

MARINE ENGINEERING BRANCH DEVELOPMENT

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ABSTRACT

In 1990, DNMT(E) instigated a major review of the training and employment of Marine Engineering Artificers and Mechanics. That review, the changes arising out of the review and the implementation of those changes are collectively termed Marine Engineering Branch Development.

The aim of MEBD is to introduce changes which will provide a better match of training to employment and allow the training, ability and potential of both the artificer and the mechanic to be more fully utilized. For the artificer, this will mean placing greater emphasis on diagnostic skills and managerial administrative abilities; for the mechanic, there will be increased maintenance and craft employment, in areas previously undertaken by artificers. This article describes the changes and their impact on the career structures of ME artificers and mechanics.

Background

In 1979, Engineering Branch Development (EBD) heralded a major restructuring of the ME and WE branches. The transfer of responsibility for the maintenance of electrical equipments from the WE Branch led to the creation of the ME Branch of today, with its common electro/mechanical base, but with electrical and mechanical engineering specialists. At the same time, new classes of ships and submarines were entering service, introducing a new generation of technology with attendant changes to watchkeeping and maintenance practices.

Since 1979 change has continued, with ever more sophisticated technology being introduced into service, with reduced complements in ships and submarines but with a higher proportion of artificers to mechanics. Also, the ME branch has not been immune to the pressures on resources which require training and employment to be closely scrutinized to ensure that resources are being used efficiently.

In 1990, DNMT(E) determined that there was a need to take stock of the employment and training of ME artificers and mechanics. Although there was no evidence to suggest the need for a fundamental change to the structure of the ME branch, it was generally agreed that in a number of areas training was not best meeting the needs of employment, particularly with an eye to the future. It was also believed that there was considerable scope for adjusting the balance of employment between artificer and mechanic. The subsequent review of employment and training, the changes arising out of the review, and the implementation of those changes, are collectively termed Marine Engineering Branch Development, or MEBD.

Aim of Marine Engineering Branch Development

The aim of MEBD is to introduce changes to the training and employment of ME artificers and mechanics which will produce a more efficient match of training to the needs of current and future employment, and enable the transfer of employment from artificer to mechanic in areas which will allow the training, ability and potential of both to be more fully utilized.

Phase 1 of MEBD consisted of an employment survey of artificers and mechanics to determine the extent to which current training was actually being used. The results of the employment survey, together with other feedback, formed the baseline for a detailed review of all career and specialist training during Phase 2 of MEBD. The work required to implement these changes to training will be carried out during Phase 3 of MEBD by the Marine Engineering Branch Development Team.

ARTIFICER TRAINING AND EMPLOYMENT

Current Problems

The employment survey and other feedback identified a number of major problems and shortcomings in the current training and employment of artificers. It was apparent that:

- (a) The systems engineering approach to maintenance introduced by EBD has developed to different levels in General Service and the Submarine Service, to meet their differing needs. This is not reflected in current training.
- (b) Adquals and other specialist courses repeat a significant amount of the artificers' career training, and do not fully meet the needs of ratings in specialist billets. Specialist craft courses in particular do not differentiate between the differing requirements at sea and ashore.
- (c) The artificer requires more training in a number of areas, including fault diagnosis, communications skills and administration.
- (d) ALMEAs in their first sea draft are slow to settle and do not fully appreciate the position of the artificer within the ME department organization, or the position of the ME department within the ship organization.
- (e) Artificers' career training is not fully utilized in many areas of their technical and craft employment.
- (f) Artificers are frequently employed below their trained skill levels, but at the same time the potential of the mechanic is not fully utilized.
- (g) In particular, artificers do not fully utilize their craft skills, especially at sea.
- (h) The requirement to gain operator qualifications conflicts with the need to consolidate career training and early development of the diagnostic, maintenance and supervisory skills required by the CPOMEA. Thereafter, watchkeeping regularly conflicts with the artificers' role as a supervisor, specialist diagnostician and maintainer.

From these problems and shortcomings, it was concluded that the current training system is not working to the best advantage of either the individual artificer or the ME Branch, and that there was indeed need for change to enable training the better to meet the needs of modern, complex warships. There is also a need to increase job satisfaction and motivation, particularly amongst young artificers.

In order to overcome these problems major changes to artificer training are proposed:

- (a) MEA apprentices will spend longer at sea, and at an earlier stage in their training. This will enable them to develop a better understanding of the ME Department's task and relate it to the remainder of their training.

- (b) The artificers' training will be more closely matched to the needs of their next draft and will generally be provided in smaller, more frequent packages, readily updated to the changing needs of new technology.
- (c) The ever more sophisticated and integrated machinery and systems being fitted in surface warships increasingly demand a greater systems engineering approach to maintenance. The reduced manning levels in the latest and future classes of ships also demand the employment flexibility with which only a multi-disciplined, systems-based training can provide. To meet this need, therefore, all General Service artificers will receive common mechanical and electrical career training.
- (d) However steam technology, which will continue to form the core of the submarine artificers' employment for the foreseeable future, does not demand the same integrated electro-mechanical systems engineering approach to maintenance as in surface ships. The employment pattern in nuclear submarines also reflects the high artificer manning levels which are primarily dictated by the operating requirement. The relatively high number of artificers available for maintenance obviates the need for the same degree of flexibility of employment in individual artificers, but does allow the development of expertise in a single engineering discipline, either mechanical or electrical. The future needs of the submarine service will therefore best be met by artificers who have a common level of electro/mechanical training, primarily required to fulfil their operating function, but who are maintenance specialists in either the mechanical or electrical aspects of submarine engineering.
- (e) There will continue to be a need for some artificers to develop a deeper maintenance expertise in some areas. Therefore, at a later stage in their career, all artificers will undertake further training to become systems maintenance specialists.
- (f) There will be greater employment of the mechanic on routine maintenance and specialist craft tasks, thereby allowing artificers to make greater use of their higher level maintenance skills and therefore be more effectively employed as specialist diagnosticians and managers.
- (g) The mechanic will fill most specialist craft billets. Artificers will receive sufficient craft training to enable them to carry out their maintenance tasks and to manage skilled craftsmen, but will not develop the same skill of hand as now. However, where a specialist craft billet requires the technical and supervisory skills of an artificer, then artificers in these billets will undertake further craft Adqual training.

Apprenticeship

Artificer Qualifying Course Parts 1 and 2

Part 1 of the AQC for apprentices will consist of common Artificer training at HMS *Raleigh*, before specialising as MEA apprentices. Part 2 will comprise one term of common, pre-sea training at HMS *Sultan*, bringing the MEA apprentice to approximately the same combined level as the MEM(M) and MEM(L), after their current Part 3 training.

Artificer Qualifying Course Part 3

MEA apprentices will then go to sea for three terms, during which they will consolidate their early technical training, commence operator training and gain a sound understanding of the work of the ME department. Some MEA apprentices will be employed in MEM billets.

Artificer Qualifying Course Part 4

After sea training, the MEA apprentices will return to HMS *Sultan* where they will specialize General Service or Submarine Service, and join up with the (ex-mechanic) artificer candidate.

Artificer Qualifying Course Parts 5 to 6

MEA apprentices and candidates will then complete the remainder of their academic and technical training. All artificers will receive craft training to the level required to support their maintenance skills and to enable them to manage specialist craftsmen. Submarine artificers will carry out further operator training.

LMEA/POMEA Sea Training

The artificer will spend about three years at sea as an LMEA and POMEA, normally in the same ship or submarine, completing operator training and consolidating maintenance training. On gaining the appropriate operator qualification and passing the Professional Qualifying Examination (PQE) for CPOMEA, the artificer will be drafted ashore to an FMU or SMMU, to gain further practical maintenance experience.

CPOMEA Career Course

Immediately before their next sea draft, CPOMEAs will return to HMS *Sultan* for a CPOMEA's Career Course. This course will concentrate on the managerial and administrative skills required by a Head of Section, and will be combined with any necessary Pre Joining Training (PJT's). CPOMEA(SM)s will also undertake further operator and technical training.

By the time these CPOMEAs return to sea, they will have received the necessary technical and management training to carry out the duties of a Head of Section in their first ship or submarine. During their first sea draft as a CPOMEA, and in the subsequent shore draft, artificers will be employed such that they can broaden their technical and managerial experience.

Technical Adquals

Before their next draft to sea, either again as a Section Head in a frigate, destroyer or submarine, or as the MEO or DMEO in a Mine Warfare Vessel, all CPOMEAs will undertake a systems-based technical Adqual. For General Service artificers, these Adquals will cover one of the following groups of systems:

- Gas Turbine Propulsion Systems; including prime movers, transmission, controls and ancillary systems.
- Diesel Propulsion and Generation Systems; including prime movers, power generation and distribution systems and associated controls.
- Hull Technology and Ship Services; including hull structure and stability, refrigeration and air conditioning systems.

Technical Adquals for submarine artificers will also be systems-based, but will reflect their mechanical or electrical specializations. For the electrical specialist, these Adquals will cover one of the following:

- Reactor Instrumentation and Protection.
- Ships Systems (Electrical); including air treatment, one-man control, hover, etc.
- UPHOLDER Systems (Electrical); including switchboards, D86, one man control, etc.

For the mechanical specialist, Adquals will cover one of the following:

- Reactor/Propulsion Mechanical Systems.
- Ships Systems (Mechanical); including air treatment, hull structure, hydraulics, HP air, etc.
- UPHOLDER systems (Mechanical); including Valenta, hydraulics, HP air, etc.

Artificers will normally only undertake one of these technical Adquals in their career. Adquals will build upon the experience gained as a junior Head of Section, and enable the more senior CPOMEA to become the MEO's specialist advisor on the systems and equipments covered by the Adquals. The Adqual will generally determine the future pattern of the CPOMEAs' employment, enabling them to develop the experience and expertise to fill the shore billets which require a deep specialist.

Other smaller technical Adquals covering specialist equipment or maintenance skills, such as outboard motors, breathing apparatus and PEC repair, will also be available, as required for specific billets.

CAT A2 Qualification

CPOMEA(SM)s who have a minimum of six months experience as a CAT B Operator and are recommended by their Commanding Officers may undertake a Nuclear Propulsion Supervisors Course. Following consolidation of this course at sea, and successful completion of Part A of a Flotilla Board, they would then be qualified to be employed as CAT A2 Operators as CPOMEAs. Success in Part B of the Flotilla Board would also make them eligible for selection for promotion to ACCMEA(SM). Parts A and B of the Flotilla Board may be taken together, or separately.

CCMEA Qualifying Course

A CCMEA Qualifying Course for all A/CCMEAs will provide technical broadening and updating and further engineering management training.

WO Promotion Course

Warrant Officer artificers will continue to do a common management course on promotion.

MECHANIC TRAINING AND EMPLOYMENT

Current Problems

The Employment Survey and other feedback also identified a number of major problems and shortcomings in the training and employment of Mechanics. It was apparent that:

- (a) Career training for mechanics is heavily front-end loaded, and is not fully utilized in early drafts. This is aggravated by M/L specialization occurring too early, encouraging trade demarcation and reducing employment flexibility, particularly in lean manned ships.
- (b) Opportunity to consolidate Part 2 and 3 Technical Training is limited by the need for the First Sea Draft mechanic to learn about life on board and to qualify as a watch keeper. Similarly, the opportunity to employ the First Sea Draft mechanic on technical tasks is limited, particularly for the (M), with necessary watchkeeping, husbandry and communal tasks forming the bulk of their employment. As a consequence, mechanics do not fully utilize their initial technical training.

- (c) The LMEMQC is perceived as being primarily an artificer candidate selection course, and as not fully meeting the needs of submarine ratings.
- (d) The majority of mechanics have the desire and ability to undertake a greater craft and maintenance load.

As with artificers, it was therefore concluded that the current training system is not working to the best advantage of either the mechanic or the ME branch, and that changes are indeed required to make a more cost-effective use of training resources, and better use of the mechanics' potential. Major changes to the training and employment of Mechanics are therefore also planned.

- (a) Mechanics' training will be more closely matched to the individual's next sea draft.
- (b) The mechanic will not specialize (M) or (L) until LMEMQC.
- (c) The maintenance, craft and administrative capabilities of the mechanic will be enhanced by Qualifying Courses for POMEM and CMEM, allowing them to be employed on maintenance and craft tasks currently undertaken by the artificer. The mechanic will occupy most specialist craft billets ashore.
- (d) The mechanic will be eligible for and encouraged to obtain all levels of Operator Qualification, including Marine Engineer of the Watch, CAT B and CAT A2 Operator Certificates.

MEM2 Career Course

After common Part 1 training at HMS *Raleigh* all mechanics will undertake common non-specialist training at HMS *Sultan*, designed to instil ship sense, and give sufficient training to carry out the routine watchkeeping and maintenance tasks undertaken by a first sea draft MEM. Ratings selected for Submarine Service will undergo basic submarine training.

First Sea Draft

During a first sea draft of 12–18 months, mechanics will have the opportunity to consolidate and employ all their training and qualify as an operator, at sea and in harbour, at the appropriate level.

MEM1 Qualifying Course

Before their second sea draft, all mechanics will receive further technical training to enhance their capabilities as non-specialist electro/mechanical maintainers. This course will also provide the first opportunity for selection for artificer candidate training.

LMEM Qualifying Course

In addition to specializing (M) or (L), the LMEMQC will begin the process of giving the mechanic the necessary additional training to allow their greater employment as a maintainer in selected areas, at sea and ashore. The LMEMQC will provide a further opportunity for artificer selection: post-LMEMQC selection by Commanding Officer's Recommendation will also continue.

POMEM Qualifying Course

A POMEM's Qualifying Course will enhance the mechanics' maintenance ability so that they may undertake routine work currently carried out by artificers. The course will also provide craft training to enable the mechanic to undertake most craft tasks at sea and form the basis for further specialist craft

training. The POMEM Qualifying Course will consist of common, maintenance and craft modules.

Options for the maintenance modules will be:

- Diesels.
- Hull and Ships Systems.
- Power Generation and Distribution.

Options for the craft modules will be:

- Machining.
- Hull Craft, including welding, coppersmithing and woodworking/GRP.
- Electrical Craft.

Mechanics will normally only undertake one maintenance module and one craft module during their careers.

Craft Adquals

Later in their careers and depending upon their aptitude, POMEMs and CMEMs may undertake Craft Adqual courses, to enable them to fill the majority of specialist craft billets.

CMEMs Qualifying Course

A CMEM's Qualifying Course will provide management and administrative training and technical updating to enable the CMEM to be employed in a wider range of Head of Section billets.

WOMEM Promotion Course

Warrant officer mechanics will continue to do a common management course on promotion.

Operator Training and Qualification

All mechanics will be eligible for, and encouraged to obtain operator qualifications. Submarine mechanics recommended and selected will undertake the appropriate CAT B or CAT A2 training.

IMPLEMENTATION OF THE CHANGES

The course design, production of task books, revision of advancement regulations, amendment of BRs and planning of the timing of the new courses is being carried out by the Marine Engineering Branch Development Team, based at HMS *Sultan*. This work will be completed by September 1994, although some courses may be introduced after that date. Course design and other work is already well under way. During this time it may be necessary to review and amend previous decisions in light of changes to Defence Policy affecting the size and shape of the Fleet, or as a result of detail course design work. It is intended that new and revised courses will be introduced at the earliest opportunity. Obviously, considerable planning will be required to ensure the smooth introduction of new courses and phasing out of old courses. This planning is not yet complete, but early target dates already agreed are September 1993 for the introduction of the new Artificer Qualifying Course and the MEM2 Career Course. However, all artificers and mechanics who joined before those dates will be eligible for the new career and specialist training courses. Where necessary, they will undertake an enabling course to make good any shortfalls in their training. Such enabling and new courses will generally be undertaken as required by specific billets.

SUMMARY

MEBD will introduce changes which will provide a better match of training to employment and allow the training, ability and potential of both artificer and mechanic to be more fully utilized. For the artificer, this will mean placing greater emphasis on diagnostic skills and administrative/managerial abilities; for the mechanic, there will be increased maintenance and craft employment, in areas previously undertaken by artificers. These changes will apply to personnel joining the Navy in the future, and to those already serving.

Marine Engineering Branch Development lays the foundations for the Marine Engineering Branch of the future, based on the successes of past and present. It seeks to make better use of every person's abilities and talents, and will yield greater professional satisfaction and rewards, ensuring that the Branch keeps its place at the heart of the Naval Engineering.
