

WHAT IS CLASS AUTHORITY?

BY

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INTRODUCTION

In recent years, various articles have appeared in the *Journal* on the subject of planned maintenance. Of these, some are from sea explaining how individual officers—or groups of officers—have tackled the problem, while others have been written from within the Admiralty to tell the Fleet about the latest official thought on the subject. It is within the latter articles that several bald references are made to the mysterious bodies called the Class Authorities.

The object of this article is to explain what the Class Authorities are and what they do, and to try to dispel an impression among one's friends that those in them are (a) having a nice idle time, or (b) trying to produce so much 'red-tape' and paper work that ships will never get to sea.

It is not intended to go over the ground already covered by earlier papers, but to start from their conclusions :—

- (i) If maintenance is going to be effective, it must be properly planned. Too little maintenance done infrequently leads to breakdown while too much done too often is wasteful of effort. Such a situation calls for the introduction of maintenance schedules.
- (ii) There must be one co-ordinating authority, outside the Admiralty organization, to gather experience from reports and returns of recurring defects and maintenance problems for all ships of a class or similar classes.
- (iii) The co-ordinating authority should include the provision of maintenance schedules among its terms of reference. This should not preclude individual ships, not yet adopted by a co-ordinating authority, providing their own to cover the interim period.
- (iv) The co-ordinating authority must embrace all departments and be the particular perquisite of none.
- (v) It is hoped that the result of the above will be to minimize breakdown and thereby increase the time that the fleet is available to be at sea.

ESTABLISHMENT OF CLASS AUTHORITIES

History

A start was made, early in 1954, by setting up working parties to produce maintenance schedules. Certain classes of ships were given priority and split up between the working parties who were themselves situated where they could obtain the maximum amount of information on their particular tasks. These working parties were formed in the offices of the Commanders-in-Chief of the Home Ports and in those of Flag Officer Submarines and Captain Coastal Forces. The provision of the electrical maintenance schedules were undertaken by H.M.S. *Collingwood*.

A.F.O. 970/55 established the Commanders-in-Chief, Home Ports, Flag Officer, Submarines, and Captain Coastal Forces as Class Authorities for the

different classes of ships. The fields of the last two are self-evident and the division between the other authorities followed the distribution of working parties and these were themselves absorbed by the Commanders-in-Chief into the newly established Class Authorities.

Responsibilities

The classes were divided as follows :—

C.-in-C., Nore	Minesweepers Boom defence vessels Seaward patrol craft Naval servicing craft Minesweeper maintenance ships.
C.-in-C., Plymouth	Destroyers Frigates Surveying ships Destroyer or frigate depot and maintenance ships.
C.-in-C., Portsmouth	Battleships Cruisers Aircraft carriers Heavy repair ships Amphibious craft.

Their responsibilities, not necessarily in the order laid out in the A.F.O., can be summarized as follows :—

- (a) To develop maintenance schedules
- (b) To develop more efficient maintenance practices
- (c) To maintain a record of the material state of each ship of a class
- (d) To sift maintenance and upkeep experience of all ships of a class in order to be able to advise the Admiralty concerning :—
 - (i) Alterations and additions designed to effect a reduction in the maintenance and upkeep load
 - (ii) Complementing with reference to its effect on maintenance
 - (iii) Provision of spare gear, etc.
- (e) To feed back co-ordinated experience to those responsible for new design
- (f) To advise on cycles of operation, maintenance and repair.

A great deal of progress has been made in 'adopting' classes of ships by the various Class Authorities and it might be said that the end of round one has been reached. It must be stressed that the Class Authorities can only offer advice to the Fleet. Whether this advice is followed or not, is entirely the responsibility of the recipient.

Constitution of the Class Authority Office

As has been stated, the Class Authority offices are part of the office of the Commanders-in-Chief, Flag Officer Submarines and Captain Coastal Forces. It is important to emphasize this point so that it is clearly seen that they are not merely the instrument of various technical departments.

For administration purposes the office is, generally speaking, under the Administrative Authority's senior technical officer. The office consists of technical officers and ratings under the chairmanship of the senior officer who



A CLASS AUTHORITY OFFICE, OFFICERS' SECTION

will normally be of engineering or electrical specialization. Flag Officer Submarines and Captain Coastal Forces have a constructor commander on their staffs but, in the case of the three Commanders-in-Chief, it has been considered best to have a constructor captain as the hull adviser to all three. While, therefore, the material of ships is dealt with by the various technical officers and their staffs, all correspondence and experience is pooled so that the 'whole ship' aspect can be maintained. It cannot be too strongly emphasized that the Class Authority must always consider a ship as a whole. This is because :—

- (i) It is no good planning the maintenance routines in one department without reference to all the others. All departments must fit into the same maintenance cycle ; for example, it is hopeless to plan an engine inspection at three-monthly intervals only to find that the Electrical Department is putting the ship out of action after four months.
- (ii) It is no good proposing an increase in complement in one department only to find that the extra men will take up mess deck space required by another.
- (iii) It is no good proposing large increases in the spare gear for one department, only to find the ship as a whole is too small to carry it.

From top to bottom, the Class Authority must work as a team. Sitting together in one office, mutual problems can be debated at any time.

The Class Authority Co-ordinating Committee

The 'whole ship' principle is maintained in the Admiralty by a standing committee of senior officers of the various technical departments under the chairmanship of the Vice-Controller, the latter being in effect the head of the whole Class Authority organization.

Although a Class Authority is empowered to correspond direct with an Admiralty department, there are sometimes questions which affect more than one department or division and it is with these questions that the co-ordinating committee deals.

ACHIEVEMENTS OF CLASS AUTHORITIES

Production of Maintenance Schedules

When the working parties became part of the new Class Authorities, they continued the task of producing maintenance schedules and it is perhaps of interest to see how a schedule is made.

First, the following information is pooled :—

- (i) The maker's experience with the particular equipment, and the information gained from the visits of members of the Class Authority to the ' first of class ' in the case of new construction.
- (ii) The past experience of officers and ratings within the Class Authority office (or anybody else they may wish to consult) with similar equipment.
- (iii) Relevant Admiralty instructions, such as the *Engineering Manual*.
- (iv) Liaison with the book writing sections, e.g. Whale Island, E.-in-C., Bath, etc.

From this joint experience the maintenance schedule can be compiled showing what needs to be done daily, weekly, monthly, 3-monthly, 6-monthly and at longer intervals to keep the equipment in running condition and to avoid its breakdown. Such a schedule, when compiled, will normally err on the side of caution, although something is sometimes found to have been overlooked.

The Class Authority defines in the schedule which routines are to be done by the ship's staff and/or base staff and dockyard.

The schedule is then submitted to the Admiralty. This gives interested departments a chance to see that it does not contravene their ideas, and the Director of Dockyards an opportunity to see that he agrees with the dockyard items.

Finally, the schedule is approved by Their Lordships and returned to the Class Authority for printing and issue to the fleet. The schedule will, even then, probably require modification in the light of experience and this can be done as a result of reports from sea.

Ship Evaluations

If the Class Authority is to be able to advise the Administrative Authority concerning the operating of a class of ships, it must know how long it takes to carry out the total maintenance task. In the first instance, this can only be done from an analysis of the experience of the fleet. In the early stages, each Class Authority has had its own method of collecting such information. As was to be expected, however, there is a wide divergence between the answers received from different ships of a class because :—

- (i) The times cannot take into account the varying prowess of the maintainers.
- (ii) Some maintainers may have a more economical sequence of operations than others.



THE RECORDING SECTION, MANNED BY CHIEF PETTY OFFICERS

- (iii) Times will vary depending on what has been considered to constitute the job. One ship may report the time taken from loosening the first nut to tightening the last, while another may count the time from the maintainer receiving instructions to do the job until he reports that it is complete. Nevertheless, in many cases good average figures have been obtained.

Commander Osborne in his article 'Maintenance Evaluation' has shown how the complement required to run the Engineering Department (or any other) in a ship can be assessed from the knowledge of the total maintenance load which must contain a percentage for breakdown. Such formulae as he describes have already been used by the Portsmouth Class Authority to evaluate the engineering complement of H.M.S. *Eagle* and the engineering, ordnance engineering and hull maintenance complements for H.M.S. *Centaur*. Such evaluations have proved very useful to the Admiralty in considering the revision of complements. Equally important has been the evaluation of operating cycles.

In the past, the Second Training Squadron at Portland had roughly one day for maintenance each week. Much of the day was wasted while machinery cooled down, and the necessary maintenance began to fall behind. The Plymouth Class Authority therefore considered the question and suggested a revision of the cycle, whereby ships are available to run continuously, but are given a week's stand-off in turn. In this way it was found that with cool machinery far more maintenance could be carried out. Such an evaluation has already made its mark on the Staff Divisions.

Cruisers and carriers are supposed to be self-supporting between refits. All other ships depend on some measure of maintenance base (or ship) support. Class Authorities are in a position to advise on the amount of this support and the number of ratings of all departments needed to complement it.

Equipment Defect Analysis

The Class Authority's interest in defects is threefold :—

- (a) How outstanding major defects are affecting the material state of the ship.
- (b) How far defects are prejudicing the carrying out of planned maintenance.
- (c) How far planned maintenance is succeeding in decreasing the incidence of defects (i.e. whether maintenance schedule operations are arranged at the correct intervals).

Information is received from an individual ship in four ways :—

- (i) A report on outstanding major defects.
- (ii) Signals, repeated to the Class Authority, which tell when a defect has arisen which affects the operating qualities of a ship.
- (iii) A report giving details of recurring defects or a defect of an unusual nature.
- (iv) A.F.O. 811/56 instructs ships to send copies of all their defect lists to the Class Authority and, later, to let him know what items have been completed.

When received, these signals and reports are logged, departmentally, on a ship basis. In addition, however, the defects are abstracted and recorded under detailed equipment headings so that it can be seen how the defect history is building up on a particular item in a class of ships or, where items are common, in various classes adopted by one Class Authority. Certain items may even be common to two or more Class Authorities.

In this way, it becomes apparent to the Class Authority when re-design is needed because :—

- (a) No amount of maintenance will cure the defect
- (b) The incidence of defects is taking up too much maintenance effort and the interested department in the Admiralty can be informed accordingly.

It should be noted that the Class Authority does not go into detailed investigation as to the why's and wherefore's of the defect, nor is it responsible for producing the new design.

Alterations and Additions

It is important to emphasize that the Class Authorities are not a link in the proposal chain for alterations and additions. The Class Authority looks at all problems with a view to seeing how much necessary maintenance can be done in the shortest possible time. For this reason they are interested in any alterations and additions which will affect the maintenance load in either way, and from their records they should be able to advise the Admiralty accordingly. They are not responsible for raising the alterations and additions themselves.

ASSOCIATION WITH OTHER AUTHORITIES

T.A.S. Equipment Agency

In the case of T.A.S. equipment an agency has been formed and is situated in H.M.S. *Vernon* to deal with matters on behalf of the Director of Underwater Weapons (Material). The agency is made up of T.A.S., O/E, and L specialist officers and is under the joint administration of the Commanding Officers, H.M.S. *Vernon* and *Collingwood*. This agency also assists the Class Authority by compiling schedules of maintenance for all T.A.S. equipment and these are 'tailored' by the Class Authority to suit particular maintenance schedules.



THE PRINTING MACHINE

The Dockyards

The fact that the Class Authorities are situated in, or near, the Royal Dockyards has meant that it has been possible to have a close liaison between the two. Quite apart from official reports, the Class Authorities are able to learn a great deal from everyday contacts in the dockyards where they have the opportunity to watch ships refitting. A.F.O. 811/56, which authorizes the dockyards to undertake certain maintenance routines as well as actual defects, emphasizes the need for this co-operation. It might well be that a dockyard could find itself faced with maintenance and defects which were more than could be undertaken. In such circumstances the Class Authority is authorized by the A.F.O. to give advice on what could best be omitted or, conversely, must be done if possible.

The M.T.E.s, H.M.S. 'Collingwood' and Other Training Establishments

The Class Authorities have many dealings with the Mechanical Training Establishments and H.M.S. *Collingwood*. H.M.S. *Sultan* has given much useful advice on maintenance schedules. The relationship between the M.T.E. and the Class Authority at Chatham is, perhaps, particularly close because of their juxtaposition and the fact that they both deal with the same engines : Paxman, Mirrlees, Deltic and Foden.

The best method of teaching the principles of planned maintenance in the many training establishments is being considered and the problem has already been solved in part. The general training of technical officers and ratings, by its very nature, instils a basis on which further instruction can be given, but there is a need to indoctrinate all other specializations as well. Where possible, all designate commanding officers of coastal and inshore minesweepers spend a day at Chatham divided between visits to the M.T.E. and the Class Authority, where talks are given on the craft's machinery and its maintenance respectively. It is satisfactory to report that the need for more knowledge of planned main-

tenance is beginning to be appreciated in the Fleet and visits to the Class Authority offices by First Lieutenants, Chief Boatswain's Mates and other seamen petty officers are by no means unknown, although more would be welcomed.

The Reserve Fleet

The full maintenance schedules are inappropriate to the Reserve Fleet, but schedules are being provided covering engineering work which can and must be done to keep the ships in a proper condition. The problem is under consideration in other departments. These schedules have been made out jointly by the Class Authorities and the Reserve Fleet. No reporting, other than copies of defect lists, will be made to the Class Authority. In recent months, useful work has been done by the Plymouth Class Authority, on behalf of the Reserve Fleet, in the examination of several ships brought forward for refit while in reserve. It is hoped, from these examinations, to be able to say, more accurately than at present, how often such ships need refit.

FUTURE OF THE CLASS AUTHORITIES

First of Class Evaluation Trials

It is hoped in the future to associate the appropriate Class Authority with very extensive first of class trials covering seven or eight months. A start is being made with H.M.S. *Puma*. In addition to the usual information obtainable from such trials, the opportunity will be taken to carry out a full man-hour evaluation of the maintenance schedules.

Work Study

While, as has been described in this article, much useful ground has been covered in the evaluation of man-hours required to meet a maintenance task, if the answer is to be realistic and economical, some form of work study will be required. The Class Authorities are vested with the responsibility for producing more efficient maintenance practices and this is considered to be one of the major tasks with which they will be faced in the next few years. It will be necessary to carry out work study on each maintenance routine and promulgate the results to the fleet. It is envisaged that such information will be given in two ways :—

- (a) The best sequence of operations to achieve the minimum time in which any item can be completed.
- (b) The actual man-hours that it is considered are needed. Even then, it would not be considered that these figures were final or the sequences mandatory, and it is hoped that it will encourage the Fleet to produce even better methods and shorter times.

Documentation

Mention has been made throughout this article of various forms and reports without specifying them. This is because both they, and their uses, have been adequately described in A.F.O.s 240, 241 and 242/57.

Up to the present, each Class Authority has been using forms of their own making and these forms have performed many useful functions. It is, however, very muddling for an Administrative Authority to have to deal with so much varying paper-work, and it is desirable for officers and ratings, going from one class of ship to another, to be confronted, as far as possible, with the same forms. Such standardization has been the work and object of an Admiralty Documentation Panel. It may still be necessary to call for special reports as

the occasion arises, especially when work study gets under way, but it is hoped that the standard system will provide the Class Authorities with most of the information they require.

Operating Cycles, Man-Power and Base Support

Although in the early stages, the Class Authorities have been occupied principally in raising maintenance schedules and defect analyses, it has been shown in this article how advice has been given on complements and on operating cycles. In the future, this side of the Class Authority work will increase enormously, and it will be able to give threefold advice in this field :—

- (i) To the Staff Divisions
- (ii) To the Admiralty material departments
- (iii) To the Administrative Authorities and to the ships themselves.

Information will fall under the following sub-headings:—

(a) Operational Availability

This is the percentage of the ship's running life (i.e. excluding conversion and extended refits) during which it can be considered to be 'on call'. In arriving at this figure, it is necessary to know the time required to carry out the total maintenance task equated to a time basis, including normal refits.

(b) Continuous Usage

The maximum time a ship may be expected to be employed continuously on operations or held at short notice with little or no maintenance being done.

(c) The Base or Depot Ship Support required including :—

- (i) the number of base staff
- (ii) electric power and heating steam supplies, so that ships can 'die out' when alongside
- (iii) testing facilities not available on board
- (iv) an assessment of the skilled technical advice beyond the capacity of the ships staff
- (v) a forecast of the spare gear required

(d) The Docking Interval

(e) The Extended Refit Interval where appropriate.

In the first instance, the Class Authority will only be able to give this information with regard to existing ships as information is fed to them from the Fleet. However, as the deposit of information grows, it is hoped that they will be in a position to assist the Staff Divisions and Material Departments in deciding the maximum operational availability, period of continuous usage, the required reliability of machinery, the size of the ships company and the necessary base support for new ships being laid down.

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