

# THE PROCUREMENT OF EQUIPMENT FOR NAVAL SHIPS

BY

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## Introduction

In ship construction, the timely supply of equipment is a vital activity never far from the critical path of any build programme, and whilst in an ideal situation such supply would be wholly the shipbuilder's responsibility, there are reasons why this is not possible in warship construction. In practice both the shipbuilder and the Ministry have direct responsibilities for the procurement of equipment and the respective areas are designated Shipbuilders Supply Items (SSIs) and Admiralty Supply Items (ASIs). This article deals with the procurement techniques adopted by the Ship Department for its supplies and emphasizes the partnership which is necessary between the Ministry and its contractors for the successful achievement of production targets.

In warship construction, it is not possible to have prototypes in the generally accepted sense for reasons of timescale and finance, and consequently when new ship projects have passed through feasibility and design study stages contracts are placed for first-of-class vessels which are essentially 'design-and-build' projects, and many equipments for such vessels fall into similar categories. There will often have been a degree of development for specialized equipments, but these will not have been fully designed and proven in an engineering sense, and much of this activity proceeds concurrently with the design and construction of the vessels. Equipment procurement is essentially a small batch activity and

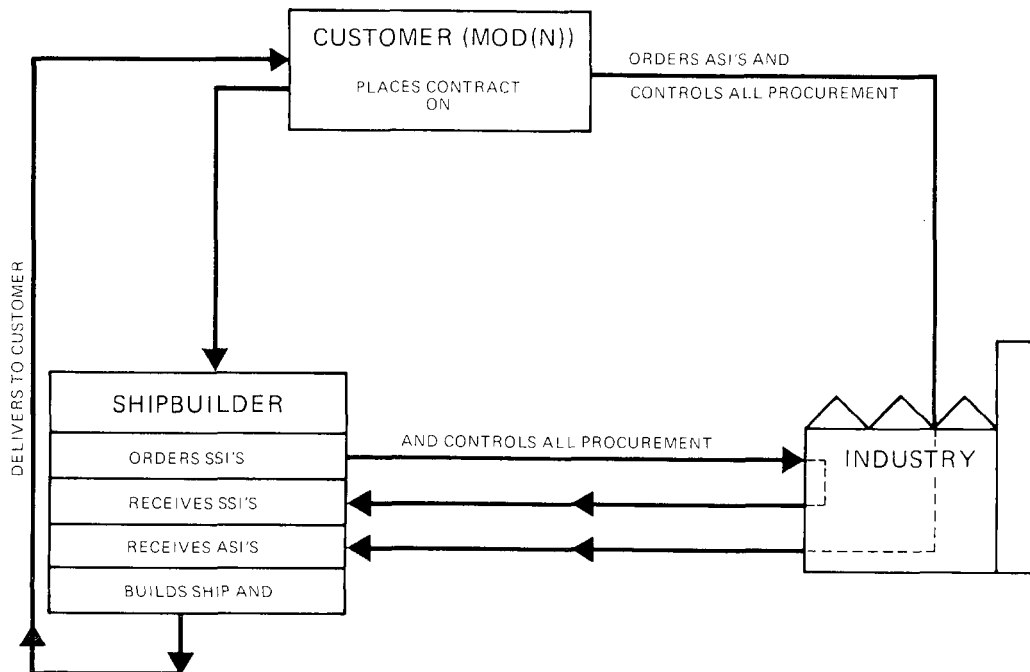


FIG. 1—BASIC CONTRACTUAL CHAIN FOR WARSHIP PROCUREMENT

time-scales are such that it is usual for follow-on equipments to be ordered to match up with follow-on vessels before the first-of-class equipments have been manufactured and fully proven in service. Design-and-build contracts require careful management in all respects, and are invariably subject to budgetary control procedures until such times as the contractors and the Ministry can agree fixed prices.

### **Responsibility for Equipment Supply**

It is Ministry policy to keep its supply of equipment to a minimum but the following considerations govern the final decisions on the supply routes adopted:

- (a) The extent to which an equipment has been developed and proven. When equipments are in the development phase with Development Contracts existing between the Ministry and the equipment contractor, responsibility for ordering production equipments for first-of-class vessels must remain with the ultimate customer, as the shipbuilder is in no position to accept full contractual responsibility for such orders.
- (b) The advantages that may accrue to the Crown through bulk purchase. For specialized equipments of proven design there may be advantages to the Crown in bulk purchase by the Ministry, particularly when the same equipments are employed in different classes of vessels destined to be built by different shipbuilders.
- (c) The natural preference of specialized equipment contractors to receive all orders for the same equipment from the same source, rather than receiving individual orders from a number of different shipbuilders, each of whom will have his differing delivery requirements, progressing procedures, etc.
- (d) The necessity to place some orders well in advance of ship contracts, and frequently before shipbuilders have been selected. Such items are termed Long Lead Items and they are usually required at specific points in ship construction programmes, e.g. by launch or, frequently, earlier.
- (e) The necessity to provide sole source suppliers with a steady load. A number of equipments are specialized or commercially based and it is essential to preserve industrial capacity and maintain specialist expertise by placing batch orders in advance of immediate programme requirements to secure the capacity. Such equipments are termed Industrial Base Items.

For a modern frigate, there are approximately 6000 items of Ministry supply, but some 5700 of these are Naval Patternized Items purchased in bulk by the Ministry for stores in Dockyards and Establishments, and many of which are small items in themselves. In such cases it would be uneconomic for these to be purchased by individual shipbuilders, and experience shows that there is a reluctance on the part of shipbuilders to become involved with what they see as a large administrative procurement task for small value components. Such Pattern Items range from paints, anchors, lockers, domestic equipment, chart tables, chronometers, sick-bay equipment, furniture; to life rafts, workshop machinery, batteries and electrical fittings. Of the 300 or so non-patternized items the more significant would be gas turbines, main gearboxes, shafting and propellers, control equipment, diesel generators, distilling plant, air conditioning plant, etc., and it is on items of this nature that the more significant procurement techniques are applied.

### **The Procurement Cycle**

The overall control of major ship projects is vested in project managers who are supported in this function by various line management activities. From the initial design concept stage to the successful completion of each first-of-class vessel, project managers are senior professional engineers who are specialists in

warship design and construction. In the Project Manager's team are design officers of all specializations, and production, costing and finance officers who are 'bedded out' from their parent groups. The procurement cycle for equipment starts within the project which is responsible for defining in general terms the equipment required, the allocation of funds to support procurement, and the delivery required to match up with the overall ship programme. Once the procurement cycle has been initiated in this way a full schedule of technical requirements suitable for contracting is formulated from the input of specialists in the design, production, and contracting aspects of the equipments concerned. These specialists are not members of the Project Manager's team, but are part of the main line management functions of design and production—serving several project managers. For vessels other than first-of-class ships, procurement responsibility passes to project sponsors whose functions are similar to project managers with the exception that they are dealing with vessels for which the design has been settled, and consequently they do not have discrete teams of multi-disciplined officers devoted solely to one project.

Within the Ship Department of MOD(PE), the Director of Naval Ship Production is responsible for the procurement of all warships including first-of-class vessels, for, whilst these vessels could in some sense be regarded as prototypes, they are by any standards large production activities in the naval warship-building yards, and the capacity of warshipbuilders to handle such vessels together with follow-on vessels must be fully integrated. The Production Directorate therefore incorporates project managers and project sponsors, together with the procurement group for equipments and costing services.

The only exception to the above arrangements is the field of submarine design and procurement which is handled by a permanent project team embracing specialists and staff in all the necessary engineering activities under the Director, Project Team Submarines.

The procurement cycle starts within ship projects, is contributed to by design, production, costing and finance specialists, and finally is put together by the Contracts Branches who are responsible for placing contracts with industry. Whenever it is sensible and feasible so to do, competitive tendering is employed but, for many ship equipments which are commercially based, single tenders on sole suppliers are invited.

### **Contracting Arrangements**

To provide the flexibility needed in the purchase of the large variety of ships, equipment and services, a selection of types of contract is available to the contracting parties. They vary as to the degree and timing of responsibility assumed by the contractor for the costs of performance and also as to the amount and type of profit incentive offered to the contractor to achieve or exceed specified targets.

With regard to degree of cost responsibility, the various types of contracts can be considered in order of decreasing contractor responsibility for the cost of performance. At one end of the range is the firm fixed-price contract under which the parties agree that the contractor assumes full responsibility in the form of profit or loss for all costs under or over the firm fixed price. At the other end of the range is the 'cost plus a fixed fee contract' where profit rather than price is fixed and the contractor's cost responsibility is therefore minimal. In between are various incentive contracts which provide for varying degrees of contractor cost responsibility depending upon the degree of uncertainty involved in contract performance. Outstandingly effective and economical performance should be rewarded with higher profits than for poor performance. Success in harnessing the profit motive begins with the negotiation of realistic standards and targets. The objective is met if the contractor either benefits or loses in relation to

achieving or failing to achieve these goals. Where award is based on effective price competition, there is reasonable assurance that the contract price represents a realistic pricing standard subject to the following:

- (a) Type and complexity of work involved.
- (b) Stability of design, adequacy and firmness of specifications, and the availability of relevant historical pricing data and prior production experience.
- (c) Prospective period of contract performance.
- (d) Extent and nature of sub-contracting contemplated.

### **Some Types of Contract used**

#### *Firm Fixed Price*

The firm fixed-price contract provides for a price which is not subject to any adjustment by reason of the cost experience of the contractor in the performance of the contract. This type of contract, when appropriately applied places maximum risk upon the contractor. Because the contractor assumes full responsibility, in the form of profits or losses for all costs under or over the firm fixed price, he has maximum profit incentive for effective cost control and contract performance. Such contracts are suitable for procurement when definite design or performance specifications exist and fair and reasonable prices can be established at the outset.

#### *Fixed Price*

Fixed-price contracts are of several types designed to facilitate proper pricing under varying circumstances. The fixed-price type contracts provide for a firm price not subject to alteration or, under appropriate circumstances, may provide for an adjustable price for the supplies, ships, or services that are being procured. In providing for an adjustable price, the contract may fix a ceiling or target price. Unless otherwise provided in the contract, any such ceiling or target price is subject to adjustment only if required by the operation of any contract clause which provides for equitable adjustment escalation or other revision upon the occurrence of an event or contingency.

#### *Incentive Contracts*

Incentive contracts provide for adjustment of profit and establishment of the final contract price by a formula based on the relationship which the final total cost bears to the negotiated target cost. At the outset there is negotiated a target cost, target profit, a ceiling price, and a formula for establishing final profit and price. Where the actual cost is less than the target cost, application of the formula results in a final profit greater than the target profit; conversely where the final actual cost is more than the target cost, application of the formula results in a final profit less than the target profit. Thus within the price ceiling, the formula provides for the customer and the contractor to share the responsibility for costs greater or less than those originally estimated. Because the profit resulting from application of the formula is in inverse relationship to costs, the formula should provide the contractor in advance with a calculable profit incentive to control costs.

Incentive contracts use profit share lines in which the contractor's share is somewhere between zero and 100 per cent. For example, under an 80/20 share line the contractor would receive £20 additional profit for every £100 by which he under-ran the target cost. Conversely, his profit would be reduced by £20 for every £100 that he overran the target cost. The share line for such contracts is usually shown graphically and, for a contract where the target cost was, say, £10 000 and the target profit £900, the share line (FIG. 2) would be constructed as follows:

- (a) Mark in point A at the intersection of the target cost and target profit.
- (b) Assuming an 80/20 share line, mark in a second point B by taking an assumed final cost of £12 000. Such a cost overrun of £2000 on the target figure means that the contractor must bear 20 per cent. of the overrun from his target profit, i.e. 20 per cent. of £2000 = £400. Thus his profit is now £900 - £400 = £500, and point B is Cost £12 000, Profit £500.
- (c) The 80/20 share line is the straight line connecting A and B.

The importance of target cost in an incentive contract cannot be over emphasized. Its negotiation is the first step in setting an appropriate incentive pattern and will condition the degree of confidence that each party has in the resulting figure. The target cost should represent the best mutually determined estimate of what the costs will actually be when performance is complete. In addition to cost, a multiple incentive type of contract may be structured to cover also delivery time and performance.

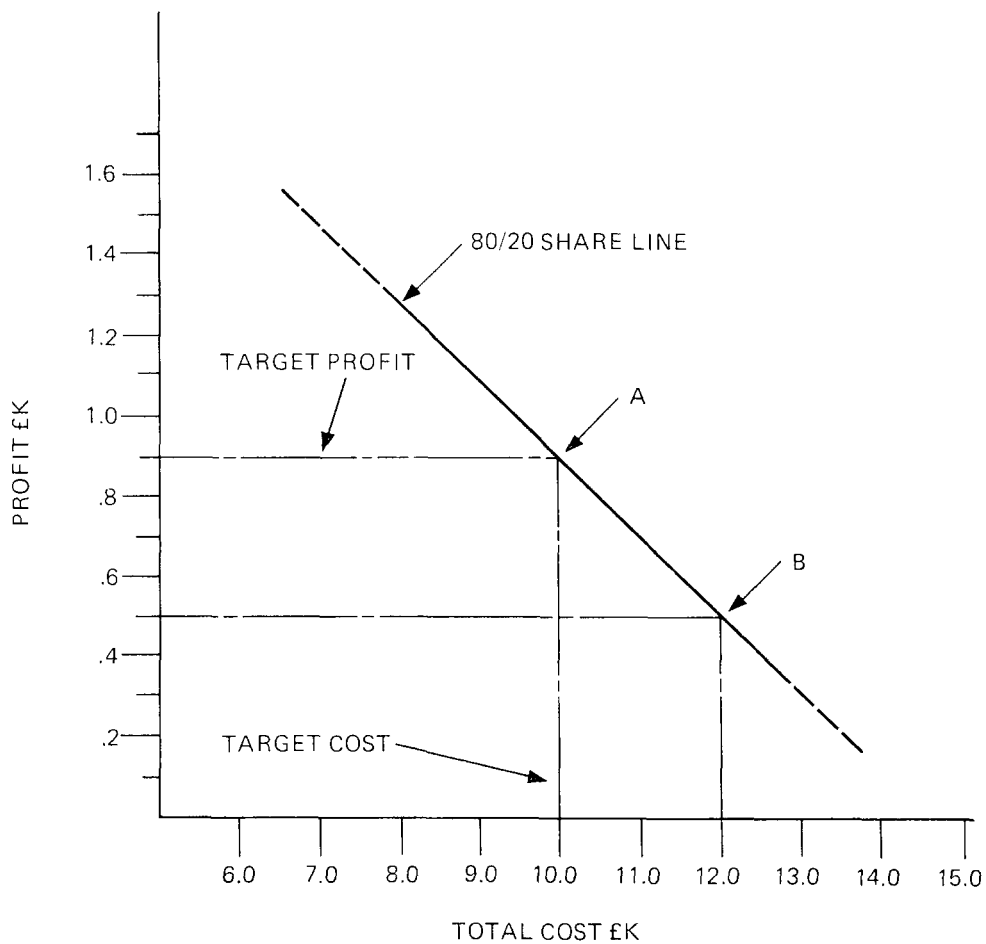


FIG. 2—CONSTRUCTION OF AN 80/20 SHARE LINE

### *Cost Reimbursement*

Cost reimbursement contracts provide for payment of all costs reasonably incurred in the performance of the contract. This type of contract usually requires only 'best efforts' from the contractor, and is often appropriate to research and development work where it is not possible to make precise predictions about the results of the effort. All cost reimbursement contracts for which the cost of the work is expected to exceed £1m are subject to Budgetary Control Procedure.

*Cost Plus Incentive Fee*

An alternative to the fixed-price incentive form is the cost plus incentive-fee contract. This provides for reimbursement of costs plus a formula fee that rewards the contractor for underruns and penalizes him for overruns. The fee is subject to an overriding maximum and minimum. This type of contract is used when the parties are unable to enter into the more demanding fixed-price incentive type.

*Cost Plus Fixed Fee*

This type of contract provides for reimbursement of the contractor's reasonable cost, plus a fixed fee which may cover profit only or profit and overheads.

*Price to be Agreed*

This type of contract is used when work must proceed without the delay which would arise while negotiations for a definitive contract were conducted. This form of contract is essentially an instruction to proceed with the work on the understanding that the Ministry and the contractor will at some specified time or level of expenditure negotiate a 'fair and reasonable' price. Every endeavour is made to convert such contracts to a fixed or incentive price as soon as possible and whilst both customer and contractor are at risk.

*'Services' Contract*

There are two types of these contracts, one covering labour only (e.g. assistance at installation or setting to work, loaned draughtsmen, technical authors, etc.) and the other covering labour and materials (e.g. extra mural assistance in the form of machine shop work which might be required by an R & D establishment). An hourly or daily labour rate, as appropriate, is established (including overheads and profit) and the contractor is paid at that rate for certified time worked. Materials purchased by the contractor are reimbursed at cost.

*Other Contract Types*

There are other types of contracts: for example, running contracts, contracts for small orders, local purchase contracts.

**Sub-Contracts**

There are very few manufacturers whose operations are self-contained to the extent that their products are made at one plant or location from basic materials through to the finished article. Items and services purchased by sub-contract vary considerably and range from raw material through to finished products, and include special machining capacity, design work, and proprietary items.

The act of sub-contracting is in essence a temporary extension of the contractor's facilities to include those of his sub-contractors, and the prime contractor must be concerned with controls exercised by his sub-contractors with special regard to cost, quality and delivery. The provisions which are to be included by contractors in placing orders on sub-contractors are fully detailed in *Standard Conditions of Government Contracts* and, additionally, the main contract may nominate sub-contractors where there are special reasons for so doing.

The main contractor is responsible for fixing the prices of sub-contracts and orders. Nevertheless, as such prices are a component of the contract price, the Ministry reserves the right not to accept them in the contract price unless it considers them fair and reasonable.

**Equality of Information for Price Fixing**

Following upon the Lang Committee's findings in respect of excessive profits made on some MOD contracts, an agreement was made in 1968 between

Government and Industry to implement the Committees recommendations that equality of information at the time of fixing prices should become a basic principle between contracting parties. Likewise, the agreement included that revised profit formulae should be used together with limits defining excessive profit and unconscionable loss. A Review Board was also established between Government and Industry to review the formulae and limits and to arbitrate to correct excessive profit or unconscionable loss. Standard Contract Conditions 43 and 48 now provide for equality of information and post-costing activities for contracts let on 'price-to-be-agreed' bases.

### **Contract Documentation**

In recent years, the Ministry of Defence has rationalized contract documentation and procedures across all its procurement areas and this has been of considerable assistance to Industry. Contract requirements are set out in a series of Defence Contract documents (Def. Cons.) and work is proceeding on standardized contract formats with shortened forms for low value orders. Additionally there is now a common Advice and Inspection note, and the necessity for countersignature on such notes by Ministry officers has been restricted to items of special concern such as safety to life and limb.

### **The Control of Design and Cost of Major Ship Equipments**

For major ship equipments where it is necessary to place with industry production contracts to design, engineer, test, and build, special control procedures exist and these are applied to items where, in the first estimate more than £100 000 is estimated for the development work. The aim is to provide a simple but effective control by officers of the Department, so that such equipments may be designed to meet the project requirements within the constraints of timescale and cost. Control is exercised through small Management Teams whose permanent members are:

- (a) A design officer appointed from the appropriate specialist area.
- (b) A production officer.
- (c) A costing officer.
- (d) A representative from the project group.

The team leader is the design officer or the production officer, depending upon whether the equipment is predominantly in the design or production phase. He is able to co-opt the services of contracts, costing and finance officers as necessary, and representatives of the equipment manufacturer and shipbuilder as required. An essential feature of this arrangement from Industry's point of view is that there is a named MOD officer who is responsible for all aspects of the contract, and it is practice to write the team leader's name into the contract so that clear lines of communication exist from the start.

Before placing design-and-build contracts, the designated management teams meet 'in house' at regular intervals and are charged with reviewing the progress of sketch designs, which will probably have been drawn up by a designated contractor in the case of sole suppliers, or a number of contractors if design competition was possible. When carrying out such reviews prior to the placing of the main design and build contracts, particular attention is paid to the degree to which the sketch design meets the Project's specification, taking into account any additional requirements which may have arisen since the previous review. The effects on time and cost are estimated and, if necessary, trade-offs are made to ensure that the budget is not exceeded.

After a design and build contract has been let, the Management Team meet every two months to establish the degree to which the contractor is meeting the

requirements as set out in the contract, particularly with regard to progress in relation to expenditure, and to the programme of the ship for which the equipment is intended. In particular the team must monitor that the contractor supplies, within three months of the date of the contract, a Contract Programme and a Production/Development Cost Plan which will show all items called for in the contract. Of particular relevance are:

- (a) Contract commencement and completion dates of design and of production stages.
- (b) *Design stage*, broken down into the principal units involved, with appropriate milestones for completion and freezing of the design, drawing submissions, the production of manufacturing drawings, test rigs, test schedules, and special jigs and tools.
- (c) *Production stage*, also broken down into principal units, with milestones for manufacturing drawings available, material ordering, shop tests, preparation for despatch, and supply of information to the shipbuilder.
- (d) Rate of spend across both stages, broken down into the principal units as at (b) and (c) above.
- (e) The arrangements for the regular reporting by the contractor on technical and financial progress.

Development/Production Cost Plans are broken down into manageable and identifiable work packages, and against each work package must be shown the budgetary cost, the expenditure to date, and an assessment of the degree to which the work package has been completed.

### **Overseeing and Quality Assurance Services**

The Ship Department of the Ministry of Defence maintains an Overseeing Service across the country which for administrative purposes is divided into seven regions, each one of which is under the control of a senior professional engineer who is termed the Naval Ship Production Overseer. The Overseeing Service provides the Department with versatile local representation throughout Industry and the overseers' prime role can be described as the Department's technical representative in the field. Quality assurance activities are an important part of the overseeing task but technical liaison, progress chasing, contract clarification, or general trouble-shooting also figure prominently. The Department's Overseeing Service also acts for a number of other Ministry of Defence authorities such as the Chief Executive Royal Dockyards, and the Director General of Supplies and Transport, and in support of Overseas Defence Sales.

Many years ago the Overseeing Service had large numbers of industrial staff who, armed with the measuring tools of their trades, carried out direct physical inspection within industry of equipment ordered for defence. These direct inspection activities have been phased out in the last twenty years and today the Overseeing Service is made up of a much smaller number of non-industrial personnel whose tasks in the quality area are the auditing of contractor's quality assurance systems and control procedures. These quality assurance procedures are based on the range of Defence Standards for quality control system requirements for Industry and are now common throughout the whole field of Defence procurement. The last decade has seen substantial changes in the inspection policy and procedures for Defence contracts: these changes stem from the work of a Committee, largely composed of industrialists, who investigated the then arrangements for Defence inspection and made a series of recommendations including those dealing with the necessity for common procedures to be operated by all Defence Departments, and the need for those Departments to evaluate the technical competence of potential contractors before placing contracts; and further that only firms with adequate quality assurance arrangements should be invited to tender.



TABLE I—*New quality documents*

<i>Title</i>	<i>Use</i>	<i>Role</i>
Def. Stan. 05-21	When Design/Development Service is required or equipment is very complex	Quality Management of The Whole Organization
Def. Stan. 05-24	When Design definition is complete and equipment is complex	Management of In-process Inspection
Def. Stan. 05-29	Less complex equipment where correctness can be determined by inspection and/or test on completion before delivery	Management of End-Product Inspection
Defence Contract Form 248	Non-critical proprietary type items	Customer examination on receipt

The Defence Standard series of quality documents were themselves based on NATO counterparts, and a feature of the present system is that the Standards provide for three levels of quality control dependent upon the technical nature of the items being procured. In descending order of rigorousness, the principal Standards are:

- Def Stan 05-21—Quality control system requirements for Industry
- 05-24—Inspection system requirements for Industry
- 05-29—Basic inspection requirements for Industry.

Defence Standards 05-21 and 05-24 call for compliance with Defence Standard 05-26—Calibration requirements for Industry.

Defence Standard 05-21 sets out quality system requirements which cover the design and manufacturing phases of products. Defence Standard 05-24 deals with inspection system requirements for products of a repeat nature (i.e. where the design is fully proven and settled) and where it is of importance to have full quality control through all the in-process stages of manufacture. Defence Standard 05-29 is applicable to the range of products for which the design is fully settled but for which the acceptability can generally be determined by test and inspection procedures on completion of manufacture.

The assessment of contractors against the Defence Standard Quality Assurance criteria, and the restriction for the most part of contract opportunities to firms with satisfactory quality assurance arrangements is firm MOD policy, and has been taking effect over the past five years. Assessment is carried out by specially trained teams of technical assessors, chosen for their knowledge and experience of the Industry and technology involved. The size and composition of assessment teams depends upon the size of the company, the complexity of its organization, and the products or services which the company offers. Assessments cover organization and quality policy and, as appropriate, design and manufacturing capability and the quality arrangements provided. Assessment teams are led by representatives of the Ministry of Defence Directorates likely to have the greatest involvement in the firm's products and services. Assessments are made against the requirements of the Defence Standards to the level requested by a company in its application. At the end of each assessment, the team leader presents to the firm's senior management a summary of the team's findings and indicates whether or not he is able to recommend registration. If registration is not possible at the time, the team leader seeks to agree with the management a period during which the company will rectify the deficiencies and be ready for a shorter assessment to verify this. Once assessment is recommended,

the Director General of Defence Contracts will add the firm's name to the List of Assessed Contractors, giving the Defence Standard level concerned and a short summary of the scope of activities offered by the firm. Assessors are centrally trained at the Portsmouth Management Centre, and these assessment courses are available to Industry who are encouraged to participate. To date some 5000 firms have been assessed and registered, and the List of Assessed Contractors is now a standard work of reference for Ministry of Defence Procurement Authorities. If any of those authorities wish to place contracts with un-assessed firms they must provide adequate reasons to Contracts Branches.

The Quality Requirements for Defence Procurement are supported by a number of Quality Regulations and Memoranda which control standardized procedures for dealing with such matters as production permits, concessions, and sub-order quality assurance. Thus in the field of quality there are now common requirements across the whole of Defence Procurement together with common documentation, and a major recommendation of the 1969 Committee has been met, in that companies no longer have to deal with different quality requirements from various sectors of Defence Procurement.

Many other important points were made in the Committee's report: it was emphasized that wherever possible greater reliance should be placed on contractors for the assurance of the quality of Defence supplies and services and, with the unification of quality procedures and documentation coupled with Contractor Assessment, the way is clear to implement this. Thus the trend is now firmly towards entrusting Defence orders only to firms whose arrangements for quality and product reliability give the Department confidence to reduce its own direct surveillance to a minimum level or even dispense with it entirely. As stated previously, overseeing numbers have reduced and Naval Ship Production Overseers have very few staff resident in firm's works, contrary to the practice of earlier years. Overseers no longer physically inspect firm's products, the responsibility for this and the correctness of equipment delivered resting wholly with the contractor under his terms of contract. The Defence Standards provide for product verification on a sampling basis by quality assurance representatives of the Ministry, and this takes the form of the manufacturer demonstrating that manufacture is correct and that he has a proper control of quality. Where an audit of a firm's quality system shows all is well, product verifications are kept to a minimum but they can be stepped up if necessary.

During the course of manufacture of important equipments, the overseeing staff will be involved in the agreement of the Quality Plan, if such a plan is a requirement of the contract concerned. Where these are required it is usual for them to contain a number of mandatory check points at which an Overseer would be present, but it must be emphasized that such check points are limited to critical features and tests.

### **Delivery and Installation of Ship Equipments**

Following the successful manufacture and shop testing of equipments, the contractor is obliged to complete all testing and quality documentation, paying particular attention to listing concessions which have been granted and incorporated before delivery is effected to the shipyard concerned. It is usual for shipbuilders to be required to employ equipment manufacturers in the installation and setting to work of major equipments, and the Department has overseeing staff stationed at the principal warship-building yards who, in addition to their normal duties during ship construction, carry out quality assurance duties during installation. The guarantee conditions usually applied to ship equipments are such that the manufacturer holds the responsibility for three years from the date of delivery or one year after bringing into actual use. Individual arrangements may be made with contractors, and the guarantees usually cover latent or

patent defects, faulty design, use of faulty materials or components, or components which are not manufactured in accordance with requirements. It is therefore very important that manufacturers are assured that their equipments are properly handled within shipyards and, for Ministry-supplied equipment, it is equally important that prompt action is taken to notify manufacturers of suspected defects. Defect reporting procedures exist for ships under construction and in the active Fleet, and the single overriding requirement for all such procedures is that action shall be taken very promptly. In general, manufacturers will always act responsibly when they receive prompt notification of defects—but not unnaturally display less interest if long periods of time elapse.

### **Co-operation with Industry**

In all successful materiel procurement, co-operation between the customer and the supplier is important—and this is especially so in the procurement of equipment for naval ships. It is all too easy to think of equipment suppliers only as the large companies producing such units as the main propulsion system, power generation, and domestic services, but the naval shipbuilding programme is very heavily dependent on the contributions of hundreds of medium and small firms whose special problems must not be overlooked. Whilst a large proportion of ship equipments have a commercial base to their design, they are required to meet such specialized parameters as shock and vibration in addition to being made suitable for application in the marine environment. Thus many of our specifications are demanding and successful procurement can only be achieved by close co-operation between the Ministry's design and production staff and the Department's overseers, with the contractors concerned.

Contractors for their part are often dependent on the Ministry for design guidance, assistance with production problems involving manufacturing concessions, quality assurance advice, and tolerance in times of difficulty in supply either through component shortages or industrial disputes. When procuring equipment for older ships, it is not unnatural that some companies are reluctant to accept small orders, and in a number of cases discussions have resulted in the Department making 'all time buys'. In other cases it is recognized that companies need a steady input of work if specialist expertise is to be retained and proper consultation between the parties can usually produce mutually acceptable solutions.

In the last year or so greater impetus has been given to placing batch orders for equipments whenever the degree of risk is acceptable, bearing in mind that whilst batch sizes will not be large by some commercial standards, considerable sums of public money can be involved.

From time to time conferences and seminars are held with sections of the Marine Engineering Industry who serve warship building, and these have proved to be very successful in promoting close co-operation.

Whilst much of the foregoing has been concerned with the procurement of new equipment for shipbuilding programmes, the area of procurement concerned with the repair and overhaul of existing equipments must not be forgotten. In this sector of business, Industry has an important part to play and many equipments are repaired under running contracts. Such contracts require particular attention by the Department's overseers as they are charged with agreeing the extent to which replacement parts are necessary and, in particular, in exercising judgment in association with contractors for those equipments which are beyond economical repair. For many units standard turn-round times are agreed as a major contribution to the logistic support of the Fleet, and in some ways the repair of equipments can be a more demanding activity than new manufacture.

To sum up, the procurement of ship equipment is an involved process

requiring the integrated co-operation of Ministry and contractor's staff. For the major equipments in modern warships no one of the parties can achieve the desired results alone.

The Department is dependent on the goodwill and co-operation of its contractors, bearing in mind that many of its requirements are complex and difficult, numbers off are small but standards are high.

The Contractors for their part demand our understanding of the industrial scene—most of them have provided equipment for the Royal Navy for very many years and given excellent service.

Together we have achieved much in the past and are coping with the present—it is the Department's policy to continue to foster the closest co-operation, learning from experiences so that we can continue to provide Ship Equipment which is of the right quality at the right time and at the right cost.

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