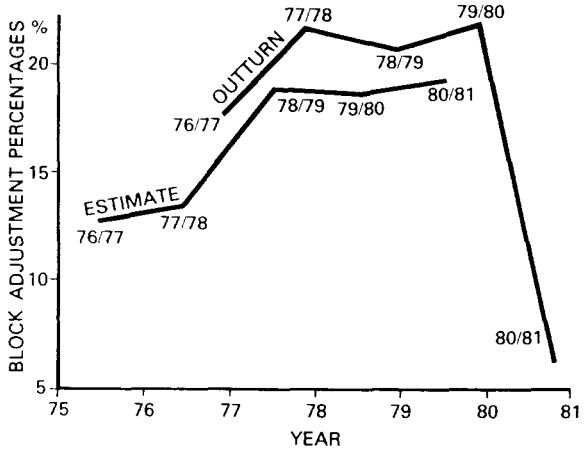


FIG. 3—ANNUAL CENTRAL BLOCK ADJUSTMENTS (AIR SYSTEMS)

*The Present LTC Picture*

Cmnd 8288 addresses the methods of dealing with the three sources of difficulty just discussed, but the following additional points need emphasis:

(*a*) *Generation-to-Generation Cost Growth*—We have to be ruthless in ensuring that we include in the procurement programme only that which has highest priority. The Fisher report is right in emphasizing the need to improve our ability to examine the cost and sophistication of equipment in light of the investment and capability intended for the future.

(*b*) *Higher-than-Average Inflation*—We must encourage industry to restrain overheads by structure rationalization and reduction of wage inflation in the interests of maintaining project activity. A tight rein will be kept on all overhead increases in new major fixed or target priced contracts which appear to break Treasury cash limits.

(c) *Control of Activity in Industry*—Efforts are being made to introduce some year-to-year flexibility within the Defence Budget, in recognition of the impossibility of trying to control something so complex with total yearly accuracy. We are also exploring contractual year-by-year funding ceilings with industry and some have already been agreed in some major projects. Success in achieving some measure of 'annuality' like this will go a long way towards avoiding the two opposite perils of underspending and overspending.

**Question and Answer Session**

REAR-ADMIRAL A. P. COMRIE (*DGA(N)*) commented that even though we have now got a much smaller underspend than in previous years, nevertheless towards the end of the financial year we are asked to have add-backs because of an underspend. When this happens we normally have to take whatever is on the shelf rather than what is on the top of our priority list. Is there any way of having the necessary studies, central committee and Ministerial clearances for a priority list in preparation for future add-backs?

MR. JAGO replied that the first problem is to try to produce better funding estimates than we have done in the past; there are two main approaches to the problem. Firstly, we need some flexibility in our year-by-year arrangements and discussions with the Treasury are in hand on this important issue. If we were in industry, we would regard ourselves as fortunate if we estimated annual cash flow within an accuracy of five or possibly even ten per cent. on an outturn of about fourteen billion pounds. This is one of the main reasons for the banking system! He suggested therefore that some measure of annuality is the best hope for utilizing defence resources to maximum advantage. Secondly, there is the other route of having a priority list of flexible add-backs at one's disposal, which is much rehearsed in the Reeves Report. He had been impressed by the great difficulties of controlling hastily introduced projects, like the VC 10 tanker conversion programme, and by the problems which they can cause for future years. He agreed it is an area we should be studying, but one where he suspected, with the exception of consumables and very simple items of equipment, we shall have difficulty simply because the lead ordering times tend to be far longer than would allow the short-term additional expenditure required.

CAPTAIN J. B. KERR (*DN Plans*) agreed with MR. JAGO and added that Accounting Officers responsible to Parliament inevitably aim low to avoid being castigated for overspending. It is difficult to detect when the overspend is developing; the position can change quite rapidly between accounting periods. So, under the present system, the Naval Staff do establish orders of priority but these tend to be for items obtainable at short notice, such as fuel. Excluding special circumstances, such as the Falklands, acceleration of programmes is difficult and, if one does buy something off the shelf at short notice, problems often result. He believed that annuality is the proper way ahead here, otherwise we have to rely in the second half of the year on priority lists which can only comprise measures that can be implemented quickly.

CNEO remarked that there was also the difficulty of persuading manufacturers to hold such items in stock pending some future add-back. He said, however, that it merited study. He also said that there was a very large fleet belonging to the Director of Marine Services which requires updating from time to time. Many of these are long-run, multi-purpose vessels so that it might be possible to have some of these in a 'pigeon-hole' ready to buy.

REAR-ADMIRAL J. P. EDWARDS (*DGFSP & S*) said that, at the beginning of this year when the last add-backs came up, we only had about a month to

decide what to buy. As it happened, he was able to spend about six million on computers, but only because they were on the spot; even then they were nearly missed because of the complications of contractual processes.

MR. JAGO reiterated that this illustrates a shortcoming in the system. The last three months had been typical of past experience where the add-backs come essentially as a result of Ministerial negotiations over the cash limits uplift. By their very nature, the latter had to take place late in the financial year and, because of the importance of the issues involved, had to take time. As a result, we had to consider add-backs only a few months before the end of the year with the obvious attendant limitations. Again, the need to introduce some measures of annuality into our financial arrangements.

CAPTAIN A. E. STURGEON (*FONAC*) commented that what is really needed is some method of short-circuiting the administrative process and the complex system of central committees, because this is what really takes the time. Although appreciating the need for checks and balances, some method was required to speed things up. What hope is there of that?

MR. JAGO replied that, with any fairly large expenditure, there is bound to be a vigorous system of central committees and assessments, if only because we are always going to be extremely short of resources to cope with the growing threat. There ought to be room in an emergency situation for simplifying the system, and it is interesting to see how the current Operation has allowed that sort of flexibility. It is also very important that we should get the levels of central committee scrutiny right and there are proposals in hand as a result of the Fisher Report to increase the levels of delegation to Service Departments.

So we cannot set aside the central committee structure, but we should be flexible in its use in times of emergency and also ensure that the right level of delegation is given to the Service Departments.

CAPTAIN STURGEON added that perhaps we are being over-cautious with our checks and balances. It had been worked out that there are eighteen levels of decision-making for a certain piece of equipment before it finally got to the Cabinet. So much money is spent on people to drive a project through and run these central committees, that by speeding up our procurement processes great savings could be made.

MR. JAGO replied that it is a concern that is felt in the centre of MOD as well as in the Service Departments, but there are many pressures in the opposite direction. There is the need to ensure that resources are being deployed across the face of the Ministry of Defence in a sensible way and, in the equipment area, whether we should be purchasing abroad or in the U.K. These are matters which are of great concern to Ministers. He had never found clearance with the Treasury a great difficulty. If one had a reasonable case to put, the Treasury were always willing to co-operate with fast decision-making. It is the central committee procedures which tend to take time and these have been examined by the Fisher studies. A number of recommendations have been made to speed up these processes both within the central committees and the structures which support the single Service Board. He hoped that this will have the desired effect and at the same time achieve the proper degree of delegation to the Service Boards.

LIEUTENANT-COMMANDER R. E. H. CHILDS (*DSWP*) commented that estimates must be correct but, because of the very long delays involved in financial submissions, NSR endorsement, and so on and because estimates cannot include any element for inflation, it is often the case that our estimates for a project are nine or ten months out of date by the time they are approved. Inevitably, it is necessary to re-submit within four or five months. Secondly,

can we not improve the communications between the senior management and project personnel? Recently, whereas Central Staff were aware of a danger of underspending in the last three or four months, DSWP was under moratorium to restrict his expenditure because he thought he would be overspent.

MR. JAGO said that he found it difficult to respond with authority to LIEUTENANT-COMMANDER CHILDS because he had only been back in the Navy Department for a short time and he had never previously worked in the Controller of the Navy's area. He went on to say he was very surprised to hear about the liaison between the Central Staff and C of N's Department. His impression is that the finance Directorates of the Bath Departments were closely in touch and that a great deal of sensible action was taken. Speaking of his Air System's experience, he believed that it is helpful for cash limits to be allocated down to Project Director level. Dealing with his single project, or range of projects, each One-Star Director is well placed to react quickly in controlling cash flow.

REAR-ADMIRAL J. E. K. CROYDON (*DGW(N)*) said he absolutely agreed that the time lag between submission and actual approval is a bugbear. Although we have contingencies in our estimates to allow for things like that, it is a great impediment. On the question of the potential overspend and the reaction to it, DUWP and DSWP were probably the two Weapon Directorates most rapidly affected by the moratorium and savings were most rapidly achieved here, whilst other Directorates, subject to the same target headings, were still in the potential overspend situation. Nevertheless we were for a month or so in a 'baling out' situation, which is why there was this apparent month or so delay in the effects reachin[illegible]SWP and DUWP.

# THE PLANNER'S VIEW OF THE NAVY'S FUTURE

**Paper presented**

BY

CAPTAIN J. B. KERR
*(DN Plans)*

The classification level of the content of CAPTAIN KERR's paper prevents its reproduction in this publication. It covered the national and NATO roles of the Royal Navy, discussed its tasks, and gave a projected view of its future size and shape. It ended with a brief discussion on three of the major equipment projects currently under consideration:

The Type 23 Frigate

The Medium Helicopter

The Future Afloat Support Ship

with particular reference to their place in the future Fleet.

## Question and Answer Session

CAPTAIN J. JACOBSEN (H.M.S. *Raleigh*) said that CAPTAIN KERR had summarized the major deterrent tasks in the North Atlantic and has shown our organization to that deterrence. He asked if there was any firm organization that would ensure that NATO plans in the long and medium-term would show the 'opposition' that the total NATO ability will provide a feasible deterrent?

CAPTAIN KERR replied that there are NATO long-term plans and there is a planning cycle within NATO where each member country declares its force levels for the next five years. This is scrutinized by the NATO International

Military Staff and is followed by negotiation to determine what is a reasonable challenge for the future. This is always difficult, of course, because we believe that the forces we put forward are themselves a reasonable challenge as far as the Government is concerned. NATO then tries to persuade a greater contribution from its members and this leads to long debate. Peacetime operations are subjected to a similar scrutiny and overall co-ordination in, for example, surveillance, out of area operations, readiness, and the major NATO exercises themselves, particularly those which affect the Command structure like WINTEX and HILEX, to ensure they demonstrate the effectiveness of NATO forces.

CAPTAIN JACOBSEN said that he had been referring to future force levels and hardware.

CAPTAIN KERR said that there was a NATO plan for hardware in the form of each country's long-term costing which is presented and considered by NATO. This was not very satifactory in his view, because each Government in the end can decide what it is going to spend its money on, despite the calls of NATO. Taking a hypothetical example, if SACLANT attempted to tell us to scrap our nuclear submarines and concentrate on conventional types, U.K. Ministers would not take too kindly to such interference in our Defence affairs. So this is a difficult grey area between national sovereignty and Alliance effort. It is equally important to get the member nations to view the conduct and concept of operations in the same way—an idea developed between the three major NATO Commanders and agreed about eighteen months ago. It is of interest that it is the first time that there has been agreement on the Maritime Concept which is a major step bearing in mind the age of NATO!

CNEO wound up this session saying he drew a great deal of comfort from CAPTAIN KERR'S last remark. NATO has moved very slowly but it is still moving forward. He wished that we could speed up the process but at least with this agreement we have demonstrated that we are prepared to do something.

# LOGISTICS—STORES AND SPARES SUPPORT

## Summary of the paper presented

BY

MR. K. J. PRITCHARD
*(DGST(N))*

An eminent naval officer had observed to DGST(N) that, as far as the stores organization was concerned, the Falkland Islands operation was the best thing since sliced bread! Be that as it may, he asked to be forgiven for saying that it has provided his Department with an opportunity to show what can be done in an emergency and, of course, for many young people in the organization it had been a time to discover a real sense of purpose and had shown them what it is really all about. He said that, if the operation was protracted, then availability of stores would be a very important matter; however, in the short term, the problem was to provide enough fuel and food to support, at a distance of eight thousand miles, all the ships that the Naval Staff were busy sending off to the South Atlantic.

Talking of add-backs, he said that we would have been in a parlous situation had we not been able to spend twenty million or so on fuel because of the underspend last year—one positive example where add-backs have paid off.

He mentioned one curious statistic that had come to light since the Falklands affair began. Sixty-six vice-admiral's flags, sixty-six rear-admiral's flags, and thirty-four commodore's flags had been issued. He could only suppose that the 'come-in-handy brigade' was still with us!!

TABLE II—*DGST(N) Stores inventories: size and value of stock at 31.3.1981*

| | *No. of Items* | *Value of Stock* |
|---|---|---|
| General Naval Stores | 95,000 | £186M |
| Electronic Stores | 198,000 | £505M |
| Weapon Control Stores | 55,000 | £185M |
| Depot Spare Machinery | 15,000 | £315M |
| Machinery Spares (SPDC) | 372,000 | £209M |
| | 735,000 | £1400M |

TABLE III—*DGST(N) Stores inventories: number and value of issues in 1980–81*

| | *No. of Items* | *Value of Issues* |
|---|---|---|
| General Naval Stores | 1,533,000 | £125M |
| Electronic Stores | 408,000 | £276M |
| Weapon Control Stores | 105,000 | £82M |
| Depot Spare Machinery | 10,000 | £138M |
| Machinery Spares (SPDC) | 379,000 | £59M |
| | 2,435,000 | £680M |

*The Size and Scope of the Naval Logistic Task*

The main message from TABLE II and III is that it is big business. We have over 850 000 line items in the whole range and the stock holding is something like £2000 000 000. The DGST(N) share of the naval budget is something like twenty-five per cent. A lot of money which hopefully we are trying, in many directions, to spend better.

One of the main problems is the size of the inventory. Ford Motor Company has a range of about forty-thousand items so our own range of eight-hundred-and-fifty thousand is big and by comparison very much more complicated.

*Initial Provision*

Initial provisioning of spares starts with the Naval Staff Requirement and the overall ship's equipment fit. Although logisticians have an essential role here, we are heavily dependent on technical advice in deciding what stocks to hold on the ship, at the base, or the main store holding—in other words, the ranging of spares. We must also address scaling the number of spares, the upkeep plan, maintenance, and the likelihood of equipment failure. A single ship may include six-hundred DG Ships equipments and perhaps about twenty major DGW(N) equipments. Initial provisioning is not an exact science and there is always a risk of over- or under-provisioning. A lot of subjective judgement is involved because, very often, a brand new weapon or new class of ship is a prototype in effect and well ahead of its field.

In the case of a new-build ship, one has to rely increasingly on shipbuilders for information and recommendations. The shipbuilder often sub-contracts a lot of his work and it is not always in his interests to commit money early. Very often he has problems of cash-liquidity that tend to make him order equipments at the last moment. Sometimes in the present recession one finds one is dealing with firms which are very tight for money or, indeed, positively

going out of business. Also there might not be enough money available to lay down a satisfactory Initial Provision, as has been the case sometimes in the last couple of years.

One thing that is clear is that, when things go wrong, DGST(N) usually tends to get kicked! It is, of course, a good deal more complicated than that and, in conjunction with the design and production departments, we have a study in hand to improve things.

It should be mentioned that the Exchequer and Audits have been taking a slightly 'unhealthy' interest in the amount of stocks we hold. At the moment it is very difficult for us to determine the origin of a lot of slow-moving and non-moving stock. Sometimes it is thought to be Initial Provisioning stock that has been over-provided and has never moved; we would, however, prefer to be able to say with conviction from where it came. Of course, much of it arises from sales to other Governments—including certain South American countries in times past—for it has always been policy to hold spares in case they want to buy them. It seems difficult for the Rayner's of this world to understand why we should hold such large stocks, as they are accustomed to thinking in terms of stock levels such as I have quoted for Ford Motors.

*Maintenance Provision*

MR. PRITCHARD said that, during a visit to Unilever, he had seen a marvellous building entirely filled with Kellogg's cornflakes. DGST(N)'s position was, however, entirely different. The organization does not set out to satisfy all demands immediately on first presentation. There are engineers who expect immediate availability of items, whether they have given sufficient notice or not, but that is not actually the Admiralty Board policy. In TABLE IV, the percentages on the left-hand side are those we have been aiming at for many years. Those on the right-hand side give the reduction due to financial cuts in respect of general stores and SPDC stores in 1981–2. TABLE V shows the present (Feb. 1982) position. The SPDC availability achievement, although it has improved slightly and is now 73·9 per cent., is still a very worrying area. The message is simple: the rapid decline is primarily because of the moratorium, followed by the period of restraint until the end of March last year and the fact that money was taken out of the programme. Of course, there is always a conflict between DGST(N) and the Naval Staff because the stores area looks big and offers a convenient target whenever there is a need to make cuts. By the time the cuts bite, the reason for the money being taken out has been forgotten and DGST(N) comes under pressure for being inefficient.

TABLE IV—*Admiralty Board approved performance target levels for stores availability*

| | *Up to 1981–82* | *1981–82* |
|---|---|---|
| General Naval Stores | 92·5% | 90% |
| Machinery Spares (SPDC) | 85% | 80% |
| Electronic Stores | 90% | 90%* |
| Weapon Control Stores | 84% | 84%* |

*Target levels of availability unchanged, but arbitrary financial cuts resulted in similar decline in actual performance.

TABLE V—*Stores availability: current performance (end February 1982)*

| | |
|---|---|
| General Naval Stores | 89·6% |
| Machinery Spares (SPDC) | 71·7% |
| Electronic Stores | 80·8% |
| Weapon Control Stores | 79·8% |

MR. PRITCHARD believed that we have got to a core beyond which it would be very dangerous to go. However, the add-back system had provided, at the last moment, thirty-seven million pounds to be fed back into the programme at the end of the last financial year; when this has worked its way through the system, it is hoped that there will be a distinct improvement in availability.

After the Defence Review, our organization, like every other, had to adjust the shape and pattern of its activity. Portsmouth is running down, Chatham is going, and Woolston and Llangennech are closing in 1986–7. If supporting only two major bases, it is well arguable that there is no need for central depots; the stocks ought to be at the bases themselves. However, the tremendous upheaval in terms of staff and the local difficulties involved, as exemplified by the Copenacre campaign of the 70s, showed how immensely difficult it is to uproot and remove a depot, even on logical grounds. Furthermore, if there is no money, one is hard put to see how the necessary storehouses at Devonport and Rosyth could be built. DGST(N) has no budget of his own and has to compete for priority items with every one else in the naval programme, and so one is constantly being denied the means to become really efficient.

*Design for Reliability and Conservation*

On this subject, MR. PRITCHARD said that one of DGST(N)'s main difficulties in the past had been that too many equipments with low reliability had been brought into service. Many of these equipments reached into new areas of technology and, he was sure, insufficient attention had been paid to their capital and running costs. His organization was trying to pay a bigger role as logisticians; to maximize resources, we could not afford to hoard too much onboard. SPAREDEX would provide a better discipline in this area and it was hoped to develop DGST(N)'s computer systems to give more information about shipboard and depot usage of stores and spares. He added that too often very expensive depot spare machinery was returned from ships with some basic parts missing or inadequately preserved and packed.

During the past decade or so, including the two major Defence reviews, cuts in spares have often been mentioned. He said that this had usually been something of a myth because, in the curious way that finances operate in the Ministry of Defence, although quite a lot gets taken out of the programme much is then dribbled back in again at the last moment. In the past two years, however, some very real cuts of provision have happened and hopefully that pattern of events will continue. If we are to keep a reasonable standard of supply to the Fleet, we all need to work to maintain and improve the effective working partnerships between DGST(N)'s organization, the Naval Staff, and the Design and Production Departments.

**Question and Answer Session**

COMMANDER P. J. STICKLAND recalled that, when he was serving in a STANAVFORLANT ship, only thirteen out of about one thousand demands made on the Force's internal stores pool procedure MATCONOFF had been satisfied because of the lack of standardization of Force equipment. He asked whether MR. PRITCHARD saw any improvement in standardization in the foreseeable future.

MR. PRITCHARD replied that, although he agreed of course with the concept, he could not see much improvement in the situation.

CNEO said that the R.N. is trying hard in the Design Department and Naval Staff areas not to get a string of prototype equipments into the Fleet. This hopefully will make MR. PRITCHARD's task less difficult and, incidentally,

avoids a huge number of modifications. One can never expect to avoid prototypes completely, he believed, in a small Navy with a low rate of build against an advancing threat, certainly on the weapons side. He indicated that the Controller of the Navy was also keen to avoid such strings of prototypes and, so far as is possible, the Type 23 design will not show this tendency.

The reason why NATO had made such little progress towards standardization was because of the huge political problems involved. There have been a few areas of collaboration such as EXOCET and some of the helicopters, but this is difficult to achieve outside the very large companies like British Aerospace, who can realistically join up with other large firms to break into the international market. For smaller items, standardization can result in small companies being put out of business and this is not acceptable for that country's politicians in whose constituencies such firms lie.

CAPTAIN G. V. BUXTON (*DG Ships*) pointed out that the main thrust of MR. PRITCHARD's talk had been rationalization of spares and stores as a means of cutting costs. The Navy was not the Ford Motor Company or Unilever who are more concerned with economic efficiency. The Navy is concerned with performance as well and we are trying to provide a service for the Fleet to perform in the event of war, yet we put our weapons stores mainly in one place and our machinery stores mainly at another. If they were lost during the early part of a war we would be in great trouble. He wondered what strategic thought is being applied to the deployment of our essential stores.

MR. PRITCHARD believed that the decision not to disperse stocks, made on various occasions in the past, was probably wrong but he would be unlikely to have sufficient money to concentrate the stocks at the two main Bases.

CAPTAIN KERR remarked that the loss of an RFA stores ship with all its war stocks would, in the immediate sense of the conflict, be almost as much concern to the Naval Staff.

MR. PRITCHARD agreed and pointed out that the loss of the central stock of electronic equipment which could not possibly be replaced in a reasonable time would be a major disaster.

REAR-ADMIRAL A. S. GEORGE (*DPSD*) referred to the concern felt by the Support Departments over the Type 23 frigate which they saw as a ship with a small ship's company, with a very small spares holding, and little redundancy in the design of the machinery. It will be a difficult support problem, he felt, without some pretty dramatic action from DGST(N). He wondered whether DGST(N) had yet had time to consider the support problem.

MR. PRITCHARD said that a policy had not yet been worked out for the Type 23 but, turning for a moment to support of the SSN, he was trying to help by putting more stocks down at Devonport and Rosyth.

CNEO said that SSN support was an example where the cyclic nature of defence finances produced a 'stop/go' effect. He was in Foxhill when they had to reduce the purchase of first outfit and depot spares. When he later took over as DPT the situation had improved, recovery bids were in and the money was there. Now it has happened again; the cycle for the SWIFTSURE Class has coincided with that for the moratorium. A degree of carry-over in the Votes from year to year would be very significant. In this way it may be possible to accumulate sufficient for, say, another frigate or an outfit of spares rather than the money being lost in a series of annual underspends, or 'wasted' in a series of minor equipment add-backs.

# THE MANPOWER SCENE

**Summary of paper presented**

BY

CAPTAIN H. W. YOUNG
COMMANDER M. G. RUTHERFORD
COMMANDER P. NOWELL
*(DNMT(E))*

The 1981 Defence Review came on top of DNMT(E)'s already busy post-EBD acitivities which include the X/WE study and artificer/mechanician realignment, amongst many others. The Review called for justification of every facet of our engineering manning and training philosophy and the need to fight for what were established policies, or indeed for those which were actually in course of implementation. One good aspect of it all was that the Review has made more likely several plans shelved a few years ago through lack of money. In fact the theme 'Invest to Save' had been adopted for this presentation, since the ability to spend money in the short term to save in the long term is very desirable, albeit the facility is seldom available to us. DNMT(E) believed that we must include contingency within our LTCs for this.

*SLIMTRAIN*

Attempts have been made to transfer as much training as possible to sea in order to achieve one of the declared prime aims of the White Paper to improve the 'Teeth' at the expense of the 'Tail'. Little more engineering training could be undertaken at sea, so efforts were made to make shore training more efficient. SLIMTRAIN was set in motion and savings are possible. ME and WE qualifying courses for petty officer mechanic will be phased out by 1983 and mechanics' Part II and III training is under scrutiny. Apprentice training will also change, with one term of the *Fisgard* year being done at *Raleigh* and the remainder at Part III training establishments after the closure of *Fisgard*. This should produce savings of about one term in each sub-Branch (FIG. 4), but it can only be achieved by re-activating PROCTIS whereby ME artificer and mechanician training are combined into one School at *Sultan*. Although the initial phases of PROCTIS were cheap and have been completed, the later phases of expanding *Sultan's* facilities and the closure of *Caledonia* and its move to the South are costly, although producing overall savings in the long term. However, the imminent closure of Chatham and the reductions at Portsmouth will mean extra work for Rosyth and *Caledonia* will provide the extra Fleet accommodation, obviating the need for expensive new buildings.

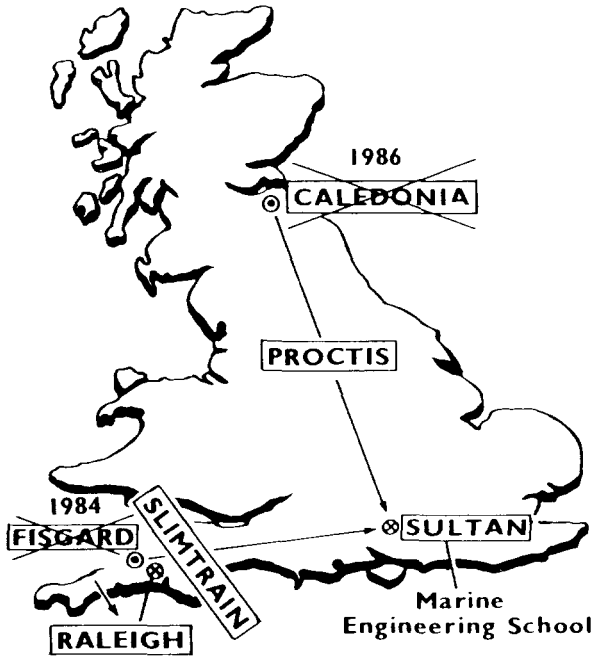


FIG. 4—SLIMTRAIN AND PROCTIS

Investment of some £9½M in *Sultan*'s expansion will allow the full SLIMTRAIN/PROCTIS savings to be realized.

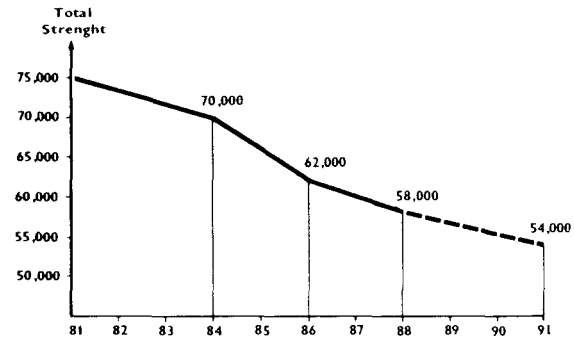


FIG. 5—MANPOWER PROFILE

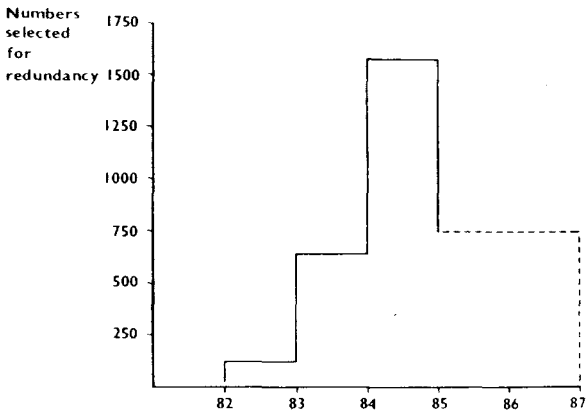


FIG. 6—PREDICTED REDUNDANCY PROFILE

*Redundancy Versus Retention*

Manpower planning is difficult enough but, when considered against a background of reductions, uncertain economic performance, and recession, it becomes almost impossible. FIG. 5 shows how naval manpower will change over the next few years. The reductions shown cannot be achieved by adjustment to recruiting and natural wastage alone, hence the redundancy scheme. Of the first phase already announced, all but eighteen of the five hundred or so officers and ratings are volunteers. FIG. 6 shows what we think the full programme will look like, the dotted line being a guess at the shape for likely redundancies between 1985 – 87. Although initially costly, overall savings of about £700M are expected over the next ten-year manpower bill. TABLE VI shows examples of the wide changes of numbers which will take place over 86 categories of ratings.

With such reductions it may seem ironic that great concern now centres around retention—particularly of our best and key men. FIG. 7 shows how unemployment, although rising steadily, peaks and dips every five years or so. It is therefore likely to dip once again and the voluntary wastage rate running in a similar but antiphase cycle may also be about to change. Of course the redundancy scheme is actively trying to encourage the latter, but we must not let it cause an overshoot. High unemployment does not necessarily mean high retention, as was the case in 1978, so the graph for the next three years could take the form of FIG. 8.

TABLE VI—*Examples of re-structuring effects on branches*

| | |
|---|---|
| MEM (M) GS | Down 30% |
| MEM (M) SM | Down 1% |
| MEA GS | Down 25% |
| WEM (O) & (R) | Down 22% |
| WEA GS | Down 17% |
| WEA SM | Up 5% |
| AEA | Down 26% |
| DIVERS | Up 22% |
| COMMS TECH | Up 36% |
| OPS (MISSILE) | Down 36% |

We clearly must anticipate such changes where possible and take steps as required to control them, hence the discussions on committal bonuses, additional pay, open engagements, and bounties to encourage retention. FIG. 9 shows the variations of numbers of submarine qualified senior-rate nuclear watchkeepers. The dip in 1978 almost caused us to lay up one submarine but a bounty scheme, which was partially clouded by pay comparability, reversed the trend. However, 300 of our 460 senior-rate nuclear watchkeepers have now done their three years and the graph shows that, even if only a few of them go early, we will be in

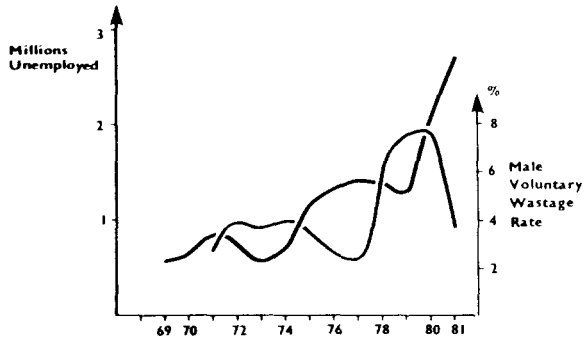


FIG. 7—UNEMPLOYMENT: MALE VOLUNTARY WASTAGE RATE

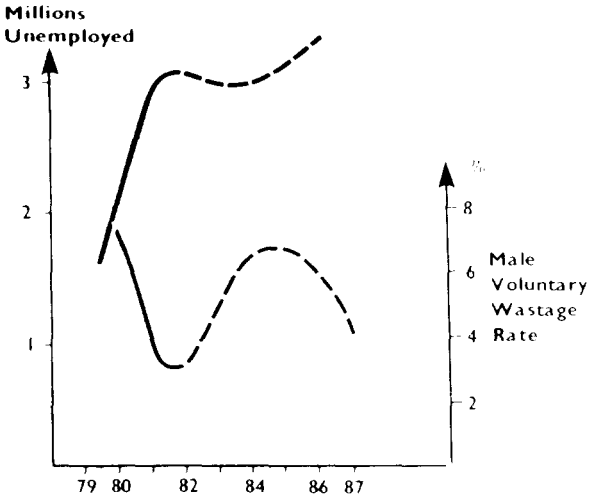


FIG. 8—PREDICTED UNEMPLOYMENT VERSUS CORRESPONDING MALE VOLUNTARY WASTAGE RATE

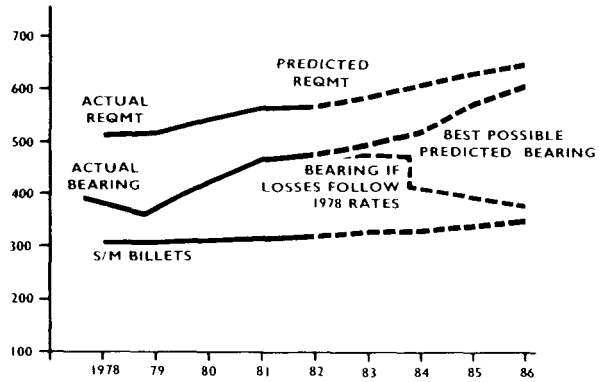


FIG. 9—NUCLEAR PROPULSION SENIOR WATCHKEEPERS

trouble again if we are to meet the *Trident* requirement. It now lies with the Armed Forces Pay Review Board to consider whether or not to continue with some form of incentive scheme. It takes ten years and £150 000 to train a nuclear propulsion senior rating.

### *Artificer/Mechanician Progress*

During the EBD studies many anomalies were noticed both between artificers and mechanicians and across the three sub-Branches, whose skilled maintainers had developed with various titles along different lines. Clearly rationalization was a vital early goal but progress was hampered by the staggered implementation of sub-Branch EBD policies. Last year the Artificer/Mechanician Working Party, set up to look at these problems and seek common training and advancement patterns, made recommendations recently endorsed by the Board.

On the first of April 1983, Title Day, all artificers and mechanicians will adopt the same set of titles, shown in TABLE VII. The term 'artificer' is retained because it is better understood by other Services, industry, and, in particular, Trades Unions who currently recognize artificers but not mechanicians as skilled men. There are many consequences, mainly affecting training and advancement, of these changes but a common set of rules for the three sub-Branches has been agreed. Some SD selection changes have also been necessary: for instance, the upper age limit for SD qualification is to be 36 because of the increased age of artificers and mechanicians.

### *Adquals*

Further savings in artificer career training might be achieved by investing in Adquals for certain areas. Sub-Branch craft skills are nearly extinct, being replaced by MEAsML and EL both of whom receive similar fitting and turning, allied trade, and engine fitting training. The policy is that successful trainees will receive additional training in the form of Adquals, supplemented

TABLE VII—*Artificer and mechanician: changes of title*

| *Present Titles* | | *New Titles* | |
|---|---|---|---|
| *Artificer* | *Mechanician* | *Full* | *Short* |
| Artificer Apprentice | — | Artificer Apprentice | AA |
| — | Mechanician Candidate | Artificer Candidate | AC |
| 4th year Apprentice | — | Acting Leading Artificer | A/LART |
| 3rd Class | — | Leading Artificer | LART |
| — | 3rd Class | Prob$^{y}$. Petty Officer Artificer | Prob$^{y}$ PO ART |
| Acting 2nd Class | — | Acting Petty Officer Artificer | A/PO ART |
| 2nd Class | 2nd Class | Petty Officer Artificer | PO ART |
| 1st Class | 1st Class | Chief Petty Officer Artificer | CPO ART |
| Chief | Chief | Charge Chief Artificer | CC ART |
| Fleet Chief | Fleet Chief | Fleet Chief Artificer | FC ART |

by PJTs to fit them for operational and for support roles, in light of constantly reviewed Service requirements. In this way a selected number of men can be trained to meet a current requirement and *Centurion*, having recorded their skills, can draft men to the most appropriate billets. Preferably, such trainees should be drawn from a pool of volunteers. However, the fear that volunteering might bring an unpopular draft is likely to mean that the pool would be too small to meet requirements. It is accepted that in-depth skills cannot be achieved by short intensive courses alone. However, Adquals are here to stay, and all engineer officers should advertise, support, and recommend them to their men, and should report back if the courses fall short of requirements.

*Engineer Officers' Training*

In the SLIMTRAIN studies, engineer officers' training has not changed and the SLIMTRAIN cuts were based on the need for officers and aritificers with appropriate professional qualifications. Vigorous discussions were held with the Tri-Service Committee tasked to investigate engineer officers' training in all three Services. Subjects covered were the requirement for chartered engineers and technician engineers, post-graduate training, and the costs and need for in-Service training rather than polytechnic and university training. Also covered were under-utilization at Manadon, Shrivenham, and Cranwell, civilianization of academic staff at Manadon and the amalgamation of the three service colleges. The Committee's report will recommend that the three colleges should remain under the control of, and be financed by, each Service, but will be regarded as a single national asset and a Standing Committee will advise on rationalization. So the discussions are bound to continue; however, from them may emerge a more coherent and broader technological training for all three Services.

## Question and Answer Session

COMMANDER C. D. D. COLBY (*DDWP*) asked what options were being considered for the future of chief artificers.

CAPTAIN YOUNG replied that there are two conflicting factors concerning the chief artificer rate: on the one hand, this level of rank does not exist in other Branches and so it would be convenient to drop it; on the other hand, these ratings perform a very real function, particularly in the ME sub-Branch and as nuclear watchkeepers in submarines taking charge of a watch or a

department. The choice was either uniformity between Branches or leaving things as they are, in a state of slightly muddled diversity. The introduction of the fleet chief rate, not really needed in the Engineering Branch, had caused the problem in the first place. The possibility of dividing chief artificer billets into those that should be fleet chiefs and those that should be 'first class' is being investigated. This is an extremely complex problem and will not be rushed. If it is decided to leave things as they are (as recommended by the Artificer Mechanician Working Party), then those recommendations will be implemented in full, at the same time doing all possible to improve the chief artificer's status and introducing a new badge to distinquish the charge chief artificer rate from other rates.

LIEUTENANT C. R. THORPE (*DG Ships*) said that DNMT(E) had mentioned the financial considerations for improving retention. Had other aspects such as promotion or, in particular, job satisfaction been looked at with the same attention?

CAPTAIN YOUNG replied that DNMT had, primarily, been looking at the financial aspects. Job satisfaction had not really been studied, partly because the whole future of the officer corps is under considerable debate and the exact way ahead is not yet clear. For ratings, consideration is being given to lengthening engagements so as not to lose the man, having trained him to be a good artificer. In most cases he is perfectly capable of continuing to do good work. Otherwise, no chance of improving the career prospects of ratings is foreseen at present. The selection rate to SD officer is unlikely to improve markedly although the upper age limit has been extended by two years. Retention would therefore be as a very senior and very useful rating, but with no offer of better career prospects as an SD officer.

## THE X/WE DEVELOPMENT GROUP

**Summary of paper presented**

BY

CAPTAIN P. R. H. COLLINSON
CAPTAIN R. H. C. HEPTINSTALL
(*DNMP*)

The terms of reference of the X/WE Study, established in July 1981, were to propose changes to the responsibilities, organization, and training of Ops and WE sub-Branch officers and ratings to improve operational efficiency, to make the most effective use of the men, and to match the manpower structures to the requirements of the future Fleet.

The Development Group first analysed the perceived shortcomings of the officers and ratings in relation to weapon systems effectiveness as follows:

*Officers*

Current PWO training has been broad, shallow, and, quite properly, biassed towards tactics and procedures but time on course has not permitted deep treatment of equipment detail. Few junior officers serve in subordinate positions in the Ops. room before becoming PWOs, yet on completion of course they suddenly find themselves in charge, often in spaces which make the job of leading, monitoring, and encouraging their teams virtually impossible.

Another factor is time. The PWO course is taken at about the six year seniority point as a lieutenant and, because the promotion zone for commander starts so early, there is little time as a lieutenant-commander to gain practical experience in warfare expertise so necessary for Command.

The WEO's problems are broadly similar, being short on sea experience after the average one sea job as a lieutenant, one as a lieutenant-commander and only half of the WE commanders currently go to sea. In the post-Nott Navy, there will be very few WE commanders fortunate enough to enjoy a sea appointment. The present 4½ days spent at the School of Maritime Operations (SMOPs) during the WEAC is insufficient to enable the WEO to appreciate the operator's viewpoint and problems and leaves him low on tactical knowledge.

The effects of the traditional rather rigid separation of essentially complementary user and maintainer tasks coupled with lack of knowledge becomes apparent in the later Naval Staff and PE appointments of both WE and seaman officers. There is an urgent need to improve the user/maintainer knowledge of the officers directly concerned with the design and efficiency of our future weapons and AIO systems. Furthermore, operational efficiency must be more prominent in our thinking. All too often the Group found that ship husbandry was in the forefront of officer's minds, often to the exclusion of all other considerations.

*Ratings*

The present rigid boundaries whereby the Ops. Branch *operate* and WEMs *maintain* do not lead to efficient or effective use of our weapons and sensors. The operator has a short, objective training, spends much of his time away from his equipment, and is generally unable to detect degradation in its performance. Lack of onboard simulators and the heavy emphasis on ship husbandry keep him woefully out of practice; FOST finds that ships returning for COST are just as bad as those on BOST.

WEM's training is very broad and new equipment, such as the Type 22 frigate's EW, Exocet, Seawolf, and 2016 Sonar, do not require senior WEM ratings. This makes advancement in the future Fleet a bleak prospect for the WEM.

The various manning philosophies whereby the WE department is manned for harbour maintenance and the Ops. department for defence watches means that the WEs are underemployed and operators are stretched at sea and the reverse in harbour at the end of an AMP with COST ahead.

It was therefore concluded that, at the officer level, the two Branch structures (X and WE) should remain but with the boundaries deliberately 'blurred'. All ratings, should be recruited as operators with a proportion being trained by Adqual as mechanics, with an artificer extraction. All surface ships should be manned for defence watch requirements and there should be no essential change to existing weapon engineering artificer training.

*Recommendations*

(*a*) *Officers:*

(*i*) *Junior Seaman Officers:* their Ops. room and weapon system experience should be regularized and monitored.

(*ii*) *Seaman Officers with Engineering Degrees:* they should be considered for occasional WE appointments, and should be allowed to opt for these in mid career, thus broadening their experience for higher rank.

(*iii*) *PWO Technical Course:* this should be started as soon as possible if the standard of weapon system knowledge is to improve and, with it, the PWO's understanding of how and why the WEO does his job.

(*iv*) *The Defence Technology Course:* this should be started as soon as possible for high-calibre seaman and WE officers.

(*v*) *Bridge Watchkeeping for Junior WE Officers:* this should be encouraged and monitored, since a bridge watchkeeping certificate is a prerequisite for a PWO.

(*vi*) *PWO Sea Billets:* up to 10 per cent. of these should be filled by suitably trained WE officers. This is where the 'blurring' of specialization boundaries will have most impact. Career integrity will not be affected because, if the officer makes a great success of his PWO job, he may be promoted before he returns to sea for his WE charge job. If he does not, there is still ample time for another WE appointment at sea. Exceptional WE officers should join the Command stream after 'earmarking' when at Dartmouth or Manadon.

(*vii*) *WE Application Course:* this should be enhanced by the addition of 5½ days at SMOPs devoted to tactical procedures. The attendance of WEOs (desig) on the Maritime Tactical Course should have the highest priority.

(*b*) *Ratings:*

(*i*) *Complementing:* ship's complements of both the ops. and the WE departments should be based on 'Defence' being the prime state.

(*ii*) *A Common Branch:* this should be formed out of the existing operator and WE mechanic ratings, a proportion of whom should be trained as mechanics by Adqual.

*Rating Career Pattern*

FIG. 10 shows that recruiting will be into the Operations Branch with an unaltered Part I training at *Raleigh* where preliminary mechanic Adqual selection will be made. There will be some flexibility in the system to allow an Adqual man to opt out later or for a later selection to Adqual to be made. On completion of Part I training, the whole entry will go to *Collingwood* for a three week Technical Appreciation course. Thereafter, they split into weapons, radar, EW, communications, and sonar functional groups and

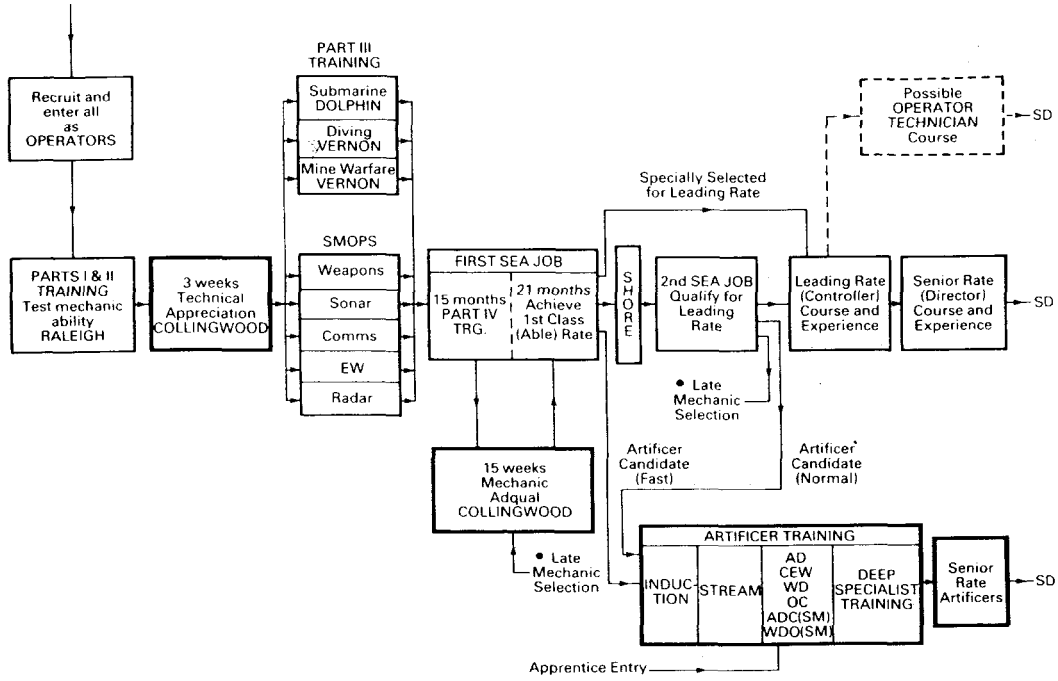


FIG. 10—PROPOSED OPERATOR TRAINING AND PROGRESSION

undertake SMOPs Part III training as at present. Ratings will then be drafted to sea and during the first fifteen months they will spend six months each with the operations and weapons engineering departments and three months on communal duties. Training will be governed by task book and, on completion of the fifteen months and having attained able rate, ratings will be eligible for the Adqual course which will be fifteen weeks long at *Collingwood*. Pure operators and those with the mechanic Adqual will fill billets ashore and afloat whilst working for advancement to leading rate.

The shortness of time in mechanic billets, shorter formal training, the disappearance of the LWEM career course examination, and the changes introduced by the Artificer/Mechanician Working Party together mean that there must be a change in the method of selection for artificer training. There will be two extraction points—one after the first and one after the second sea draft. Adqual ratings not selected for artificer training would serve as operators and would be eligible for advancement in the same way as their counterparts in the pure operator stream.

Because of the long-term shrinkage of sea billets for senior mechanic ratings, all will be eliminated for petty officers and above. This has been achieved by substituting a leading hand with a mechanic Adqual when there is already an artificer in charge of the group, or by adding an artificer in lieu where a senior mechanic has equipment charge and there is no artificer on whom responsibility can logically be placed. A powerful case exists for creating an operator technician as an alternative attraction to artificer training for the above-average junior rating but a detailed case has yet to be made.

A validation team has been established and initially charged with validating the proprosals and drawing up an implementation plan by about the end of the year.

**Question and Answer Session**

COMMANDER D. N. FARR (*CND*) asked for more details of the implementation of the development.

CAPTAIN HEPTINSTALL replied that the team had not yet attempted to study implementation in detail. So far, only validation of the detail had started. The whole process was expected to take about two years before implementation could start. He expected a gradual change with the operator mechanic growing into the system and the WEM dying out. The shortest time for the implementation to be completed would be about sixteen years.

CAPTAIN COLLINSON said that the drafting implications, after complementing, are much more difficult than the training implications. As only two courses had been 'invented' for *Collingwood*, implementation of recruiting and training is very much easier than the future drafting.

CAPTAIN LOUGHNAN (*DSWS*) was concerned that the reduction of sea billets and the plan to 'blur' the boundaries between WE and Ops. Branch at the junior rate level might result in dilution of experience, particularly in the WE area. He also sought assurance that the system will produce WE officers at commander level who have sufficient technical experience to fill all the necessary MOD(PE) billets.

CAPTAIN COLLINSON did not believe that, for ratings, there will be any dilution of experience, and that 'blurring' will broaden rather than reduce the opportunities to gain experience. For officers, the intention was to increase the number of WEs with sea experience by filling some ten per cent. of the PWO billets with weapon engineers. The billets concerned would not be those currently filled by General List PWOs, whose sea experience would therefore not suffer.

COMMANDER V. H. LUCAS (*SWEO to SM2*) said that the Submarine Service had already experienced WE officers with OOW qualifications. Although this provided valuable experience which could be taken back into the MOD(PE), there was a danger that WE officers spent a great deal of time watchkeeping and were thereby unable to pay due attention to their own departmental responsibilities. He hoped that complements of General Service ships should not need to rely on these officers for sea watchkeeping.

CAPTAIN COLLINSON pointed out that it was not intended in the X/WE proposals to replace a PWO by taking a WE away from his department. WEs would only be required to use their 'bridge tickets' when borne as a PWO. It will certainly call for careful consideration by C.-in-C. Fleet and the FOFs as to how these young men are to acquire their 'tickets' and whether they can pay proper attention to their technical responsibilities during that period of their training.

COMMANDER P. J. LIGHTBURN (H.M.S. *Defiance*) asked what 'sampling' had been carried out in the recruiting 'market place' to ensure that volunteers would still be willing to join this 'blurred' Branch. In his experience many sailors join the Navy with specific ideas about what they wish to become and frequently are disappointed on finding themselves doing something different at the end of their training.

CAPTAIN COLLINSON replied that sampling had been carried out. He went on to point out that many ratings apply to change Branch either at *Raleigh* or soon afterwards. As Captain of *Collingwood*, he had frequently found that such applicants said that they really had no idea when they joined what type of work was involved in the Branch they were joining. Although the Development team would have preferred to allow the man to do his initial training and to have seen at sea what an Adqual job entailed before making the selection, advice from Area Personnel Selection Officers was that the selection process had to be done early. The present proprosal is that they will be 'tagged' at *Raleigh*, but it has been firmly said that there must be flexibility to allow men to change should they so wish.

CAPTAIN M. A. VALLIS (*DNR*) said that, even in current conditions, there is difficulty in getting men of the desired quality for the seaman operator Branch. For the new proposed Branch, the standard wanted would be much higher. A seaman is perceived as being an unskilled man in a technical world, and the term 'operator', even in the context of radar or sonar operator, is not understood. Men of the right quality are there to be had but we must seriously consider changing the name of the Branch. If we insist on calling them 'seaman operators', we are standing into trouble.

CAPTAIN COLLINSON said that the team felt this was best looked at during the validation phase.

COMMANDER P. S. STURGES (*DSWS*) said the 'communications technicians' were a 'growth industry', yet we heard from the X/WE team that experience from sea suggested that 'operator technicians' were not needed. Could this be explained?

CAPTAIN COLLINSON replied that it was not that they were 'not needed' but rather that they would be a good rate to 'invent' in order to balance the structure proposed by the team. They would have to be given the sort of training now given to mechanicians (artificer candidates, in the future) to achieve pay-banding and provide the necessary 'carrot' to retain sufficient numbers of the upper intelligence level of operators. So far, the team has been unable to make a case for such a man.

# APPOINTING

## Summary of paper presented

BY

CAPTAIN J. A. STEPHENSON
COMMANDER R. N. M. PAIGE
COMMANDER D. J. WOOD
LIEUTENANT-COMMANDER A. CLARK
*(DNOA(E))*

CAPTAIN STEPHENSON explained that his presentation would take the form of a series of set questions on a variety of appointing topics, each being answered in as much detail as circumstances allowed by the appropriate member of his team. The future holds much that is still unknown in the manpower field, not least because of the South Atlantic deployment and he promised that where they were in the dark they would say so.

*Redundancy*

Q1. Why is there a redundancy programme when there is no apparent surplus of officers?

There is a total overbearing of officers, compared with the total number of complemented posts, which does not, of course, spread itself evenly across all ranks, specializations and sub-specializations. Some are in shortage and some in surplus. A certain amount of compensating can go on—junior lieutenant-commanders doing senior lieutenants jobs, MEs doing shore ME(SM) jobs, some sub-specializations doing a greater proportion of common appointments than others, and so on. The overall surplus is disguised by a combination of factors such as—longer turnovers, short tours and hence more turn-overs, leave between appointments, additional billets for special studies, extra courses, and the occasional officer on 'gardening leave' and so on. The Defence Review had demanded a close scrutiny of our whole organization and the complements everywhere are being changed and cut down. SLIMTRAIN has been just one of a number of activities in this line. This is producing a new total requirement of the officers we need to run the post-Review Navy. We need to match our bearing to that requirement although complement billets cut will not all go at once but will be phased out over a period of time.

Q2. How were the first phase redundancy numbers and specialization splits arrived at?

Current bearing was compared with a best estimate of the 'New 1984 Requirement' and since the latter was not known in all cases, the minimum possible reduction was assumed. The number of redundancies and specialization split fell directly out of that comparison.

Q3. What of the next phase? Some captains and commanders were made redundant in the first phase, are lieutenants and lieutenant-commanders to be cut next time round?

The straightforward answer is that we do not know yet. The next redundancy phase will depend upon the exact breakdown of the 'New 1986 Requirement' and it is unlikely that this will be available until September this year. It can be stated that currently lieutenant-commanders are overborne whereas lieutenants are underborne and consequently it would seem quite possible that there will be some lieutenant-commander redundancies in the future.

Q.4 By 1986 commanders sea jobs could be reduced by half. Will this affect the prospect of commanders getting to sea?

Whilst the Fleet is contracting and officers are being made redundant, the shape of the Fleet is also changing and it seems likely that this will result in a proportionally greater reduction in sea time for commanders. Nevertheless, it is important for commanders to get to sea, if at all possible, and we will be examining all means of achieving this. For instance it may be possible to make a special case to keep appointments short for senior officers who are likely already to be familiar with the equipment, even while other appointments and drafts are being extended. This, however, cannot entirely alleviate the problem for WEs, where jobs have already been reduced in some cases to 18 months, and for submariners where the move towards streaming in the surface fleet must further reduce their chances of getting a surface ship. Hence it does seem that the chances of a sea job for commanders will reduce, but hopefully we will find a way of minimizing this trend.

Q5. Still on the topic of appointments, you will no doubt have heard of the possibility of longer appointments. What is likely to be its effect on career planning and is more streaming likely?

From a purely appointing aspect, we want to be able to give all officers as broad a background as possible, particularly in the early part of their career. This conflicts with the recently announced intention to go towards longer jobs and streaming and typing in order to reduce shore training and turbulence. The full implications of this policy are still being examined but a compromise should result. For a start there should be little effect on the current *modus operandi* of the Submarine Branch. For the remainder, blanket application should be avoided. Only certain jobs should be extended and increased streaming should be introduced only where absolutely necessary.

Q.6 Some 20 per cent. of our commanders and a similar proportion of captains WE and ME are in posts which are complemented for both civilians and naval officers. Why do appointments to these posts always seem to cause turbulence?

In general these are called Engineering Joint Shared (EJS) posts. They occur in DGW(N), DGS, and CED and cover all ranks and lists. Turbulence associated with filling these posts stems mainly from the methods the civilian management appointing system uses compared with our own. There are two major areas of difference:

(*a*) In the civilian field, the employer rarely exercises his right to appoint his employees against their will.

(*b*) Once selected for promotion, the employee has to wait until a post in the higher grade becomes available. He must then apply and be selected for the post before he is actually promoted.

These constraints make it difficult for civilian appointers to plan ahead and results in very short notice moves—much shorter than the six months appointing notice that the Naval Secretary attempts to achieve. It is not unusual for a post to become available at a few weeks, or sometimes only days, notice and, if it is an attractive position then clearly turbulence will result if we are to fill it. This has made bidding for EJS posts difficult and, even if we do bid, the pressure of civilian numbers means there is no guarantee that we will win the day however well-qualified the naval officer might be. In some areas there could be as many as fifteen civilians available for one post.

Q7. If the Air Engineering sub-Branch is getting smaller, what problems does the appointer see in this area?

All GL engineer officers will continue to be selected for promotion from a

common list, regardless of sub-specialization. As AE officers are only approximately one seventh of these, their selections do not follow a neat statistical pattern but fluctuate in an embarassing fashion. The numbers are small when compared with all engineer officers in those ranks affected, and fluctuations could be absorbed by using the Common Appointment Pool of jobs as a buffer without causing unreasonable pain to other Branches. The possibility of increasing the numbers of common appointments is also being considered.

As the total numbers in the AE sub-specialization reduce, each officer becomes a larger percentage investment and the not-infrequent appointing dramas, death, personal accident, and voluntary retirement are likely to lead to increased turbulence.

No step change in envisaged in the size of the AE sub-specialization and these problems are, at worst, only likely to increase slowly. There should be adequate time to consider and introduce palliative measures as required.

**Question and Answer Session**

CAPTAIN D. K. BAWTREE (*DSWS*) asked CNEO how, in view of the reducing number of sea billets, he saw the future need for sea-experience in officers appointed to MOD(PE) jobs.

CNEO replied that, whilst it is still desirable to have a combination of experienced civilian and the sea-experienced naval officers in MOD(PE), he did not believe that any specific amount of sea experience was a prerequisite for engineer officers in many PE jobs. There are, however, a number of jobs where sea experience is the vital rationale of the job. EJS posts do not necessarily depend upon it at all.

REAR-ADMIRAL J. E. K. CROYDON (*DGW(N)*) said that sea experience was a very important, if not vital, factor in the design and development phase of an equipment to ensure proper representation of user and maintainer interest. If we are unable to ensure this by having naval-only posts then that input must be obtained from elsewhere, such as closer liaison with Captain Weapons Trials and Fleet Staff.

LIEUTENANT-COMMANDER P. J. M. TURNER (*CED*) said that one of the disadvantages that naval officers in EJS posts have is a lack of management accounting experience. Were any courses being made available to improve the situation?

REAR-ADMIRAL CROYDON said that it had been discussed by the WE Advisory Panel and its importance was certainly recognized. The 'trainers' have been asked to look at the possibility of introducing a 'broad brush' Management Accountancy Module of a similar length to that given to civilians destined for MOD(PE) appointments.

COMMANDER R. B. STONE (*RNEC*) asked the Appointers to comment on the fear of many junior engineer officers that their career prospects have been diminished by the Defence Review, since the redundancies announced so far have been for commander and above.

CAPTAIN STEPHENSON said that until the size of the 1984–1986 requirement of lieutenant-commanders and lieutenants is known, the structure of promotion will not be clear but he did not believe that the end result will make any significant difference in career prospects. The pyramid will have had a slice taken off one side.

COMMANDER M. C. SHIRLEY asked what was the current view on the seemingly inappropriate policy of sending submarine specialists to key General Service appointments in view of the need highlighted at the Conference for

WE officers to get General Service sea and bridge experience?

CAPTAIN STEPHENSON said that he believed this policy will inevitably have to come to an end if the career of any ME or WE non-submariner is to get the necessary seagoing content.

CNEO remarked that in the past on the ME side there has been a prime requirement for officers to have had a sea job as a commander before they could be promoted. He was aware of only one ME officer of some eminence who has been promoted without having had a sea job. On the WE side there are a number of good precedents to demonstrate that it is not necessary.

# THE MATERIAL ASPECTS OF THE SHIPS, AIRCRAFT, AND SUBMARINES OF THE FLEET

**Summary of paper presented**

BY

CAPTAIN A. K. POTTER
*(DES(N))*
COMMANDER P. W. W. RIDLEY
*(DG Ships)*
COMMANDER P. A. STURGES
*(DSWS)*
COMMANDER T. K. CANNON
*(DPT(SM))*
COMMANDER A. E. ROBERTS
*(DGA(N))*

## The Impact of the Defence Review on the Current Fleet

*The Changes*

How is the material scene affected by the Defence Review and in particular how will it affect us as engineers? In the search for economies, support has been cut in greater proportion than the reduction in hull numbers.

A major feature of the Defence Review was the decision to delete mid life modernizations of our destroyer and frigate force. The decision, deliberately intended to reduce the cost of support, was based on the following two principles:

(*a*) It would increase the numbers of hulls available to the Fleet without the need to build more.

(*b*) Without the modernization task, the cost of the dockyards could be significantly reduced.

Ideally, the alternative to modernization is a short ship life of, say, 12–13 years but this would not maintain hull numbers without a very large building programme. At the other end of the scale, a longer life would not be realistic because after, say, 18 years without modernization a ship is likely to be both operationally and materially obsolete. Thus, stopping modernization, closing dockyards, and a new usage/upkeep cycle go hand in hand. The problem of how to update fleet capability under these conditions is addressed under 'Fleet Capability'.

Closure of Chatham is going ahead and will be completed by 1984 and the submarine refitting task will then be shared between Rosyth and Devonport. Portsmouth Dockyard will reduce to a Fleet Maintenance and Repair Base by

1984, Gibraltar will cease to refit ships by 1983, but will continue as a Naval Base.

Finally, in an effort to cut down the 'tail', as much training as possible will be done at sea and shore establishments will be reduced. *Fisgard* and *Caledonia* will close in 1983 and 1985 respectively and a sea/shore ratio of 50/50 is the aim for 1986.

*Surface Fleet Upkeep*

Following the Defence Review, the Admiralty Board laid down four fundamental precepts for future Fleet upkeep policy:

(*a*) The support of the Fleet should be no more than the minimum necessary, accepting some risk.

(*b*) Surface ship modernizations and major refits are to cease.

(*c*) Surface ship refits should contain an allowance of 10 per cent. in man weeks for As. and As.

(*d*) Whole ship life is to be eighteen years with at least three in the standby squadron.

In recent years the advent of gas turbine propulsion, equipment removal routes designed for upkeep-by-exchange, condition-based maintenance, better materials and protective coatings, and a conscious desire to design for reliability and longevity has resulted in lengthening refit intervals. Unfortunately as the refit interval stretched the refit length extended, and the resultant gain in ship availability to the Fleet was zero. The Defence Review has forced a very firm stand to be taken against lengthened refits, not without a certain amount of risk.

The restorative refit has been introduced; this will merely return the structure and preservation condition to a level to last out the ship's life without modernization or attempting to restore to 'as-new' condition. It is believed that the new upkeep cycle is about right accepting some risk, but there is concern about up-dating the Fleet capability. Even with the aforementioned deletions, dockyard capacity will barely cover the future DED and restorative refit tasks, and thus the man-weeks for As. and As. and the total refit package will have to be strictly limited.

To sustain Fleet efficiency, it will be essential to specialize a man to a ship or equipment type. The aim is therefore to group ships and equipments with specific home ports/dockyards so avoiding long separation from home ports during refit. Portsmouth having no refit capability, ships home-ported there must refit somewhere else. To cater for this, a 'garage-refit' scheme is being considered: for this the ship's staff's tasks during refit are undertaken by a permanent shore-based refitting group, thus releasing the ship's staff to man the previous ship as it leaves refit. The scheme has been pioneered at Gibraltar with LEANDER Class frigates; its success will largely depend on the smooth nose-to-tail streaming of the ships being refitted.

The new refit interval is incompatible with the present rules regarding statutory tests of air bottles and lifting appliances, etc. These are laid down by the Health and Safety at Work Act and will be carried out during operational time by a special unit set up in each Naval Base or Dockyard. Clearly the importance of FMG support will be increased and the maintenance load will have to be reduced in every possible way.

Upkeep-by-exchange, whenever possible at the lowest component level, and condition-based maintenance will also assume even greater importance. Already there is an increasing tendency for the Fleet to undertake its own repairs and rely less on outside assistance. The Fleet COGOG team for example is now undertaking tasks which were once considered beyond the

capability of uniformed personnel. As. and As. are being re-appraised to simplify and reduce work content to bring them within ship's staff capability.

*Submarine Upkeep*

Whilst the changes on the submarine side are not quite so drastic, there is a similar story to tell. The refit interval for all submarines has been increased, by about a year for SSBNs and older SSNs and by eighteen months for the SWIFTSURE Class, to ensure optimum core usage and to compensate for the loss of Chatham. No major problems are envisaged although hull valve examination will need careful planning to maintain safe-to-dive dates and steam and feed systems will require careful monitoring in view of the severe in-service corrosion problems already experienced.

As. and As. will be cut back and screened and only those which are required for the following reasons retained:

(*a*) Essential update of operational capability.

(*b*) Essential for ship and personnel safety.

(*c*) Obsolescence.

(*d*) Noise.

Refit work packages are to be pruned not only for As. and As. but also for maintenance content to be compatible with dockyard capacity.

Spares have been affected by the severe restraint on new contracts in the last two years and strict stores control is necessary to keep submarines operational. Complete upkeep-by-exchange units are in very short supply; in some cases in the SWIFTSURE Class there is only one exchange unit for the six submarines. Submarines and maintenance bases can help by returning units as quickly as possible and not demanding equipment unnecessarily.

With the closure of Chatham, the plan is for Rosyth to do SSBN refits and some SSN DEDs, and for Devonport to do all other SSN work plus the additional ex-Portsmouth SSK refits. Devonport has yet to complete a 'normal' refit (the slow starting SWIFTSURE refit cannot be considered normal) so a steep learning curve will be required to plug the gap left by Chatham.

*Aircraft Maintenance*

Naval in-service helicopters are aging and incorporate, at best, 1960s technology. The Sea King, workhorse of the helicopter fleet, is a product of the late 50s, and its airframe and engine capability have reached the ultimate of its dynamic system. While the Lynx is a later design, it is true of both types that further improvement can only be achieved by expensive redesign of their dynamic systems.

Advances in avionic technology have, however, enhanced the submarine detection and attack systems, reduced weight, and increased endurance on task. The limited number of aircraft results in usage to the limits of structural and mechanical integrity so increasing the defect rate which in turn demands more support and increases financial pressure. The obvious way ahead means spending scarce money to reap future benefits of new technology to improve reliability and maintainability.

The reduction of uniformed personnel in shore support will mean more work for industry and for the Naval Aircraft Repair Organization (NARO); thus management of resources and good industrial relations are of increasing importance to our operational capability.

Expected major changes planned for Sea Harrier, Sea King and Lynx affect the weapon systems and have ship A. and A. implications, thus availability of resources for ship As. and As. will affect Fleet Air Arm improvements to some degree.

Improved ability to diagnose and repair equipments at second line and use of built-in test equipment (BITE), particularly in avionics, should reduce the cost of logistic support. Condition monitoring will provide wear state data of mechanical components and allow for critical items to be more realistically lifed. Air station and ship air engineering management computers will replace cumbersome paper records and will provide defect analysis data to aid diagnosis.

One million direct manhours are expended annually in NARO for the Tri-Service repair task but the reduction of aircraft types due to the withdrawal of Wessex and Wasp helicopters represents only 5 per cent. of the total load, so we cannot rely on much spare capacity resulting from this. The informal agreement with the Society of British Aerospace Companies to share the total Tri-Service helicopter repair load has involved duplication of expensive jigs and it will not be possible to continue this policy in the future.

'Single sourcing' for 3rd and 4th line repair will soon become the norm.

Improvements in support information include introduction of the naval air station engineering management computer (NASEM) already mentioned. There will also be a rapid expansion in the use of microfiche for maintenance documentation.

*Manpower*

The earlier presentation on manpower underlined the decision to minimize the unit production cost of the Type 23 frigate by reducing the on board maintenance manpower and increase the shore-based support. Reference was also made to the results of a recent study into the future involvement of uniformed personnel in software procurement and support and the submission through CNEO to the Second Sea Lord recommending the introduction of a career structure aimed at producing officers trained to system-analyst level.

*Logistics*

FIG. 11 shows the disproportionate increase in the cost of spares relative to capital equipment for weapons equipment in the period 1965 to 1976. What are the reasons for this?

(*a*) Unreliable equipment? Certainly a major cause, but reliability costs money and it requires a conscious decision to spend money for future reliability.

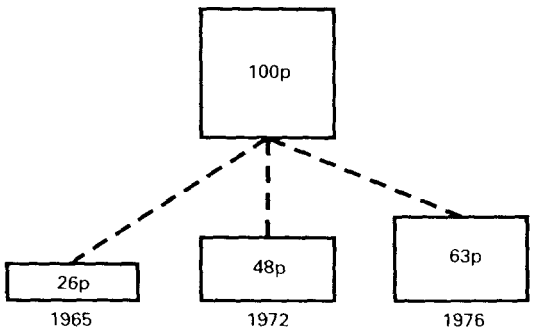


FIG. 11—SPEND ON SPARES RELATIVE TO SPEND ON CAPITAL EQUIPMENT

(*b*) Deficient maintenance? For example, between June 1979 and July 1980, of 164 items of Radar 912 returned for repair, 56 per cent. were fault free!

(*c*) Deficient stores provisioning? TABLE VIII shows that the ship's consolidated allowance list (CAL) does not, at least for one DLG, one Type 21, and two Type 42s on which the data is based, accurately reflect what the ship requires.

Set against the latter are the large stocks provided in ships and depots which are never used and are a vast capital investment lying fallow. The minor fleet trial, CODE NL, which aimed to examine the effectiveness of the CAL and the effect of logistic supply items on weapon equipment availability was discussed. Over half the spares required by the WE department are not listed in the CAL,

over 60 per cent. of those actually required were not held on board, and a high proportion of spares carried were not required. The results have been so significant that ERSUI collection has been extended to the whole Fleet for weapon equipments and to a selected twelve ships for the more numerous DG Ship's equipments.

TABLE VIII—*Summary of data for 1979*

| *Ship Class* | *No. of WE demands* | *Demands made for non-CAL items* | *Demands met from onboard stock* |
|---|---|---|---|
| DLG | 2461 | 53% | 33% |
| Type 21 | 1154 | 54% | 24% |
| Type 42 | 2102 | 56% | 17% |

*Support Information*

The presentation next reviewed the problems of support information and referred to the Management of Support Information Project (MSIP), set up by the Naval Projects Committee to provide a comprehensive, accurate, easily managed, and readily accessible source of support information for ship and shore users. The report of MSIP, yet to be approved, puts forward a five part strategy for the proposed system:

(*a*) 90 per cent. of documentation to be on microfiche.

(*b*) Documentation to be produced using information processors.

(*c*) Rationalized documentation.

(*d*) Mechanized user retrieval and muster tasks.

(*e*) Develop a ship-orientated comprehensive indexing system (SHIPCIST).

SHIPCIST is to be based on a master record centre data bank set up at Yarrows initially as part of the Type 22 build, with particular reference to through-life support. So far Type 21, Type 42, and LEANDER Class frigates are on the record and the aim is eventually to include all ships. SHIPCIST will cover ship-fit definition, As. and As., modifications, documentation, and drawings. Having looked at the shore-based system, the presentation outlined the ship ADP system OASIS, and in particular OASIS III (TABLE IX).

This section concluded with a discussion of the role of the Naval Maintenance Data Centre which collates and processes equipment-related stores usage information for presentation to C.-in-C. Fleet, CFS, and Design Departments.

TABLE IX—*Onboard ADP support in ships*

| | |
|---|---|
| OASIS I | Stores management |
| OASIS II | Ship and personnel management |
| *OASIS III | Technical management |

*OASIS III will provide:

(*a*) Ship's comprehensive indexing system;

(*b*) Maintenance management system;

(*c*) Feedback of ship's running data.

**Fleet Capability**

The presentation addressed the problem of keeping the Fleet up to date within the limitations of the Defence Review. Upkeep cycles for surface ships and opportunities for fitting As. and As., together with their weeding and

subsequent listing in order of military worth were discussed. Constraints on the fitting of As. and As. include:

(*a*) Matching of refit and equipment availability dates.

(*b*) The limitation of A. and A. work by the size of the industrial budget allocated to the refit.

(*c*) For maximum Fleet availability, the need for strict adherence to the allowed time in hand and also the requirement for ships to be to operational standard on completion date.

The implications of limiting As. and As. were discussed, and the findings of the Operational Capability Study Group (which has been examining the way the effectiveness of the Fleet might develop on the new upkeep cycle over the next decade) were reviewed. Also considered was the possibility of carrying out the smaller As. and As. in operational time during AMPs or DEDs. The main recommendation was that the A. and A. processes must be more flexible and each A. and A. should be examined critically to see whether it can be achieved more cheaply.

TABLE X—*Costs of major phases as proportion of life costs (17 equipments)*

| *Phase* | *Percentage* |
|---|---|
| R & D | 5 |
| Production | 32 |
| Shipfit/STW | 6 |
| Support | 57 |

*Costs*

To find out where the money goes, the Procurement Departments have looked at the effects of design, support, and operational policies on through-life costs of ships and equipment. For example, a DGW(N) study of seventeen equipments showed that, in general, production and support costs form by far the greater proportion of their through-life costs (TABLE X). However, almost 60 per cent. of the through-life costs of an equipment have been committed by the time its NST has been endorsed, although of course very little money has been spent at this stage (FIG. 12). It is thus the development phase that demands the most careful attention since it determines the cost of all sub-sequent stages.

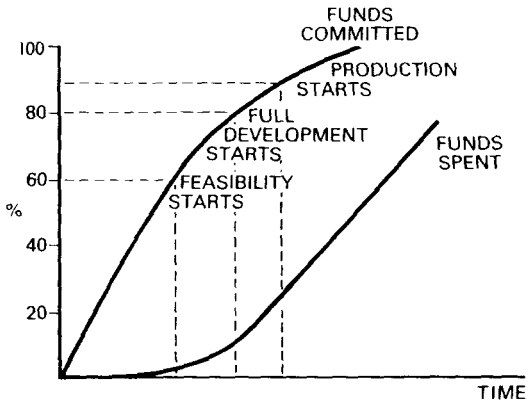


FIG. 12

Repair options also radically affect the through-life costs of equipment. Repair by the manufacturer may be chosen in favour of the lower long-term cost of repair on board for several reasons.

(*a*) It is less expensive in capital equipment terms. Repair on board usually requires heavy capital expenditure over a short period.

(*b*) Equipment configuration is more readily controlled. This is important when considering modification programmes and document standardization, etc.

(*c*) A contractor may not wish to sell his repair techniques, or he may require a repair load as a pre-condition for running a costly post-design support programme.

Government policy requires a reduction in MOD(PE) intramural resources,

so more commercial procurement is inevitable. It will be necessary to work closely with Industry, challenging our current engineering standards to ensure that they provide only the minimum necessary to do the job, while contractually-safeguarded design and support guarantees will have to be demanded.

*The Future Fleet*

The presentation followed up CAPTAIN KERR's forenoon preview of the future Fleet with a review of the technology that will come with it.

The new technologies being considered in the weapons field were outlined (TABLE XI). Areas in which DG Ships is carrying out essential research are, for example, our ability to burn future fuels; the extension of vibration analysis in ships and aircraft to computer-based installations; glandless pumps using magnetic couplings; solid polymer electrolysers in submarines; Franco-Tosi fluid couplings in gearboxes, and so on.

TABLE XI—*New weapon technology*

| |
|---|
| a. Very high-performance integrated circuits |
| b. Distributed computing |
| c. Adaptive software |
| d. Multiplexed data highways |
| e. Fibre optics systems |

The build programme to support the shape of the Fleet described in the forenoon was then outlined and finally the presentation closed with a closer look at the proposed designs for the three new projects, the SSBN, the SSK, and the Type 23 frigate.

**Question and Answer Session**

REAR-ADMIRAL J. P. EDWARDS (*DGFSP & S*) said that he would like to emphasize what COMMANDER STURGES had said concerning the problem of achieving full operational capability of the Fleet with the future limited capacity of dockyards. The situation was fluid, and so the Conference today had not revealed the final answer. A question had been asked in Parliament the previous week as to whether Operation Corporate was going to alter anything so far as dockyard closures were concerned, to which the Secretary of State had replied 'The strategy remains'. Having said that, the strategy will remain of course, but the timing and nuances of that strategy may change quite a bit and the likely effects of the Operation are at this moment being assessed. In conclusion he believed, as does the Admiralty Board, that we would either sink or swim in the future on two main platforms. The first is on the retention of our officers and men, and the second is on the success of the very much reduced dockyard capacity to cope with the future load.

COMMANDER C. D. D. COLBY (*DDWP*), responding to CAPTAIN POTTER's invitation for suggestions from the floor, remarked that one way of improving our reliability record might be to ensure that our contracts with Industry are based on reliability incentives, whereby contractors who achieve a set reliability goal, or improve on it, reap financial rewards for so doing.

CNEO agreed but remarked that the contracts personnel seem remarkably loath to implement the idea. He believed that with quite a small reduction in our aspirations we may, for less money, gain a great deal in reliability.

COMMODORE H. L. O. THOMPSON (*DDSI*) said that, to give incentives that were worthwhile to the contractor, the contract has to be worth millions of pounds. For contracts of a few hundred thousand pounds, one is simply left fighting for the normal MTBF targets, if possible on a fixed or ceiling-priced contract.

COMMODORE P. J. OLDRIDGE (*DUWP(N)*) said that, when he and ADMIRAL WARSOP looked at the 'Willoughby Initiative', one conclusion that had appeared more important even than incentive contracts was that maximum effort should go into the front end of any design. A good example of this was Sonar 2016 which had been properly de-bugged from the outset in contrast with the Sonar 184 which had not.

COMMODORE N. B. M. CLACK (H.M.S. *Drake*) asked to hear more on the degree of confidence placed on the Garage Refit scheme as it applied in the U.K. As the recent CSO(E) and the Production Manager at Gibraltar, he was aware that one of the main ingredients for the success of the scheme had been the amenability of the workforce and the absence of other competing projects in the Yard. These ingredients may not hold for the U.K. The scheme had relied on a uniformed support, approaching 60 per cent. of the civilian effort.

REAR-ADMIRAL EDWARDS recognized the risks involved and said that the uniformed effort that will go into the Garage Refits in Rosyth and Devonport will be large. Something like 60 per cent. of a normal crew will form the Garage Group.

CAPTAIN J. C. JUDGE (*CSO(E) to FO Portsmouth*) said that there was some doubt about the Garage Refit concept in view of the new usage cycle and that it would be debated at the next CSO(E)'s meeting.

COMMODORE CLACK said that the intention to overcome the crew change-round problem by having several intermediate drafting stages throughout the refit, as recommended in the Willis study, was only a small amelioration at best and that the dockyards will certainly have problems.

LIEUTENANT-COMMANDER G. A. R. CHILDS (*DSWP*) was concerned about the danger of the Fleet becoming obsolescent with long times needed for installation of modern electronic equipment. What consideration had been given to the attractive concept of containerization, cellularity, or even concepts such as the Blohm and Voss MEKO frigate?

REAR-ADMIRAL J. E. K. CROYDON (*DGW(N)*) said that all these ideas had been examined. Essentially, the ship must be designed from the outset to accept such concepts. Difficulties experienced with SCOT illustrated the potential problems if such design work was omitted. He believed that the way ahead was 'modularity' where electronic parts of hardware and software can be changed to enhance reliability or capability throughout life. Containerization may come in the future and he would like to see it studied more closely.

CNEO agreed with ADMIRAL CROYDON that we should concentrate on designing ships for weapons conversion with standard electronic equipment which will fit into standardized spaces, so that new technology can reach the Fleet as early as possible.

COMMANDER P. J. A. WYATT (*DSWS*) said that a recent study had shown that using containerization to fit a machinery system into the AOR would increase the initial production and through-life costs by 25 per cent.

CNEO agreed but pointed out that the containerized Sonar 2031, although expensive, had been the quickest way to get the set to sea.

CAPTAIN J. P. W. MIDDLETON (*Staff of FOSM*) believed that we would never achieve proper savings by through-life costing. The Government accounting system's attention to PESC years, the short lives of Governments, and the seniority of the financial decision makers made it inevitable. He believed that we should go for minimum unit production costs and maximum through-life cost, as the politicians would like us to do. Secondly, he would like to see much less accent placed on the peripherals to the NSR, namely the

Defstans, the Milspecs, and NWS 1000, that add enormously to the cost of Defence equipment. Finally, he thought that it was unsound to tie an A. and A. package to a percentage of the total work package; rather, we should be looking at cutting down the restorative work in favour of undertaking more operational-updating As. and As.

REAR-ADMIRAL CROYDON agreed with CAPTAIN MIDDLETON on the problem of the high cost resulting from standards and specifications imposed peripheral to the NSR. This matter was being studied very closely at this moment with a view to simplifying contracts.

COMMANDER R. S. BLACKMAN (*DG Ships, Type 23 Project*) said that every engineering standard called for in the Type 23 was being closely scrutinized in order to cut out all 'gold plating'.

CNEO pointed out that R.N. standards are not only used and quoted by U.K. companies for their equipment but also the Dutch, French, and even the Americans are keen to achieve them. His fear was that we might cut things too fine with the Type 23; it was up to the project staff to call attention to any area where they were forced to use unsatisfactory equipment to meet the cost limit.

CAPTAIN POTTER (*DES(N)*) said that he agreed with CAPTAIN MIDDLETON's point about As. and As., but the figure quoted in the presentation was understood to be the figure that the Operational Capabilities Study Group produced for planning purposes. There are many questions to be tackled in this context and nobody has the full answers yet.

CAPTAIN R. D. SINCLAIR (*CED*) said that the quoted figure was historically that which could be achieved. A. and A. work involved a heavy design and financial load which was why a limit had to be set.

CNEO thought that the design load for an A. and A. to be incorporated in a run of several ships of the same Class should not be excessive.

CAPTAIN LOUGHNAN suggested that more A. and A. work should go to the shipbuilders, an idea welcomed by CNEO but he added that their numbers were declining. ADMIRAL EDWARDS commented on the political implications of such a course in light of the announced closure of three dockyards.

REAR-ADMIRAL GEORGE felt that rigid adherence to time in hand at refit was likely to prevent improvement of a ship's capability. More flexibility, undesirable though it might be, would enable a wider range of As. and As. to be undertaken. He believed that it is not a resource-controlled matter.

COMMANDER J. V. HODGKINSON (H.M.S. *Daedalus*) asked if enough was being done to collaborate with our NATO allies in some good production runs of ships or equipment such as had been achieved in the aircraft industry.

CNEO replied that, despite success with aircraft projects, the matter is politically extremely difficult. After some thirty years in existence, NATO members have only achieved standardization in minor areas, such as refuelling methods, some small-arms ammunition, etc. If NATO members agreed which country should produce each specific ship class, then it would have very far reaching and often damaging effects on the existing industrial base of the other countries concerned; this is a decision that they are thus understandably loath to take. There are enough problems to be faced simply for NATO to maintain a united and robust stance. It could be very dangerous to attempt to impose such a major industrial restructuring.

COMMODORE M. F. SIMPSON (H.M.S. *Nelson*) felt that the Conference was looking at the problem in too narrow a fashion. It was not a question of one country unilaterally producing one equipment type for everyone else, but the sharing of research, design, and development costs of a common item which

may then be produced by each nation using its own labour and resources.

CNEO said that the evidence of Concorde did not support COMMODORE SIMPSON's theory. He accepted that, although sophisticated weapons systems may, like Concorde, not produce savings, a ship project might; it should, however, be done commercially if possible rather than being Government-run.

ADMIRAL COMRIE said that the first truly internationally-designed helicopter was going to be the H101, the new medium helicopter. He contrasted it with the other possible candidates, the Lynx, Puma, and Gazelle which had not achieved the inter-NATO spread of fit that had at first appeared possible.

# SUMMARY OF CLOSING ADDRESS

BY

VICE-ADMIRAL SIR TED HORLICK, K.B.E.
*Chief Naval Engineer Officer*

The CNEO thanked the Captain and officers of the R.N.E. College for their contribution to a day which he had found useful, fairly reassuring, and fun. In particular, he congratulated the presenters and the audience for their material and discussion points. Some people might leave with the impression that it was the Defence Minister and Command 8288 that had imposed the alterations to sea/shore ratio and changes that had been published. This was not so: what the Minister had done was to tell each Service Board what money it had to spend and left it to them to decide how they were to spend it. The Admiralty Board had deliberately reduced the manpower bill because they believed that is the only way that they may get enough kit to sea. We now have some radical enough planning assumptions to work on, so that we can do some of the things which five years ago or less would have been thrown out as impossible. It is therefore a very exciting time for us all, especially the younger officers, and two-way communication between the senior and junior staff is now even more essential.

Redundancy had been the worst conceivable activity over which, as CNEO, he had to preside. It was hugely advantageous that so far the majority had been volunteers but we could not expect that to continue. One of the manpower team had rightly said that we must not assume that the present boom in manpower and retention will continue and, with the future thinned-down Navy, we must ensure that proper delegation of responsibility takes place, particularly to the younger officers and the middle group of ratings. This, coupled with proper ship manning, the right tools for the job, effective use of ADP, and appropriate shore backing will mean we really will achieve a more highly motivated Service even than now.

Finally, he re-emphasised how outstandingly good had been the engineering contribution to the crisis so far. We all expected the Fleet to sail smoothly and well but few could have expected the Task Force to be boosted with ships from Trade so quickly and efficiently. It was also remarkable how people even at the lowest levels knew what had to be done, took full responsibility, took the right initiatives, and buckled down to the task. We must be very concerned that whatever we do in the future we do not destroy the system within which this can occur. Finally, he said:

> 'I do believe that the thing most of all that we should take away from Operation CORPORATE is a driving desire to give each person the authority appropriate to his level and make him use it. Thank you very much and good luck to you all.'