H.M.S. ' INGLESHAM '—INSHORE MINESWEEPER CLASS

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.

Ship's Boats—H.M.S. ' Eagle '

In the 35-ft. F.M.B., it is impossible to service the timing chain or its auto tensioner, without removing the engine from the boat. This is due to insufficient clearance having been left between the engine and the forward W.T. bulkhead of the engine compartment which prevents the flywheel being removed *in situ.* This results in a disproportionate amount of time being required for the adjustment of auto tensioner or the replacement of its springs.

Comment

Auto tensioners should not require adjustment between major overhauls—this is the only case reported out of 600 engines in service and must be considered an isolated case.

Turbo Auxiliaries—Water-cooled Bearing Housings—H.M.S. ' Unicorn '

Two instances of corrosion failure have occurred in the water jacketed, cast iron, turbine bearing housings of Weir's vertical auxiliaries. The perforations were in both cases external and no damage to ball and roller bearings was caused. In view of the fact that spare housings are not carried, no attempt was

made to repair by welding. Instead, the cooling water piping was altered to pass through the oil reservoir box, thus cooling the oil after exit from the bearings. The repairs have been entirely satisfactory, and no decrease in the convection induced flow of oil has been observed. This modified system is easier to examine and clean, and obviates the risk of unobserved corrosion leading to sea water contamination and consequent failure of bearings.

Comment

This corrosion is considered due to electrolytic action between the cast iron housing and the copper cooling water pipes. Messrs Weir were informed of the troubles experienced with these turbo-driven auxiliaries and suggested that the troubles may be due to the position of the cooling water inlet in relation to the various ship discharges.

It was also thought that possibly an unusual amount of air in the cooling water supply was the cause of the trouble. To overcome the difficulties Messrs Weir recommended replacement of the cast iron parts in gunmetal.

The installation of the copper coil in the oil sump is considered a satisfactory modification in the circumstances.

Fresh Water System—H.M.S. 'Swiftsure'

During the 'Arctic Cruise' both gravity tanks and associated piping froze up. This was due mainly to the inadequate heating arrangements, which it is hoped will be improved by the Dockyard during the current self-refit period.

It is considered however that this experience is yet another argument in favour of the abolition of these archaic tanks and their replacement by pressure tanks down below.

Comment

The matter was referred to D.N.C. who remarks as follows :—

'In future large ship new construction continuous running pump fresh water systems will be fitted, in which neither gravity tanks nor pressure tanks will be required. Adoption of such a system has been delayed due to the necessity for designing and producing a pump suitable for continuous operation and with little pressure variation between conditions of full discharge and no draw off. The system is, however, being fitted in H.M.S. *Majestic*, *Victorious* and *Royalist*.'

Replenishment at Sea—H.M.S. 'Swiftsure'

This was carried out several times during the period with satisfactory results except as regards communications. B.R. 1742/52, Appendix I, Tables C and D, page 26, gives one code of flag and light signals while the Addendum, B.R. 1742B, gives a completely different one (paragraph 18) though stating in paragraph 16 that those to be used are as in B.R. 1742. Paragraph 4 of the introduction to the Addendum states that the signals contained therein are for use with ships of other Navies. Paragraph 16 makes confusion worse confounded.

This resulted in our getting involved, on one occasion during Exercise 'Mainbrace,' in a heated argument with a British oiler, who wanted to use the N.A.T.O. signals.

It is considered that some clarification of replenishment signals is well overdue.

Comment

This matter was referred to D.N.D. who remarks as follows :—

' Signals are indeed confusing at present. However, an amendment to B.R. 1742 is about to be issued which brings the signals shown at transfer and reception points in line with those given in B.R. 1742B.'

Feed Regulators—H.M.S. ' Newcastle '

We have not been unduly worried by hunting of boiler water levels as has been the case in some ships. It does occur to some extent even with systems fully isolated (i.e. each feed pump on its own boiler) and there appear to be certain speeds at which it is more pronounced (e.g. about 160 propeller r.p.m.). However, we believe this is largely caused by stickiness in extraction pump and/or feed pump governors and/or feed regulators, and may originate in the two former rather than the latter. We attempt to do a regular cleaning routine on these items and certainly any hunting is much less pronounced after it.

Comment

Ships reporting hunting troubles have mentioned frequent cleaning and adjustments to Robot feed regulators, but have made no mention of paying the same attention to feed pump and extraction pump governors which may well be the solution to this problem.

In support of this theory it is noted from records that this trouble follows a pattern which could point to sticky governors :—

(*a*) Ship has spent a long time in dockyard hands,

(*b*) Considerable fluctuations of exhaust pressure and main feed pump nozzle box pressure, which vary in sympathy with changes in the rate of feed,

(*c*) The effect of (*b*) above on the steam pressure is quite sufficient to make another sprayer necessary, thus aggravating the situation.

Even though this may not be the complete answer, the desirable effects and importance of this simple maintenance feature will be further promulgated.

Boiler Safety Valves—H.M.S. ' Superb '

A major problem with the boilers since the refit has been leaking safety valves. The trouble is believed to lie entirely with the main valves and it is doubtful whether it will be possible to make them steam-tight for the following reasons :—

(*a*) The clearance between the valve spindle and guide bushes is anything up to 15/1000 in. The designed figure is 3/1000 in. in diameter.

This results in so much float when lapping in the valve to the seat that this method has been abandoned for the more modern method of using separate laps for the valve and the seat. However, owing to the different sizes of the piston chamber valve guide it has proved difficult to construct a good lap for the seat.

(*b*) The material of the valves and seats is of poor quality, resulting in inability to obtain a good surface, but it is not yet certain that this is the reason for inability to get the valves tight. Work proceeds and a further report will be made.

(*c*) The inner surface of the valve seats is jagged as a result of past leakage and corrosion.

Comment

It is important that this clearance should be reduced to the designed amount at the earliest opportunity. As no doubt is already realised, if the clearance is too great the valve is not sufficiently guided on to its seat and leakages will persist.

Action has recently been taken with the makers to supply spare main valve seats of 13 per cent. chrome stainless steel.

Boiler Casings—H.M.S. ' Superb '

With regard to the boiler casings it is the old story of insufficient attention being paid to their careful replacement after removal, although it is difficult to get closing plates to be a good fit all round. Tests are now frequently being carried out by turning out all lights in a steaming boiler room. Even the smallest gap in an air casing clearly reveals itself.

Comment

Records prove that where a ship's propelling plant overall efficiency begins to wane, defective or leaky boiler casings are one of the principal causes.

For locating leaks, especially after cleaning, it is helpful to darken the boiler room and have someone inside the furnace with a powerful lamp.

H.M. dockyards have velometers which can be used for tracing leaks when the fans are running.

Steam System—H.M.S. ' Superb '

It was decided that a very careful test by air pressure should be made of the main steam systems as we were already suspicious that there was leakage taking place between the screwed portion of the flanges and the steam pipes on two joints that had started leaking on passage. A series of air tests were therefore carried out with most interesting results. Initially it was quite impossible to build up a greater pressure than ten pounds as there were so many leaks even in short isolated lengths of the system. The noise when air pressure was applied in the after engine room where no machinery was running rather resembled a main line railway terminus with many waiting to leave. Not only was the leakage between the threads of the main steam pipe flanges confirmed but many other unsuspected leaks were discovered. For example, serious leakage was found from distant reading thermometer pockets tucked away out of sight on top of the main steam pipes, and therefore quite inaccessible under steam, there being the usual maze of assorted steam pipes in our engine-rooms on top of which only the smallest and most daring of persons can creep. Incidentally these pockets are only holes in the pipe—no actual pocket is fitted. Hosts of leaking cock bosses, glands and so on which would not normally be heard with machinery running, and would be inaccessible because of the heat. It is interesting to note that after a terrific blitz which commenced at once, and has continued until quite recently, it is now possible to build up a test pressure of 100 lb/sq. in. very rapidly. Furthermore the average feed water consumption in any previous commission was never less than 50 tons/day when main steaming. The average consumption taken over the past quarter under main steaming conditions is 33·5 tons/day ; recent passages at sea have produced consumption figures as low as 24 tons/day—we rather tend to disbelieve such figures and have yet to prove their truth. In many ways it was most fortunate that in view of the flange leakage *Superb* had to have three replace steam pipes, and that it was decided that these were to be fitted at Rosyth. During the two

periods spent at Rosyth another minor refit was carried out, and since all the ship's company were available a tremendous amount of work was got through, most excellently backed up by the resources of Rosyth Dockyard.

Comment

This is an ingenious and useful way of locating steam leaks, and judging by the feed water consumption figures quoted, can have marked effect on both efficiency and economy. Some Engineer Officers contend that the efficiency of a ship's E.R. complement is inversely proportional to the feed water consumption.

Steaming with Locked Shafts—H.M.S. ' Superb '

Some very useful experience was gained in steaming with locked shafts when making the passage from Portland to Rosyth. The inner shafts were locked during this passage to enable steam to be kept out of the after engine-room thus enabling ship's staff to commence the work of removing the first main steam pipe. (So many valves leaked that isolation was impossible.) Fuel consumption figures were interesting, there being little difference from trailing until 150 r.p.m. when the consumption rises very rapidly. Perhaps the most useful thing that we learnt was how careful it is necessary to be when tightening the shaft locking gear under way. I had been caught in another cruiser with jammed locking gear due to an enthusiast turning the jacks the wrong way when trying to unlock the shafts, and to avoid this happening in *Superb* the direction of rotation on the jacks for unlocking the shafts was carefully recorded. However a conscientious watchkeeper observing one night that there was movement in one of the shafts decided that the slack should be taken up on the jack concerned. The jack he tightened was unfortunately the one that was in compression. When the ship stopped therefore, this jack was put into such tension as the torque was removed from the shaft that nothing would shift the jack. In the end it was necessary to unfasten the jack from its bedplate. The moral here is simple to see—if jacks slack off when underway make certain that jacks in compression are lengthened and not shortened, and vice versa for jacks in tension.

Comment

This is a useful hint about shaft-locking jacks. When any ship has occasion to operate with locked shafts, recordings in tabulated form of r.p.m., s.h.p., and speed of ship, etc., up to maximum permissible torque, would be appreciated for Admiralty records.

Feed Heater Drain Pumps—H.M.S. ' Superb '

Considerable difficulty is being experienced in maintaining the glands of these pumps tight. The temperature of the water is high and no available packing appears to stand up to the temperature involved. In order to conserve feed water these pumps are not at present used. Can any special packing be recommended ?

Comment

Due to the long overhang of spindle and impeller from the nearest bearing, difficulties in keeping these glands tight could point to the out-of-balance of rotating members and/or excessive clearance at the gland neck ring.

To assist in further investigations, particulars of packing now being used and temperature of water would be appreciated. It is considered that Allenite Leafoil specified for these pumps should safely cover the maximum operating temperatures.

As a point of interest, a mechanical seal has been brought out by Cranes Packing Ltd. and is at present fitted in an auxiliary feed pump in a *Dido* Class cruiser for trial purposes. New materials and a re-design of the seal have just been evolved and will, it is hoped, prove suitable when in contact with liquids of high temperature. We would like to fit an experimental seal to the feed heater drain pump in *Superb* during refit. The pump would require a complete refit with the seal being fitted in the Yard.

Boats—H.M.S. ' Superb '

The water-jacketed exhaust pipes are a constant source of worry once they start failing. Commercial motor boats now have what appears to be a very satisfactory plastic exhaust pipe in which the exhaust and circulating water mix and are discharged together.

Whilst the hull design of motor boats is not our ' part of ship,' the damage to machinery which results at present owing to the unsatisfactory type of boat in use in the Service affects us very much in these days of reduced complement. The amount of work that has had to be put into ship's boats is quite unacceptable with our present complement. A very large proportion of the damage is due to the design of the hull which renders boat handling in rough weather difficult, even for the most expert and experienced coxswain. Can we not therefore, in our own interest, take positive action in having the design of boats improved to meet the requirements of easy handling in all weathers, combined with seaworthiness and large carrying capacity ?

Comment

In new design boats water-jacketed exhaust pipes have been eliminated. In sizes below the new 45 ft. medium-speed M.B. (replacement for 35 ft. F.M.B.) they have been retained as a means of cooling long exhaust runs built closely into the structure around the after cabin.

It is not intended to build any more hard-chine boats except 16 ft. F.M.B.

The policy of E.-in-C. regarding new motor boats and servicing craft designs is as follows :—

(*a*) To use standard engines, viz. Enfield V.S.1 and H.0.2, Perkins P4 and P6, Foden F.D.4 and F.D.6,

(*b*) In all boats above 30 ft. to press for twin screws,

(*c*) To use reduction gearing where possible,

(*d*) With Perkins and Foden engines, to use single lever engine controls for ease in handling,

(*e*) Whenever possible to arrange for 18 in. clear space surrounding engines for maintenance purposes.

Steam Heaters in Ventilation Trunking—H.M.S. ' Superb '

The steam heaters fitted in the ventilation trunking in this ship are not fitted with by-passes. In the course of quite a short space of time they become almost completely blocked with dust and no satisfactory way exists of cleaning them other than complete removal. It has therefore been decided that, since no department of the ship can spare any hands for this purpose, all heaters in the living and other important ventilation systems should be removed and stowed away. As a temporary method of bridging the gap special canvas trunks have been manufactured on board and are proving very satisfactory. The ventilation has much improved. Although this removal is quite in order, since it is laid

down in B.R. 16, Article 531, paragraph (*c*), it is worthy of note that there is very little chance of these heaters ever being replaced without dockyard assistance, and that it has also raised an acute problem of stowage. Would it not be better to do away with this form of ' hot house ' heating, bearing in mind that the average sailor shuts punkah louvres off in the winter rather than direct the flow of air elsewhere ?

Comment

This matter was referred to D.N.C., his remarks to which are as follows :—

' In future new construction ships, and whenever practicable in ships undergoing modernization and conversion, it is intended that a new design air-heater will be fitted in the ventilation system.

The heaters are a straight-through type consisting of a single row coil with low resistance to airflow.

It is appreciated that the heating powers of the existing types of straight-through and by-pass air-heaters are excessive. The new range of Admiralty standard heaters is designed to raise the temperature of the air entering the compartment to slightly above the compartment temperature.'