

COMMERCIAL REFIT OF A FRIGATE ON SOUTH TYNESIDE

BY

COMMANDER C. B. DAWE, C.ENG., M.I.MECH.E., M.I.MAR.E., R.N.
(COMPEX Refit Liaison Officer, Staff of Commander-in-Chief Fleet)

Introduction

In February 1984 the management of Middle Dock, South Shields, successfully extricated themselves and four small ship repair yards from British Shipbuilders. Tyne Shiprepair Limited (TSL) now operates mainly from Middle Dock and Wallsend Dry Docks on the Tyne. In October 1984 their tender won for them the commercial half of the Comparability Exercise (COMPEX), namely to refit H.M.S. *Euryalus*.

Management of COMPEX

CED appointed a Programme Manager Commercial Overhaul of Warships (COW), a Chief Constructor R.C.N.C., to set up and drive through the total COMPEX programme which consisted of the refitting of H.M.S. *Euryalus* and H.M. Submarine *Otter* in private repair yards, and H.M.S. *Arethusa* and H.M. Submarine *Osiris* in Devonport Dockyard. This article will deal with the surface ships only, mainly *Euryalus*, though it should be stressed that the arrangements made for *Arethusa* were exactly the same unless otherwise stated.

To start with the Programme Manager needed to assemble a team to assist him in his task. He obtained a Project Leader (Frigates) PPTO(C) and an Assistant Project Leader (Frigates) PTO2(L) from CED. A Refit Liaison Officer Commander (E)(ME) was appointed additional to the Engineering Staff of Commander-in-Chief Fleet for duty with the frigate COMPEX refits.

To enable the eleven competing contractors to price the refit and hence submit realistic tenders a firm of specification writers, Three Quays Marine Services (TQMS), was employed. They were led by a TQMS manager who was to become the COMPEX Contract Manager.

The five people mentioned so far were common to both surface ship refits.

To assist the Contract Manager was a team for each ship, each one consisting of an Assistant Contract Manager, three specifications writers (1 mechanical engineer, 1 naval architect, 1 electrical engineer), three overseers (1 mechanical, 1 constructive, 1 electrical) and a secretary, all from TQMS.

To assist the civilian overseers and to introduce them to Royal Naval standards, five senior rates from the ME and WE Departments of each ship were appointed as naval overseers. To complete the team, a representative of the Principle Director of Technical Costs was positioned in each yard.

Finally for *Euryalus* only, and this was the only difference in the arrangements for the refits, a DGST(N) cell of 6 was established in a large store in Middle Dock to demand, receive and distribute 'owner supplied' spares and material.

This team of 39 people additional to the usual personnel involved in a refit was necessary to get COMPEX off the ground in the enforced time scale. However it was somewhat luxurious and is unlikely to be seen again; its very size and shape caused problems and delays.

Family Tree

The possibility of the problems and delays mentioned above was pointed out by TSL at a familiarization visit to South Shields some weeks before the refit started. Looking back, the fact that it was nearly impossible to draw an accurate family tree should have cast doubts and supported this view. However, full of enthusiasm and confidence and armed with outline Terms of Reference, the Ministry team assured the Company that all would be well. Again looking back, the outline Terms of Reference were never refined and only broadly adhered to, the well-meaning and hard-working team doing what needed doing at the time and short-circuiting formal procedures, usually with the best of intentions but invariably with contentious if not disastrous results.

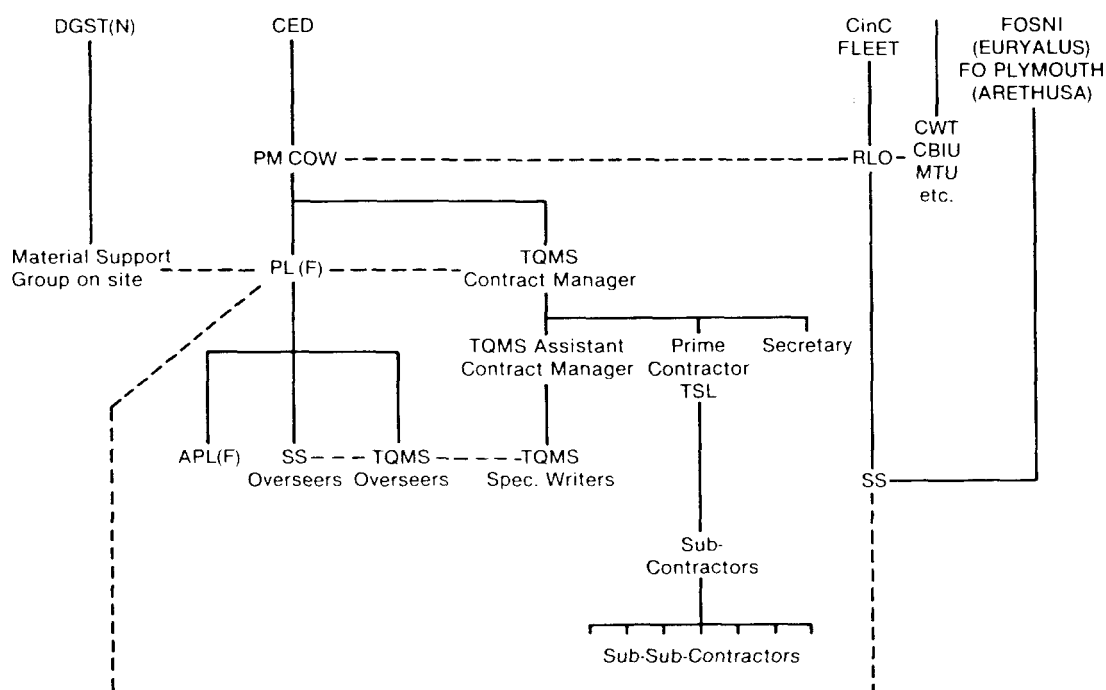


FIG. 1—THE FAMILY TREE FOR THE REFIT OF H.M.S. 'EURYALUS'

APL(F)	Assistant Project Leader (Frigates)
CBIU	Central Boiler Inspection Unit
CED	Chief Executive Dockyards
CWT	Captain Weapons Trials
DGST(N)	Director General of Supplies and Transport (Naval)
FOSNI	Flag Officer Scotland & Northern Ireland
MTU	Machinery Trials Unit
PL(F)	Project Leader (Frigates)
PM COW	Programme Manager Commercial Overhaul of Warships
RLO	Refit Liaison Officer
SS	ship's staff
TQMS	Three Quays Marine Services
TSL	Tyne Shiprepair Ltd.

FIG. 1 shows the formal organization, with the only route to TSL being through the Contract Manager. In his absence, authority was delegated to his assistant. This was in accordance with the TORs although everyday business contact between the Ministry team, ship's staff and TSL took place at the relevant level. Working relationships and friendships at all levels became close as the refit progressed but problems arose as a result.

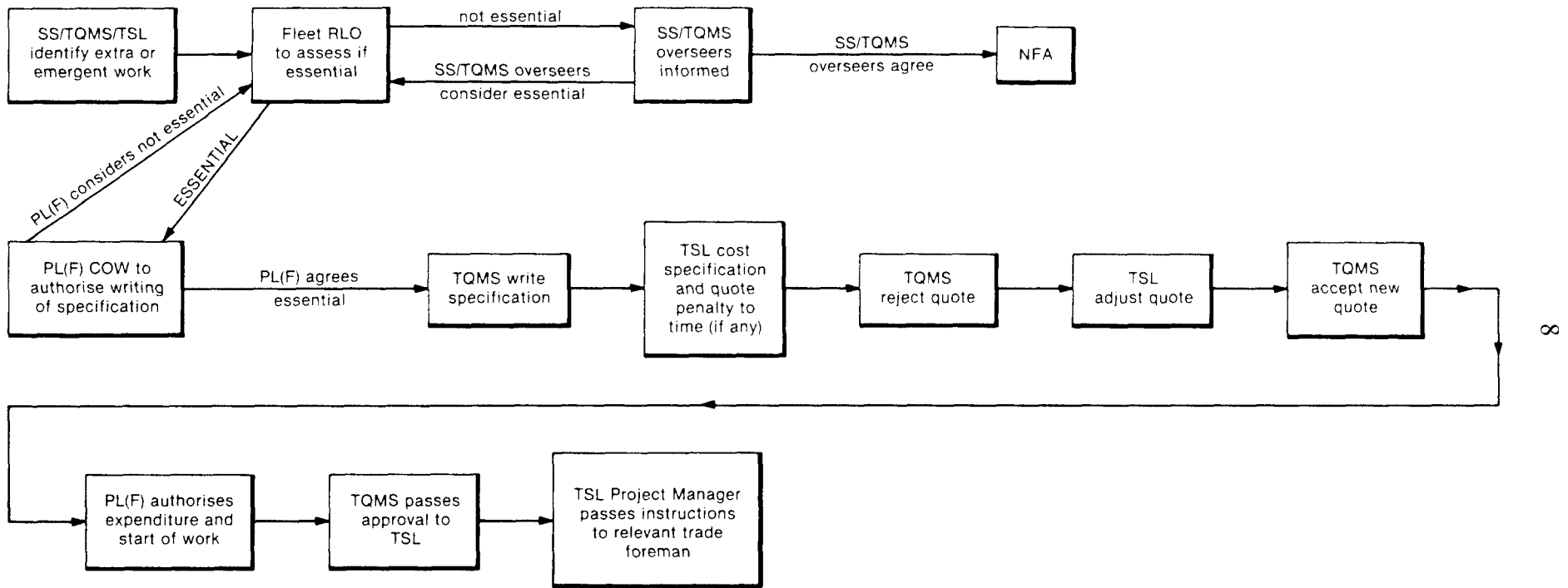


FIG. 2—PROCEDURE FOR PUTTING IN HAND EXTRA AND EMERGENT WORK
Abbreviations as in Fig. 1

Extra and Emergent Work

In the usual rush to meet milestones (particularly payment milestones) especially towards the end of the refit, if extra or emergent work became apparent TSL either got on with it on their own initiative or put it in hand on request from ship's staff, RLO or TQMS overseers. When presented with the bill, the Contract Manager and Programme Manager had no option but to refuse to pay for the work as it had not been put in hand in the proper manner. This led to ill feeling, with the Company understandably upset at not getting recognition for work that they had done in good faith. On several occasions they intimated that they would stop all work until payments were agreed. This was not in anyone's interest and inevitably a compromise would be reached, relationships were re-established and work continued as normal until the next time . . .

The process for agreeing and approving extra and emergent work was clearly defined (FIG. 2) with the Ministry team promising to give their authorization the same day if the work was discovered in the morning, or by lunch time the following day if the work was discovered in the afternoon. As stated above, TSL had early tabled their unease about this.

In practice the approval process took between a few hours and 6 weeks, averaging between a week and 10 days. In most instances such a delay was not acceptable and PL(F) and the Contract Manager would authorize the work to start without having agreed a cost.

Refit Complement, Build-up and Responsibilities

The refit was to be undertaken with a reduced ship's company in attendance, the normal ship staff input including defect work, planned maintenance, safety, security, fire-fighting, radhaz, welding sentries, stability and brow sentries being taken on by TSL. Most of these tasks were sub-contracted to Wallsend Security Services who carried them out as well as, if not better than, the average sailor detailed off for the job in normal refits. The team was led by a retired member of the Special Branch and was made up mainly of retired policemen and servicemen.

The ship's staff were responsible for ensuring that the measures taken by the yard were satisfactory, and for bringing to the attention of the Contract Manager, PL(F) and RLO anything with which they were unhappy or that was considered insufficient for the safety of the ship. Having done this they had fulfilled their obligation and if the deficiencies were not rectified any accident or fire would be the sole responsibility of TSL.

After much reasoned discussion between the ship and Fleet Staff a complement of 5 officers (First Lieutenant, MEO, WEO, SO and DWEO), 23 senior rates and 21 junior rates was agreed. The First Lieutenant was reappointed as Commanding Officer to give him greater powers of punishment should the need arise, which it didn't, rather than having to travel to Rosyth for Captain's Table. This number was about right, though the ME senior rates were somewhat stretched and the Ops and WE junior rates were slightly underloaded. Fine tuning with the experience gained has given a better balance for next time. It was agreed that if TSL were working on board then ship's staff would be in attendance to support them but on Christmas Day, for example, there was no one from the crew or from the Ministry team within 200 miles of the ship.

The build-up to a full ship's company was dictated by Raise Steam date and Setting to Work (STW) of WE equipments. To raise steam and set to work the propulsion plant as smoothly as possible, the whole ME Department needed to be in attendance and living aboard. That being the case there was

a requirement for chefs, caterers, dining-hall parties, stewards, etc. It was about this time that the WE Department needed to be brought to full strength during WE STW so that the people who were going to work with the equipment at sea could familiarize themselves with that equipment and witness it going through Harbour Acceptance Trials (HATs).

With so many naval personnel living on board and with the additional risks and hazards involved with setting to work, it was decided that this was the correct and fair time to take back the responsibilities of fire-fighting, security, stability and radhaz, thus introducing the need for some Ops Department junior rates to join. As the R.N. had no jurisdiction over the civilian work-force, two brows were used, one for naval personnel manned by naval quartermasters and one for civilians manned by Wallsend Security Services.

Preparation for the Refit

Euryalus was defuelled, de-ammunitioned, de-stored and unstowed in Devonport. During the first evening out of Devonport the tow broke off Portland. Having drifted all night, she was recaptured the following day and towed into Portland where she sheltered for a few days until the weather improved enough for the tow to continue. She arrived at South Shields five days late and started the refit on 5 December 1984.

First impressions

It soon became apparent that private ship repair yards have a different approach from the Royal Dockyards. Each man had his own trade but if his progress was held up by the lack of support from another trade and the job was within his capability then he would do it rather than wait. Private yards also have total flexibility to hire and fire as the work-load dictates.

There was no lagging route or exclusion period during delagging and relagging. When asked about this, TSL were amazed by the questions as there was no asbestos in the machinery spaces and therefore no danger. In many instances this is a very useful attitude when minor lagging is required but it is thought that on the whole it is better to do all delagging and relagging in a concentrated period, rather than one pump or system at a time as required with other work going on in the same area.

TSL are of course bound by the Health and Safety at Work Act and are regularly inspected by the Executive from Newcastle. However they interpret the Act far more liberally than do the Royal Dockyards.

The ship having eventually arrived, work started apace with the cleaning of the fuel tanks, stripping down and cleaning the boilers, removing aerials, opening shipping routes, stripping out compartments and docking down all going on in the first few days. The small ship's company was frantically busy familiarizing the Company with the ship, advising on how to operate and run down systems and being generally at TSL's beck and call. By Christmas a pleasing amount of work had been done and a great spirit of enthusiasm and friendship was evident. However the strip out phase is easy and results are obvious. The repair and reinstallation phases proved to be more difficult.

Difficulties Arise

After Christmas problems set in. A ship repair yard that is not familiar with a ship or its equipments can only work to the information that it is given. It was very quickly found that much of the information required was not readily available in the drawings and BRs provided by CED or held by

the ship. Some information was easily available in two or more BRs and on drawings but the publications contradicted each other. PILs and IPCs were out of date, gave wrong part numbers, or gave no part numbers at all. The material support group was snowed under and could not cope. APL(F) procured a micro-fiche viewer and a set of fiche and he and RLO were trapped in their office for days at a time trying to assist TSL and MSG. Lt-Commander Polehill from SPDC visited Middle Dock on several occasions to help unravel the mess but the refit struggled on.

The problems with BRs and drawings continued throughout. Initially these were fairly easy to overcome because friends of PL(F), APL(F) and RLO in Devonport Dockyard were happy to provide assistance over the phone. However after some of them were 'caught at it' this source of information virtually dried up. Official telexes and letters were usually answered but this took valuable time. Subterfuge was resorted to where disguised voices were used asking for information on behalf of *Arethusa* or *Naiad*. On several occasions it was discovered that the Dockyards had known for some time that available information was incorrect and so they did not use it but worked out of their heads from experience gained over the years rather than going through the procedure of amending the documentation. Both the ship and COW team reported as many of these instances as time and pressure of work allowed to the relevant authorities, but it is suspected that the surface has only been scratched and that much valuable information will be lost to CED/DGSR and the R.N. after 6 April 1987.

Stores and Spares

The trouble with sorting out pattern numbers combined with the non-availability of some items defeated the Ministry's promise that any item would be delivered within 14 days of the Company submitting an order. Eventually the COW team was asked for approval by TSL for them to procure from their own system items that did not materialize from the Ministry system. They did this with some startling success, providing non-available Paxman parts and five mechanical seals for various pumps within a week where SPDC's delivery forecasts ranged from 6 to 18 months. (How do we keep our ships at sea?). Furthermore items obtained in this way were cheaper than if ordered through SPDC. There were two other eye-opening examples. An order for a piece of equipment for a system found in the main machinery spaces of all steam ships and which is not normally found on the shelf was ordered, through SPDC, from the maker who has several MOD contracts tied up. The answer was £X with a delivery forecast of Y weeks.

When ordered privately by TSL from the same contractor the answer was $\frac{\text{£X}}{2}$ in $\frac{Y}{2}$ weeks. The second example concerns a different MOD supplier. TSL ordered 13 of an item for use on the bridge and were quoted £Z. Out of interest this supplier asked why they had ordered so many when TSL normally order one or two. On being told that they were for a warship the price became £2Z! TSL firmly believe that the provision of spare gear should be left to the ship repairer except of course for weapons and specialized components. They can get them at cost price instead of the inflated prices that it would appear that the Ministry has to pay. They may even get a discount from firms with whom they have an account and of course they do not have to pay the considerable DGST(N) handling fee. Even Upkeep by Exchange (UxE) items that have been overhauled by Dockyards, Royal Ordnance Factories or MOD Contractors can be more cheaply and quickly overhauled by the Company. This was proved when some UxE pumps were not available and the existing ones had to be overhauled locally. On top of

that, the ship repairer would be responsible for the finished product. Some 15 major mechanical and weapons items overhauled by various MOD agencies arrived defective and over £0.5 million worth of Remedial Extras were raised to enable TSL to put these into working order.

If the policy used by TSL to employ the manufacturers of weapons, radars, radios, computers, etc. as sub-contractors is followed, then spares for those items should not be too much of a problem.

The non-availability of Embodiment Loan Items (ELIs) for As and As is so familiar an occurrence that it only rates this passing mention.

Other Expensive Delaying Factors

When hard cash is involved Breaches of Moratorium (BOM) take on a new significance. A good example was a BOM to improve the stability of Batch 1 LEANDERS. Initial overtures were received in TSL early in the New Year. It was costed at about £50,000 with no penalty to time. The final decision was received in TSL some weeks later on 26 February 1985. A reappraisal by the Company produced a price of around £300,000 with a delay of nearly 4 weeks to the undocking date, slippages to subsequent milestones, and consequential financial penalties. Any Extra Work raised after start date is charged at a higher rate than the original work package at the time of tendering. Expensive BOMs are like Christmas presents in the commercial world.

Planning

In general, where things went wrong outside what has been mentioned so far, the cause was the inexperience of TSL with warship refitting. They did not understand the problem and they did not know what questions to ask. Their small planning team worked day and night to knock their original plan, which for example showed all WE HATs taking place on the same day in the week before sea trials, into shape. The lack of a good plan caused some friction between ship's staff and TSL as it was almost impossible for the ship to arrange to have the right person in the right place at the right time to witness a key event. At other times ship's staff were kept back over weekends to help with or have something demonstrated to them which for one reason or another did not take place.

Hand-over of Compartments

The only other times that ship's staff fell out with the Company was at hand-over of compartments. When TSL considered that they had completed a space or equipment an inspection was carried out by them, ship's staff, and TQMS. Inevitably the ship would produce a long defect list. TQMS would examine the list and find that some items were in the Specification. These TSL would attend to. However many were not in the Spec. but ship's staff wanted them done. How do you write a defect list that guarantees that every minor deficiency is included? Do you write such a defect list or do you accept that the deck tiles in a junior rate's mess are not going to be changed if they are not lifting or cracked even though they do not look 100 per cent? The ship's view is different from that of the person holding the purse strings.

The Experience of the Royal Dockyards

Dockyards are very good at doing the little things and putting the finishing touches to a refit without being asked as they know the standards that are

required and appreciated by the Navy. Further, Devonport admit that they would rather have a defect list which says 'repair as necessary' or 'refurbish as required' because they believe that they know what needs doing without being told.

Devonport foremen do not all subscribe to that view. They enjoyed the *Arethusa* Specification because they knew exactly what the customer wanted doing and their workers were told to do no more and no less. This for the first time ever gave them complete control over their men and they could positively allocate their resources. That is not to say that they were necessarily happy with the result, as many of them did not believe that the work required by the Specification reflected the true state of the ship. We must get the specifications correct but unfortunately, in spite of BR 8593 (12), naval engineers are not particularly good at writing defect lists these days. This is not necessarily the fault of the engineer officers who no longer learn the art under the guidance of Commander (E) or Commander (L) and the Senior Engineer during their early days at sea, as used to be the case. With different operating cycles today there are MEOs and WEOs taking some ships into refit who have never written a defect list before.

Inspections

Captain Weapons Trials (CWT) carried out Installation Inspections (IIs), HATs and eventually SATs on all WE systems and equipments. The Central Boiler Inspection Unit (CBIU) as normal carried out the required boiler inspections, and the Machinery Trials Unit (MTU) had HAT(ME) and SAT(ME) presented to them. Their efforts were much appreciated and gave the ship's staff a feeling of confidence. However the reports, particularly from CWT, ran into many pages of defects. The majority of these were original sin and should have been noted by other authorities including ship's staff before the defect list was written. This would have had two advantages. Firstly extra work would not have had to be put in hand at a stage of the refit when it was unwelcome and secondly the work would have been cheaper if it had been in the main defect list.

Unfortunately, even with the vast knowledge and experience of CWT, documentation proved to be a problem. On one or two occasions the team that carried out an II were not able to come back for HAT and a different team arrived. A few of their pick up points contradicted those of the II team. Having raised extra work requisitions to comply with the items raised at II and spent money on them, the COW team were not prepared to spend more money to have those items undone. Apart from the money aspect, to do so would have made the Ministry look foolish. Similarly FOF 1's Operations team asked for some work that had been done as the result of CWT inspections to be reversed. These requests were refused for the same reasons.

Acceptance

Project Acceptance took place on Thursday 14 November 1985, after several false starts, much rearrangement and numerous postponements. CSO(E) to Commander-in-Chief Fleet carried out a very thorough inspection of the ship. He was content in the knowledge that the Specification had been met, that all Extra and Emergent work had been completed, that CWT had carried out a full set of IIs and HATs on the WE side, that CBIU had been closely involved, and that MTU had witnessed HAT and SAT(ME). He described much of the final coat of paint in many areas as 'workmanlike'. This was one area with which the ship also were most unhappy. However the preservation and painting had been carried out strictly in accordance

with BR 3939 which does not define the finish that is required. The Royal Dockyards produce a very good appearance with the final coat of paint but they are used to working with warships rather than with merchant ships where the grade of finish does not appear to be so important.

Post Refit

Since refit *Euryalus* has completed SATs(WE) with few problems. Credit for this is due to Vickers Shipbuilding and Engineering Ltd. (VSEL) who were TSL's WE sub-contractors and to all the manufacturers of the equipment who were sub-sub-contracted by VSEL. Much credit is also due to WEO and his team who prepared for and presented the SATs unaided as no contractors appeared on board to assist although invited to do so in the Specification.

During SAT(WE) the ME Department and other areas of the ship experienced defects at about the same rate as most ships coming out of refit. Some were guarantee defects caused by poor or incorrect workmanship and have been charged against TSL. Others could not be held against the Company as they resulted from poor documentation, incorrect drawings and inferior quality MOD supply spares and UxE equipment.

At ODMA (Operational Date Material Assessment) the inspecting officers and the Commanding Officer, supported by CSO(E) to Flag Officer Plymouth, agreed that *Euryalus* was at least up to the standard of average Batch 1 LEANDERS at that stage.

Conclusion

It has been shown that warships can safely be put out for refit to commercial ship repairers.

The finished product will be better next time with the experience gained by TSL for *Euryalus*, particularly if the available documentation is brought up to a usable standard. The Company has had the opportunity to look at *Arethusa* and special note was made of the standard of finish of the paint on the ship's side, sign-writing and lagging. They now know what is required. It would be unfortunate to lose the expertise gained in TSL and it is for consideration that future invitations to tender should be for two refits to go to the winner of the tender to consolidate the experience gained during the first one.

More than one member of TSL stated on more than one occasion that *Euryalus* had not had a Commercial Refit. She had a naval refit in a commercial yard with naval and Dockyard practices and standards, which were foreign to commercial yards, being thrust upon them. This includes the provision of spares and material discussed above. Not unreasonably TSL had expected to be given a Specification, with extra and emergent work cropping up during the refit, and some drawings and BRs to which they could work without having unfamiliar practices injected sideways at vital moments. There is a lot of truth in this and perhaps the Ministry should consider trying a commercial refit.

Postscript

This article is the view of the refit of H.M.S. *Euryalus* taken by the RLO and does not necessarily reflect the view of the ship's staff or any other authority involved. There are at least six reports on COMPEX being written by participating authorities and only when they are received in CED and compared, will the overall view become apparent.