



H.M.S. 'SURPRISE'

NOTES FROM SEA

The following are extracts from letters received from Engineer Officers of sea-going ships, together with remarks by the Engineer-in-Chief's Department, where appropriate.

Steering Gear—H.M.S. 'Illustrious'

It was an alarming experience to have to change over steering gear while dodging between the Torpoint Ferries with the rudder 20 degrees to Port. While trying steering gear there had been excessive vibration in the pump attributed to a motor bearing; with one pump in use the gear appeared satisfactory. The second motor was examined, found to be correct and restarted. Shortly after the rudder jammed.

When, with a sigh of relief, we anchored in Bigbury Bay it was found that when the wheel was moved quickly, with both pumps running, three of the four pump shut-off valves from the rams were shutting under pressure and locking the fluid on both sides of the rams.

It was found that the emergency hydraulic operating plungers, which close these valves, had stuck in the near-shut position, after test, leaving the valves sufficiently open for slow movement of the rudder but not for full speed. It was later discovered that these plungers, which are identical with the main transmitter plungers, had been fitted with leathers not of the maker's specification. On consulting the records it was apparent that a similar incident had occurred in 1942, but had not been given sufficient publicity. Notices are being fixed to the shut-off valves and at the starters of the pumps.

It is recommended that these valves should be tested before bringing the electric pumps into use. It is further recommended that a full speed trial should be included in the normal trying of steering gear, but mind your fingers on the spokes of the wheel!

Comment

The remote hydraulically operated stop valve is closed by operation of the hand pump in the centre engine room. It is operated by opening the release valve (also in the engine room), to relieve the pressure and allow the spring on the stop valve in the tiller flat to open the valve. Thus, unless the leather in the ram of the valve was extremely sticky, the valve should open (spring is loaded 150-170 lb) and it seems more than probable that the pressure from the remote control hand pump and accumulator had not been properly released.

Avtur Fuelling—H.M.S. 'Triumph'

Recent embarkation of Avtur from a lighter revealed that this vessel was only capable of a discharge rate of 3,500 gallons/hour. It is not known whether the majority of facilities for supplying this fuel are on such a pathetic scale, but in time of war this would be operationally unacceptable.

Comment

The inadequacy of the pumping capacity of gasoline lighters has been appreciated and Board approval has been given for the modification of a number of lighters to deliver fuel at a rate of 50 tons/hour.

Fire and Bilge Pumps—H.M.A.S. 'Sydney'

Erosion on the discharge passage of the pump casings has accelerated over the past six months to such a degree that the life of the casings can only be placed at about 6 months.

Apparently when the chilled skin of the casting is pierced erosion is swift and complete.

Temporary repairs in the way of filling with whitemetal have been carried out by Dockyard.

Comment

The erosion experienced in the discharge passage of the fire and bilge pump casings is thought not to be due to breaking through a hard skin but because once the surface is roughened, turbulence is increased and erosion naturally accelerated. This trouble has been overcome in a home yard by building up the eroded parts with stainless steel, sprayed on, and finished off flush.

Lubricating Oil Change Over Cocks—H.M.S. 'Sheffield'

These were the cause of some trouble in the forward engine room, which first showed itself in a loss of cooling effect on the starboard oil cooler. Examination of the sea-water inlet valve showed that the valve itself was nearly off its spindle, and when this was rectified it was thought that the matter was finished. However, the trouble persisted; examination of the sea-water outlet valve and the sea-water side of the cooler showed no defect, and screwing down on the spring-loaded relief valves on the oil side of the cooler made no difference. Opening the sea-water supply cross connection valve had no effect. On examination of the starboard change-over cock it was evident that there was little relationship between the position of the cock and the position of the indicator. A good deal of time was spent in looking up drawings and corres-

pondence to try to find the reason for this and it was eventually found that the cock had been checked in the working position so often, bringing the indicating arm up against a locking pin that the indicator arm securing peg had started to shear, although the arm itself was not loose. With the indicator in the working position the cock was within $\frac{1}{4}$ in. of being completely shut off.

The cock on the port cooler was found to be in a similar state although not quite so close to the shut-off position. Restoring the cocks and indicators to their correct position solved the problem and reduced the speed of the F.L. pumps by about 100 r.p.m.

Comment

An A. and A. has been proposed for all cruisers and below, to modify the plug of the rotary valve so that supply of lubricating oil to the bearings cannot be shut off between the working and by-pass positions, which will also permit a certain amount of movement past the shut-off position before a restriction of the flow is encountered. Also, lighting is being improved so that the indicator plates of the rotary valves are adequately illuminated.

Persistent Leaky Joints—H.M.S. 'Sheffield'

The chief trouble experienced has been with the saturated steam system which blows a joint about once a week. This could possibly be avoided by a better system of drains, and certainly repair would be easier if it were possible to isolate various sections whilst still supplying essential services.

Comment

Although B.R. 1988, Article 6205 in general limits the use of spiral wound gaskets on the saturated steam system to cases where the working pressure is above 300 lb/sq. in., they are for use on persistently leaky joints at any pressure.

Vacuum Soot Removal Gear—H.M.S. 'Sheffield'

Whilst boiler cleaning at Esquimalt we took advantage of the offer of a vacuum soot removal plant loaned by the Royal Canadian Navy. This was not as powerful as anticipated but would be a great help after a few modifications. However, any means of keeping boiler rooms, personnel and the ship clean was considered well worth trying, particularly in view of the ship's programme and duty.

The gear is easily portable through the openings in the ship. Also supplied, were strong paper bags in which to carry away the soot collected. The electrical supply was taken from the jetty. It was difficult to get a powerful suction effect. This was caused by a bad joint on the soot bin which was secured by adhesive tape. Sealing this joint every time the soot bin was emptied slowed down the operation. The rate of soot removal was never very great and eventually the gear was used only to clear up soot remaining after the majority had been removed by more conventional means.

It was thought that the performance would have been improved by the use of better nozzles, a combination of saw and nozzles being the best; another improvement would have been the fitting of more robust joints on the suction side.

As it stands, the equipment does not appear to be a great help with boilers of the size fitted in *Sheffield*. However, a larger version would be a great asset. It is believed that a form of soot removal gear was introduced by H.M.S. *Devonshire* recently, and a comparison between these types would be of interest.

Comment

Water washing of boilers is shortly to be introduced generally. In this process the soot is pumped overboard as sludge, and soot removal plants are unnecessary except, possibly, for aircraft carriers.

Boats—H.M.S. 'Sheffield'

Cutless rubber bearings for the 35 foot motor boat and Admiral's barge have caused a certain amount of concern due to the rapid rate of wearing. The alignment of engines and shafts is frequently checked to reduce the wear to a minimum, but even so, the replacement has far exceeded the allowance and spares have had to be flown out by air from the United Kingdom.

Comment

One of the cutless bearings that has worn unduly should be sent to E.-in-C., Admiralty, Bath, Section EN/DI 15 together with a statement of the amount of service it has given.

It is possible that these bearings have been incorrectly preserved in grease with the resulting deterioration of rubber. The only preservative permitted in this case is french chalk. If bearings are found to be preserved in grease they should be thoroughly cleaned and new demanded in lieu as their life will be very short.

Propeller Shafts—H.M.S. 'Cockade'

After re-alignment of the propeller shafting abaft the main thrust blocks in *Cockade*, considerable whip was experienced in both forward intermediate shafts at 25 knots, and was sufficient to set fire to the port bulkhead gland packing, although no overheating was experienced in the stern tubes or plummer block bearings.

Comment

Unless the whip has persisted, it is almost certain that it was caused by the bulkhead gland as opposed to the whip causing overheating of the gland. Given a very small original eccentricity and a tight gland, local heating on the side of the shaft will cause the whip, which is progressively aggravated until the gland is slacked back.

Main Inlets—H.M.S. 'Charity'

Charity has found that with choked inlets an increase of speed to 15 knots enabled vacuum to be maintained temporarily, whereas at ten knots or less all vacuum would have been lost. It was necessary on one occasion to get under way with one strainer still open, with the result that one engine trailed for a short period at slow speed under atmospheric conditions. Owing to the absence of shaft brake or locking gear this risk had to be taken.

Comment

It is possible by judicious control of the opening of the main inlet, and the speed of the main circulator to clean a weed grid while steaming at slow speed. It may be a messy business but it is certainly safer than trailing under atmospheric conditions.

Turbo Generator Gearing—H.M. Ships 'Peacock' and 'Chivalrous'

Some Engineer Officers are a little concerned with the state of gearing e.g. *Peacock's* main gearing and *Chivalrous* turbo generator gearing. No case is

serious but it would help considerably if ships carried adequate records of tooth side and tip clearances and centre distances as originally fitted.

Comment

An article in Volume 2, No. 1 of the *Journal of Naval Engineering* by Commander (E) Joughin outlines a reasoned method of obtaining an appreciation of gearing. Any important changes in centre distances should be shown up by bridge gauge readings at the bearings.

Main Refrigerating Plant—H.M.S. 'Vigo'

The Sternes plant in H.M.S. *Vigo* has a long history of ineffectiveness and in the last two years of records the cold room has never been below 18°F. The equipment appears to be below design specification and as a result the maintenance requirement is high. It is proposed that consideration be given to replacing this plant by Weir's type as fitted in *Saintes* and *Armada*, or Hall's as fitted in *Gravelines*. Recently the supply of methyl chloride has been very 'damp' and this is being pursued with Naval Stores.

Comment

This report does not contain sufficient information of what is wrong. Eight other 'Battle' Class destroyers are fitted with Sternes refrigerators which have given satisfactory service. Improved performance would probably be obtained in *Vigo* by cleaning and dehydrating the circuit and recharging with arcton.

Spare Gear in Destroyers

Squadron Engineer Officer, 1st Destroyer Squadron, reports as follows :

'The new procedure for demanding and returning spare gear is most unpopular owing to the amount of paper work involved. It doesn't seem to be appreciated that a destroyer Engineer Officer has to rely upon a stoker mechanic as a writer and that he is only likely to remain in the capacity for six months at a time. The return procedure appears to have been designed merely to check on the honesty of the ship's Engineer Officers ; if such a check is necessary it would be better done by the S.P.D.C.s where a qualified clerical staff is available. The method of creating the ledger is most cumbersome, involving a lot of work which won't pay a dividend for several years and even then will be difficult to refer to. What is needed is a complete ledger in the form of an expanded D.320 containing all the details required to demand and giving space for transactions. Many items which are never renewed could be grouped together on one page to keep the size down. The system is fundamentally good but does need to be workable in small ships.'

Similar comments have been raised officially and are under consideration.

Comment

The procedure outlined in A.F.O.4214/51 resulted from Board instructions that D. of S., D.N.O., D.E.E., D.N.C. and E.-in-C. should evolve a storekeeping system common to all. Alterations to this procedure must be acceptable to all Departments concerned, but improvements that can be suggested should be put forward for consideration. Any alternative proposals should not involve extra work by clerical staffs at S.P.D.C.s which are strictly limited and heavily committed.

If there are 'many items which are never renewed', there is no point in carrying them as spares ! A.F.O.4343/51 called for reports from all ships with proposals of what spares could be landed. It is just such items about which information is required.

Superheater Elements—H.M.S. 'Apollo'

The wear and waste test carried out has shown all tubes to be in good condition with the exception of one superheater which had a minimum reading of .059 in. Another superheater tube from this area is being removed and examined in the hope that this bad tube is an isolated case.

Whatever the answer turns out to be, in this particular case it is considered that these tubes (Melesco) should be taken out, dried and plugged, as a matter of policy whenever a ship goes into Reserve or undergoes an extensive refit. Attempts at drying in place are invariably futile.

Comment

Paragraph 403 of the *Reserve Fleet Notes on the Preservation of Machinery* deals with the drying out of superheater elements. Their preservation is a tedious job, but good results are obtainable. It is not considered to be justified for ships undergoing refits except in exceptional circumstances.

Main Feed Pumps—H.M.S. 'Crossbow'

H.M.S. *Crossbow* reports that during a full power trial difficulty was experienced in feeding the forward boiler, due to a 'sticky' feed pump governor. It was found that the lower, or smaller diameter, half of the governor was coated with a film of what appeared to be carbonized grease. After cleaning the governor appeared satisfactory, but the full effect will be judged when the repeat full power trial is carried out on the Autumn Cruise.

Comment

A common defect which has become more common with the introduction of boiler compound. Regular examination and cleaning of feed pump governors and boiler feed regulators is the only sure way of ensuring steady boiler feeding. The 'grease' referred to here was more probably boiler compound.

Main Engines—H.M.S. 'Concord'

Examination of the starboard H.P. turbine of *Concord* under refit at Singapore has shown the blade shrouding to be worn approximately .008 to .010 inch. Rotor and casing blade shrouding clearances taken on the inboard and outboard sides at the flanged joint level at each 90° turn of the rotor showed that inboard clearances were regularly .022 to .026 inch (i.e. under the designed .030 clearance) and outboard .036 to .040 inch. No damage or distortion has been discovered and all bearing surfaces are in good condition. A further report will be forwarded.

Comment

Discrepancy between inboard and outboard axial clearances is not uncommon, but it is often of small magnitude. It is usually due to distortion of the turbine casing in which case it can only be remedied by extensive machining of casing blade roots and tips, and this invariably means that remedial action cannot be undertaken except at large repairs.

Auxiliary Machinery—Destroyers

Heavy erosion and corrosion has taken place in the impeller casings of some distiller circulating water and fire and bilge pumps. Inserts fitted in the distiller pump of *Comus* and the fire and bilge pump of *Cossack* have proved satisfactory. A new distiller pump has been fitted in *Concord*.

Comment

The makers have been informed of this trouble which is fairly widespread. Evidence of this kind is useful in adding weight to E.-in-C.'s insistence that alternative materials or modified design are necessary.

Main Steam Cross Connection on Unit Valves—H.M.S. 'Battleaxe'

The cover and valve box faces of these valves were machined flat during the leave period and the joints remade with $\frac{1}{64}$ in. reinforced C.A.F. jointing. No further trouble with leakage has been experienced.

Comment

This action is in accordance with B.R. 1988, Article 0205, and it is gratifying to learn that it has done the trick.

Boilers—H.M. Ships 'Scorpion' and 'Battleaxe'

Scorpion reports trouble with superheater taper lip plugs on No. 1 boiler, several of which had leaked through small cuts between the soft-iron gasket and the header. Messrs. Foster Wheeler's instruction book states that a special cutter is provided for deep cuts and a roller for small cuts. Neither of these tools is supplied to *Scorpion* or *Battleaxe* nor are they mentioned in the list of special tools. A grinding dolly was made and the cuts ground out, a job which took two working days, but would have taken considerably less with the tools mentioned.

Comment

The question of maintenance of taper lip plugs and holes in all ships fitted with Foster Wheeler boilers or economisers is being taken up with the firm.

It would appear that no individual ships have been supplied with special tools. Subject to the outcome of discussion with the firm, these tools may be supplied to Dockyards and refitting bases.

It is understood that Messrs. Foster Wheeler have evolved an emergency (temporary) repair technique for leaky taper lip plugs which will obviate the necessity for ships to carry special tools. Information will be passed to all concerned in due course.

Communications—'Weapon' Class

The present system of Damage Control communication is poor. The only method by which D.C.H.Q. can contact either section is via the forward and after switchboards, or else by messenger. It is hoped that when D.C.H.Q. is re-sited a more satisfactory system of communication will be installed.

Comment

Damage Control communications are automatically reviewed and brought up to date on resiting D.C.H.Q.s.