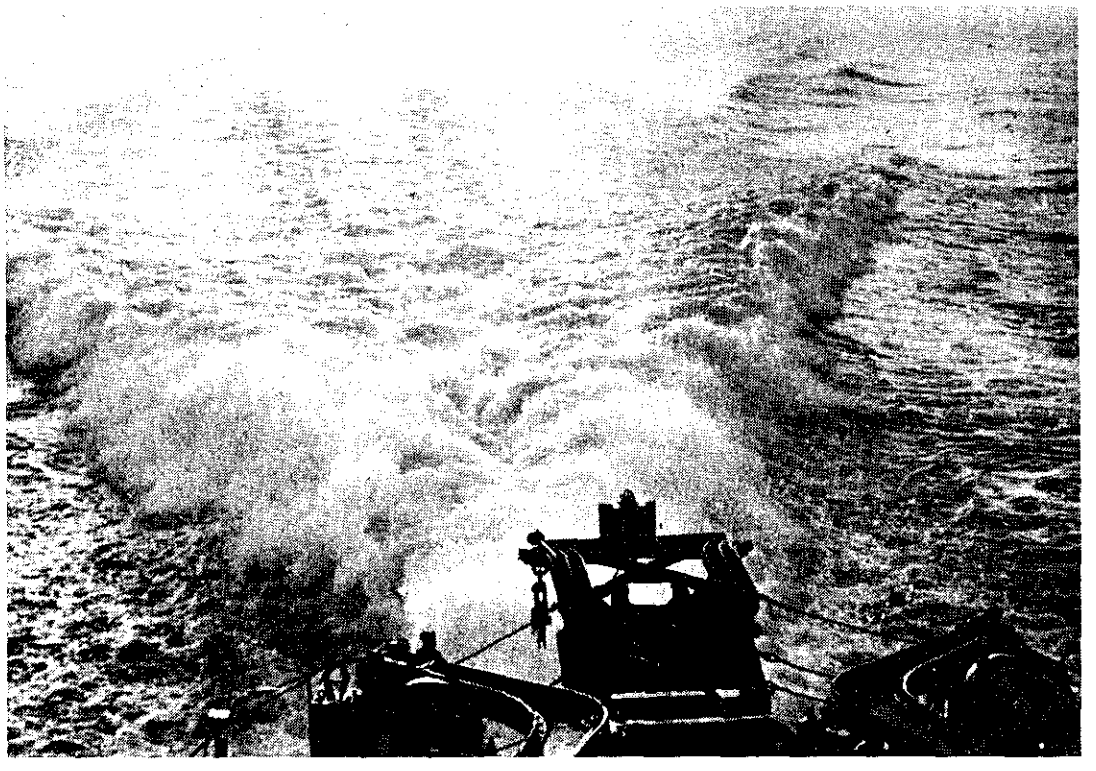

'. . . A Moat Defensive to A House'

PART II

NOTES FROM SEA

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

The extracts from the letters and the replies sent to individual ships are not always in a form suitable for publication in the *Journal*. In some cases, therefore, the extracts have been slightly altered in form but not in substance, and the comments have been amended and amplified.

Readers are invited to comment in the correspondence columns of the *Journal* on the extracts and replies.

Refrigerating Circuit Tests—H.M.S. 'Cumberland'

In contradiction to E.M. Article 295, hydraulic tests on refrigerating circuits are best done with oil, as the least trace of water leads to trouble, particularly in Freon plants.

Comment

The use of oil is liable to lead to a false sense of security, in supposing that dehydration would not be necessary because water had not been used. It is unlikely that :—

(*a*) Oil used would be free from moisture.

(*b*) The oil could be removed without letting air, and therefore moisture, into the circuit.

(*c*) The oil film remaining on the surface of the heat exchanger could be removed without using a solvent. Whether oil or water is used, dehydration after is essential, and it is easier to use water. Consideration is, however, being given to modification of the test procedure which will make the use of water and oil unnecessary, and the Engineering Manual will be amended in due course.

Evaporators—H.M.S. ' Newcastle '

The removal of the splash guard already reported has proved to be effective, and both sets have run for six months without difficulty and with a more sustained output.

The main baffles have now been moved 5 in higher, to their alternative position, in order to operate with a higher water level ; no difficulty in running has resulted.

The salinometer discharges have now been fitted with an alternative lead into the suction bend of the distiller pumps, thus saving water which formerly went to bilge.

Comment

It seems evident that the main baffles were incorrectly fitted on installation. The upper position is correct.

The outer splash baffles are no longer being fitted to Buckley & Taylor (Quiggins) plants, and they should be removed from all plants of this capacity, but not landed until an improvement in efficiency is assured. An A.F.O. will be issued.

Plummer Block Gland Packing H.M.S. ' Newcastle '

A.F.O. 687/53 introduces the new stern gland packing material in place of ' Maseo '. We use $\frac{1}{2}$ in square ' Maseo ' in the plummer block oil glands. Is this new packing a suitable substitute for ' Maseo ' for this purpose ?

Comment

It is considered that the new type stern gland packing is too hard for this purpose, and that ordinary black hemp (Old Patt. 9 New Patt. 7900/7913) would be more satisfactory.

Drivers in Boats—H.M.S. ' Newcastle '

The constant sight of motor boat drivers sitting immobile in our boats irked the Senior Engineer so much that it was decided to try to run boats without drivers. Before this was done, we analyzed the engine failures which had occurred when boats were away from the ship, to find how many could have been remedied by the drivers. There were extremely few, and after some persuasive

conversations, the Commander agreed. For the last four months all 4 boats go away without a driver (even when the ship is on patrol) unless there are exceptional reasons for carrying one.

The F.E.O. remarks :—

It is agreed that in these days, a stoker mechanic should not be necessary in addition to a full seaman crew. There are, however, many advantages to be gained if boats have an engine room rating in the crew. The solution, in the best interests of the Service as a whole, seems to be for the stoker mechanic to undertake the duties of stern sheetsman. This of course benefits the Executive, and not the Engine Room Department, but a *quid pro quo* inboard, to even up should be possible.

Comment

The Engineer-in-Chief agrees with the Fleet Engineer Officer that it is desirable to have an E.R. rating in the crew, if only for the reason that a useful training opportunity is otherwise lost. It is felt that the upkeep of the machinery, as far as cleanliness and the making good of minor defects, is likely to suffer too, but the experiment is an interesting one, and should be commented on when more experience has been gained. It must not be forgotten that this departure from custom is indirectly a great testimonial to the reliability of the modern small Diesel engine.

Disposal of Unwanted Metals—H.M.S. ' Maidstone '

Opportunity has been taken during the refit to sort out and dispose of unwanted metals in accordance with A.F.O. 1158/54. So far, approximately 20 tons have been landed and it is expected to land a further 15 tons. Most of this is the accumulation over the years of ' useful ' materials, the majority of which could not be identified since it bore no markings. This lack of identification also applies to metals which are supplied nowadays, and it is considered that the marking of metals could be improved. The colouring of the ends, which invariably get cut off either before supply to the ship or afterwards, is not satisfactory.

Comment

It is gratifying to see such co-operative response to A.F.O. 1158/54, and to note the appreciable quantities that can safely be landed.

The marking of metals for identification has been under consideration for many years. Proposals are now being considered by the Engineering Standard Co-ordinating Committee (Metallurgical Sub-Committee), and until an agreed method is promulgated, the marks should be re-applied as necessary whenever issues are made. In the event of materials being received unmarked, suitable marks, which will not conflict with any of the colours laid down in A.F.O. 2646/53, should be applied and recorded.

Turning Main Engines -H.M.S. ' Decoy '

When it has been necessary to keep main engines stopped for long periods, vibration has become apparent on re-starting the engines, in spite of the fact that they have been turned under steam at 3-minute intervals while ' stopped '. In an attempt to avoid this the practice has been adopted of turning the engines for one minute under steam, at the slowest possible speed Ahead, every two minutes. This seems to give a satisfactory answer.

Comment

The practice of keeping turbines trailing under steam at the slowest possible speed under ' stand-by ' conditions is concurred in where operationally possible. Turbine vibration in *Darings* is now under consideration.

Damage Control—H.M.S. ' Decoy '

Various proposals for re-siting D.C.H.Q. have been made by the Home Fleet *Darings*, the position favoured by *Decoy* being the Electrical Workshop. This has two main advantages besides providing more space and better communication, (a) it is close to the forward switchboard so that the essential close liaison with the Electrical Dept. is easier, and (b) it is below the water line.

Firefighting equipment is adequate but needs re-siting in some cases—Oilfyre nozzles, for instance, are stowed immediately over the oil fuel tank manholes where they would be quite inaccessible in the event of a major oil fire.

The provision of a stand-pipe sea suction at upper deck level, somewhere amidships, for the Diesel pump is very desirable. Major damage to the ship at either end would almost certainly result in the loss, at least temporarily, of some pumping capacity, either by damage to firemain, or the pumps, or by loss of electric power. Under these circumstances, the Diesel pump would be invaluable, and could be brought into use much more quickly and effectively if a sea suction was available at an accessible midships position.

Comment

The question of re-siting ABCD headquarters is being considered officially.

Guidance on siting fire-fighting equipment is given in the Ships' Fire Fighting Manual, Chapter 31.

' Oilfyre ' nozzles are supplied for use in compartments adjacent to F.F.O. tanks. It is agreed that they should not be sited directly above the tank manholes.

D.N.C. has remarked as follows :—

' Portable Diesel pumps are provided primarily for fire-fighting, and provision is made in the *Daring* class for two stand pipe sea suctions, one at each end of the ship, for use with the Diesel pump. The fitting of an additional stand pipe sea suction amidships for use of this pump is not considered justified and, for the present, no change is contemplated in the policy laid down in the Fire Fighting Manual, BR.1257 '.

Engine Revolution Counters—H.M.S. ' Decoy '

In this ship, these work at engine speed and are graduated in ' fives '. They are difficult to read accurately, and useless for taking a snap check of engine tachometers. The old type, which was driven at $\frac{1}{5}$ engine speed, and had a positive movement for every figure, is much preferred.

Comment

Harding & Rhodes instruments of this type are fitted in many earlier destroyers, and this complaint has not been received before. It is perhaps a question of habit to some extent.

New construction frigates are being fitted with a new design of Chadburn in which this difficulty will not arise.

Workshop Equipment—H.M.S. 'Decoy'

Although two excellent lathes are provided, only one 4-jaw chuck is supplied. There may be a good reason for this, but it is difficult to imagine what it could be. It is, admittedly, seldom necessary to use both lathes simultaneously, but the necessity could easily arise. It is considered that the workshop facilities would have been much improved if, instead of one of the lathes, the ship had been provided with a small milling machine.

Comment

The writer has answered his own question correctly !

The suggestion of a small milling machine has been taken into account in the design of a Universal Machine Tool in which a miller is incorporated. Owing to the cost and work involved, it is not intended to replace existing machine tools except, possibly, at modernizations.

Feed Regulator—H.M.S. 'Daring'

The holes for the link pins of the needle valve of 'B' boiler feed regulator were found to be elongated, giving a total of $\frac{3}{16}$ in slack in the movement. The work of replacing the needle valve, normally short, was made quite lengthy by the seizing and stripping of threads. Whether this was due to original poor workmanship is not known, but all the spare gear used needed attention before fitting.

Comment

The seizure of needle valve threads cannot be attributed to high temperature seizure. Original poor workmanship was, therefore, the probable cause.

Other reports on the non-interchangeability of spare gear for feed regulators have been received, and the matter has been pointed out to the maker.

Yarway Steam Traps—H.M.S. 'Daring'

Several instances have occurred recently of the test plug under the valve of the Yarway steam traps being severely eroded. These plugs are shown on the drawings as being of stainless steel, but the plugs fitted are not of this material. A set of stainless steel plugs will be made and fitted.

Comment

This has been reported to Messrs. Dewrance, who have been asked to comment on the suitability of the material, and on the possibility of fitting parallel shank plugs instead of tapered.

Sharples Oil Separator—H.M.S. 'Daring'

No further contamination of the lubricating oil has occurred, and negligible quantities of condensed gland steam are separated. It has been found that the Sharples separators give their best performance if the oil is heated no higher than 120 F. Raising the temperature to 140 F stops separation, which restarts if the temperature is dropped.

Comment

Shore trials of the Sharples centrifuge gave no indication of improved water separation at oil temperatures below those specified in BR 16 Article 58.

If further details of operation of the centrifuge and the condition of the oil can be given, it may be possible to assess the reasons for this abnormal performance.

Lighting-up Torches—H.M.S. ' Delight '

The electric lighting-up torches are seldom used because they take too long to heat up, and even when at full temperature, they cannot be guaranteed to ' flash ' the oil immediately.

Comment

A design for fitting a pilot register to the superheat furnace is now being prepared. This should obviate the requirement for a lighting-up torch of any type.

Economizer Maintenance H.M.S. ' Delight '

During the self-maintenance period an effort was made to make good the leaking ' clean-out ' fittings on ' A ' economizer. Ninety of these were found to be leaking, and were renewed, using the original type of jointing washers in eighty one fittings. The bores of the remaining nine fittings were considerably oversize and corroded, and could only be made reasonably tight by using the special soft gaskets.

In view of the time required to test and make tight these fittings, it is considered that, if tight, they should not be disturbed for examination of tubes except at refits.

The value of these clean-out fittings is so small, and the potential leakage and maintenance liability so great, that it is considered that they should be sealed-welded in place.

Comment

It is agreed that these fittings are of small value and require excessive maintenance. The proposal to seal-weld is under consideration for all boilers fitted with them.

Turbo Generator Gland Steam—H.M.S. ' Delight '

The reduced pressure, saturated steam supply to the turbo generator glands is a nuisance. If the turbo generator has to be run in the shut down boiler room in harbour, the whole saturated range has to be de-isolated to supply a very small quantity of gland steam, which is hardly sufficient to keep the line drained. This causes waterlogging and leaking joints.

Comment

The possibility of using superheated steam is being investigated with the makers.

Gland Evacuation Condensers—H.M.S. ' Delight '

' B ' boiler room gland condenser produced a violent ' cloud ' after being overheated. Subsequent water pressure test failed to show any leaks.

It is considered that tubes secured by rolling in the tube plates are unsatisfactory, and that screwed ferrules and metallic packing at each end, as in the distillers and E.R. gland condensers, would be more trouble-free, and easier to repair.

During the examination of this condenser, it was noted that erosion had started at the inlet ends of the tubes. All tubes had to be renewed after Contractors' Sea Trials in both gland condensers because of severe erosion. It is proposed to fit pattern 2581 rubber inserts in accordance with B.R. 16 Art. 146 (5).

Comment

There are many small heat exchangers in service with tubes rolled into the tubes plates at both ends, and few adverse reports on them are received. The change to packed tubes would require major modifications, and is not considered justified, unless further adverse reports are received.

Inlet end erosion may be due in part to excessive water speeds. If these can be reduced without affecting performance, they should be.

The proposal to fit rubber inserts is concurred in.

Suction Hose Couplings —H.M.S. ' Delight "

Every time the 35 ton/hr portable electric pump is used, considerable trouble and delay is experienced in making good joints between the suction hoses, which have screwed couplings. No reason can be seen for this type of connection, particularly as the sea suction stand-pipes and the Diesel pump are fitted with swing-bolt couplings. It is considered that the couplings on the 35-ton pump suction hoses should be altered to swing-bolt type.

Comment

This extract was referred to D.N.C. who has replied as follows :

' The swing-bolt coupling used with the Diesel pump is too big and heavy for the 35 ton/hr portable electric pump, and at the time of going into production, no suitable swing coupling was available. Consideration is being given to the adoption of the British Standard range of swing-bolt couplings which, if accepted, will provide a suitable type for the 35 ton/hr pump.'

Corrosion of Copper-Nickel-Iron Pipes —H.M.S. ' Delight '

Six cases of perforation have occurred during the last 4 months.

In each case the area of corrosion and perforation is very isolated, the remaining area in the vicinity being ' as new '. The only reason that can be suggested is polluted water during the ship's fitting-out period on the Clyde. The condenser vent pipe was only corroded at a position corresponding to the ship's water line in the light condition.

Comment

Cases of corrosion of copper-nickel-iron piping should, in addition to being mentioned in Periodical Letters (A.F.O. 926/53), be reported to the Admiralty Corrosion Committee in accordance with A.F.O. 959/53. Details should be given of conditions of service, the position of adjacent fittings likely to cause turbulence, any brazing in the vicinity, previous history and comments. If possible, photographs or, preferably, samples should be forwarded. Even copper-nickel-iron, developed as an easily worked alloy to replace copper, cannot be expected to be immune under conditions of severe turbulence and local high water speeds, although its use has considerably reduced the incidence of such failures.

Furnace Fuel Oil Tank Leaks—H.M.S. ' Delight '

Bad splits have occurred in the plating of No. 7, 8, 10 and 11 F.F.O. Tanks. Small leaks on welded seams exist in tanks 1, 3 and 4. Attempts were made by Malta Dockyard in March to repair by welding the splits between 7, 8 and 11 tanks, but subsequent test showed that further splits had occurred. The dividing bulkheads are distorted, and appear to be weak, and an item has been inserted in the docking defect list for these tanks to be repaired and the bulkheads stiffened. No. 10 F.F.O. tank is leaking through a 6 inch split into the shaft tunnel.

Comment

D.N.C. has remarked as follows :—

' Action has already been taken to introduce an A. & A. to cover the work of preventing further splits and cracking in the bulkheads of the F.F.O. tanks, and the ship should now be aware of the instruction '.

Water Washing Boilers —H.M.S. ' Delight '

Study of the recent A.F.O. on water washing indicates that certain modifications to the procedure will be required for B. & W. boilers. The time required will be considerably longer than suggested, as it is found that these boilers hold a steam pressure for at least 36 hours after shutting-down in this climate (Mediterranean), and no work can be done in uptakes or inside the furnaces during this period. It cannot be seen how any water lance can be made to penetrate the economizer, composed of closely pitched and staggered studded tubes.

Comment

Agreed, for the A.F.O. was based mainly on experience with Admiralty 3 drum boilers. In this case washing from the outside is the best that can be done with the economizer, together of course, with regular use of soot blowers.

Quality of Gauge Glasses—H.M.S. ' Scorpion '

Some trouble has been experienced with gauge glasses (tube type) in *Scorpion*, which failed in succession until a ' Pyrex ' tube was found which held. It is understood that the ' Pyrex ' tubes are no longer being purchased on the score of expense, but there is no doubt that they are far superior to the present supplies. It is considered that to provide boiler gauge glasses of inferior quality is a poor investment.

Comment

This is a recurring problem, the solution of which is most elusive. A further series of trials with different types of glass will be undertaken.

Burning Temperatures for Furnace Fuel Oil—H.M.S. ' Scorpion '

Experiments to date with Furnace Fuel Oil burning temperatures indicate that 180 F is the best temperature with the oil now being supplied to the Fleet. It has not yet been possible to support this conclusion with prolonged consumption trials, but it certainly appears that combustion is better at this temperature. At lower temperatures, an unacceptable quantity of ash is formed.

The S.E.O. comments :—

Trials of different burning temperatures with similar fuel have been carried out in *Virago* and *Superb*. In the former a saving of 10 per cent was achieved by burning at 170°F instead of 230°F, and in the latter, a saving of 15 per cent was achieved by reducing the temperature to 150°F. These measurements were made by tank, in calm weather, when reasonably accurate dips were possible. The viscosity of the oils in use averaged about 160 Redwood No. 1 at 122°F, and 550 Redwood No. 1 at 80°F. Incidentally, all furnace fuel supplied to Home Fleet Flotilla from various sources during the Spring Cruise, smelt as though it contained a considerable proportion of Diesel oil.

Comment

It has been found that different types of registers require different preheat temperatures for the best results. In general, the A.I.O. register, as fitted in *Scorpion*, perform better at the high preheats, but trials in Jamaica with large A.E. registers gave quite different results, and an A.F.O. giving further guidance, and superseding A.F.O. 41/54, is being issued.

All Admiralty F.F.O. contains a diluent of Diesel fuel type.

Obsolete Engine—H.M.S. 'Crossbow'

The starters of the Fowler 2.D.Y. Engines fitted in *Crossbow's* boats still give considerable trouble because of their proximity to bilge water, and the circulating water pumps fail frequently because of wear in the carbon seals.

Comment

The Fowler 2.D.Y. is an obsolete engine, and will be replaced by an Enfield MO2 when due for major overhaul.

False Valve Seats—Sixth Destroyer Squadron

All ships in the squadron are having trouble with persistent leakage through the false seatings of steam valves. Much labour goes into removing these valves for refit only to find them leaking again shortly afterwards. Seal welding round the false seats does not appear to be the answer, probably because of the difficulty in controlling an electrode in such an awkward space.

Comment

It has been found that where refitting authorities have been able to seal weld seats, steam leakage has been prevented.

It is appreciated that seal welding cannot be carried out on all valves, particularly small ones, and this department is now working with D. of D. on a revised design of screwed-in seat.

Full Power Trial—Sixth Destroyer Squadron

The article on full power trials in Vol. 6 No. 4 of the *Journal* was found to be an excellent *aide memoire*. Although the contents of this article are largely commonsense, some points are frequently overlooked, and it is for consideration whether it should be included in a more permanent and official publication.

Comment

This article will be reprinted in R.R. 1988.

Spare Gear—Sixth Destroyer Squadron

All ships in the Squadron are taking advantage of Dockyard assistance to de-rust and preserve spare gear.

Progress in *Scorpion* and *Crossbow* is not known to date, but in *Battleaxe* two L.S.Ms have been working full time in the Dockyard P.I.P. section, and should cover 10 per cent of the spare gear by the end of the refit.

Comment

This action is to be commended. Supplies of spare gear from S.P.D.C. are now suitably P.I.P'd for long storage on board, and the initial ' on board ' spare gear for new construction will be similarly P.I.P'd. Unfortunately, many ships have spare gear not preserved to the latest standards, and it is to be hoped that every effort will be made by ships to clean and re-preserve where necessary.

Attention is invited to the two-day P.I.P. course mentioned in A.F.O. 2444/53.

Rigid Resilient Mountings—H.M.S. ' Cossack '

Further investigation into *Cossack*'s rigid resilient mounting brought out the following facts :

(*a*) The corrugated plates were ·040 in too thick.

(*b*) The backing plates were incorrectly manufactured to the dimensions shown on drawings.

(*c*) The dexine pads were insufficiently shimmed to provide the ' pull down ' required.

(*d*) Many spare corrugated plates held have been found unusable, due to distortion and incorrect manufacture.

As a result of these errors the weight of the engines has been taken on the corrugated plates instead of the dexine pads.

Comment

It is possible that damage to the main machinery would result if uneven crushing of the corrugated plates occurred, with the mountings in the conditions described.

It is, therefore, proposed that, at the first opportunity, the accelerating and decelerating pads and washers be replaced with new pads and washers of the same dimensions cut from :—AP7848 ; Dexine 118 ; Walkers Quest ; or Walkers N.E.Q. After cutting to size, the rubber should be cleaned by sand-blasting or wiping with a clean rag, soaked in acetone or other grease solvent, and treated with two coats of ' Necol ' rubber lacquer (red). AP7051.

When fitting the accelerating pads, a pre-compression of 0·05 in should be applied (i.e. with the weight of the turbine on the accelerating pads, and with the holding down bolts slack, there should be 0·05 in per $\frac{3}{8}$ in thickness of the accelerating pad clearance between the turbine feet and the corrugated plate). The corrugated plate should be just nipped, by tightening down on the holding down bolts up to 15 per cent compression of the decelerating washers. If, after a wait of 48 hours with the bolts tightened to 15 per cent compression of the decelerating washers, the corrugated plates are not nipped, the accelerating pad shims should be adjusted so that the plates become equally nipped all round.

Repair to a Distiller—H.M.S. ' Cockade '

In *Cockade*, when tracing a persistent cloud in the evaporator, it was decided to water pressure test the distiller. The vapour side was filled with fresh water,

but before any pressure could be applied, the distiller was found to be leaking at both ends, in way of the joint between the end flanges and the distiller shell. The construction is such that the end flanges are tinned and then riveted to the shell, and the joint subsequently ' wiped ' with solder.

There was insufficient time for an immediate complete repair and, as an interim measure, the end joints were covered with four coats of Detel Red paint, Pattern 4298, and the subsequent Canterbury test showed that the cracks had been sealed. No further ' dirty water ' was made during the following 10 days at sea, but an occasional coat of Detel Red was applied for safety's sake.

On return to harbour, the distiller was dismantled by the Small Ships Repair Base, Hong Kong, the end flange rivets were tightened, and the joints wiped with solder. The repair proved satisfactory under test, but some 6 weeks later the sweated joints cracked once again, and the interim measures have again proved effective.

The original distiller shell was manufactured in mild steel ; this was replaced by a non-ferrous shell in January, 1951. This shell is bolted to support brackets on the deckhead of the Engine Room. The after feet are drilled with $\frac{29}{32}$ in holes to take $\frac{7}{8}$ in bolts, and in the forward feet the holes are $\frac{29}{32}$ in by 1 in to allow for expansion. On re-assembling after the repair, it was found that the elongation had already been fully absorbed. The short time in harbour again did not allow the distiller to be re-lowered to enable the holes to be filled, and $\frac{3}{4}$ in bolts were fitted to ensure room for expansion.

It is thought that, when the mild steel was replaced by a non-ferrous shell, no allowance had been made for the difference in expansion. No other ships in the squadron have suffered this defect.

Comment

This method of effecting a temporary repair is interesting.

Cockade's method of repair is concurred in. Isolated cases of this have occurred elsewhere. The cause of such leakage has in most cases been the strain placed on the shell by incorrectly hung supports. This possibility should be investigated. In later production, end flanges will be welded to the wrapper plates.

A.B.C.D. Trials H.M.S. ' Consort '

In *Consort*, a series of closing down trials were carried out in which all engine and gear room fans were stopped, shutters closed, and boiler room personnel exercised wearing gasmasks and protective clothing. In the engine room and gear room it was found that although the temperature remained reasonable (maximum about 105 F) the high humidity caused extreme discomfort. It is considered that personnel could not remain continuously on watch in A.B.C.D. State 1A, for longer than 30 minutes with an upper deck temperature of 75 F. Boiler room personnel experienced little hardship, but communications became complicated.

Comment

It is agreed that the high humidity existing under ' closed down ' conditions is the main factor causing discomfort to personnel and, ultimately, limiting their endurance even under comparatively low ' dry bulb ' temperatures.

It is requested therefore that in future trials, both ' wet ' and ' dry ' bulb temperatures be taken and quoted, together with the corresponding upper deck ' wet ' and ' dry ' temperatures.

Water Washing Boilers—Eighth Destroyer Squadron

Locally manufactured water washing gear has recently become available, and it has been used by 5 ships of the squadron with excellent results. There appears to be no doubt whatever that, had this system of external cleaning been in force during the Korean conflict, the task of replacing a large number of generator tubes, due to root corrosion, would have been nullified.

Comment

This is indeed good to hear, it is seldom that drastic changes in practice get such whole-hearted support.

It is to be hoped that, in the Korean conflict, the availability of ships for service would also have been increased, as well as saving expensive tube replacements.

With improved rain water catchments and decks made watertight, tubes at the ends of boilers may be expected to have a longer life than hitherto, provided care is exercised in cleaning the odd corners of tube nests and drying thoroughly after external water washing.

Diesel Generators Eighth Destroyer Squadron

A correlated report is being rendered separately on the unsatisfactory performance of Diesel generators. The inability to tune with any precision, the low continuous load available from the machines, and the disproportionate man hours spent on maintenance, to allow shutting down for steam refitting and fuel economy, all contribute to an unhappy and inefficient state of affairs.

Comment

E.-in-C. is well aware of this, particularly in the case of *Battles* and *Weapons*, and would welcome any additional information to give weight to an overall policy of replacing all these unsatisfactory types in due course.

Flexible Pipe Connections for Diesel Generators—Eighth Destroyer Squadron

These are a continual source of trouble, being of the spiral wound asbestos packed metallic hose type. Adequate spares are held, but it is strongly recommended that while these last, opportunity be taken to design and put into production a synthetic rubber type with integral wire reinforcement such as is used on gunmounting equipment.

Comment

A flexible non-metallic hose is now available and a standard specification is in the course of production.

Boat Engine Starting in the Arctic - H.M.S. 'Virago'

A 25 foot motor cutter fitted with an Enfield H.O.2 aircooled engine was embarked specially for starting trials in the Arctic on Admiralty Instructions. It was not possible to start this engine in the Arctic. It still requires the assistance of ether for starting at air temperatures below 55°F.

Comment

An investigation into starting difficulties experienced with this engine is being carried out at the Admiralty Engineering Laboratory with the co-operation of the makers. Certain modifications to improve the starting qualities will be

introduced as soon as possible. These include re-positioning of the starting handle, a modified decompression cock and an ether capsule device for use at low temperatures.

Auxiliary Boiler—R.Y. 'Britannia'

When using the auxiliary boiler at reduced power when shore electrical supplies are available, it is found necessary to use a Z.12 or Z.14 size sprayer. The existing registers are not designed for such a small sprayer, and poor combustion results giving rise to continuous white smoke and heavy carbon deposits on the firerow tubes.

Comment

To enable this very low power steaming to be satisfactorily carried out, a smaller size register will be fitted in lieu of the existing bottom one, with which it should be possible to obtain good combustion, burning 140 to 500 lb F.F.O./hr.

Running Evaporators—R.Y. 'Britannia'

The running hours are : For'd set 458 : After set 362. Both sets have made clear water at an output of between $3\frac{1}{2}$ to 4 ton/hour. The coil steam pressure, after blowing down, has now risen to 11 lb/sq in. for'd and 12 lb/sq in. aft. This pressure steadily increases throughout a 24 hour running period to 21 lb/sq in and 24 lb/sq in respectively. Some difficulty has been experienced in keeping the brine density within reasonable limits. The open-ended internal brine pipe has been modified by plugging the end and drilling approximately 80 in number $\frac{5}{16}$ in diameter holes to prevent scale finding its way into, and choking, the suction valve. Even so, the brine density remains at 24 and 26 in the forward and after shells respectively. Experience has shown that it is necessary to keep both brine and diluting valves wide open to achieve the minimum density.

Comment

The cause of restriction may be in the diffuser of the brine ejector.

It is suggested that a trial be carried out on one plant, replacing the diffuser by a straight length of 2 in bore copper pipe of equal length.

In operating with this revised arrangement, the quantity of diluting water should be regulated so that the temperature of the brine mixture at the brine pump suction is in the region of 120 F.

Maintenance of Paxman 12 RPH Oil Driven Generators —5th Frigate Squadron

These have generally been most satisfactory, and it is rare to spend even 24 hours steam auxiliary for lack of Diesel power. However, this means that the 1,000 hour routines are almost continuously being carried out. The stage of 2,000 hour (full top overhaul) routine has now started in 2 ships, and the extent of the work will probably mean that ships will have to spend longer steam auxiliary than is normal, to prevent too great an increase in the hours running of the remaining Diesels. The loss in fuel economy must be accepted, as the accumulation of overdue routines would be beyond ship's staffs ability to overtake.

The 1,000 hour routine specifies the removal of all pistons for inspection and renewal of top compression rings. By arrangement, some ships are doing this fully, and others removing only a representative pair. Generally speaking, the

conditions found do not justify either removal of all pistons, or renewal of rings at 1,000 hours. However, where bad sprayers have remained undetected, or fuel pumps need calibration, serious accumulations of fouling have been found, fully justifying removal of pistons and freeing stuck rings. A serious disadvantage is the inability to foresee such special cases. Only a single exhaust pyrometer is fitted downstream on each cylinder block. While these give some indication of uneven loading between banks, they are useless for detecting bad combustion or excessive fuel supply to any given cylinder. It is strongly recommended that consideration be given to increasing the number of pyrometers. Meanwhile, all that can be done is to change sprayers completely at every 1,000 hours routine, or earlier if suspect, and to have fuel pumps calibrated at every opportunity. Calibrations of fuel pumps have disclosed inequalities of delivery, and even spring breakages which had been undetected, while the engine was on load.

From top compression ring clearances taken so far, it is clear that while renewal as recommended at 1,000 hours is not necessary, it may well be at 2,000 hours. This is not due to wear on rings so much as groove wear. If maker's replacement tolerances are followed, this means that it may well be necessary to change all pistons at 2,000–3,000 hours—a serious commitment both from manpower and spares aspects. Messrs. Paxman deny that this should be necessary, and correspondence with them continues, but, if their limit tolerances are accepted, and because tapered section rings of a standard size are fitted and all spares are of this size, there seems to be no option but to change all pistons. Fairly comprehensive wear records will shortly be available, and it is suggested that an independent report should be called for, so that the matter can be taken up between E.-in-C. Department and Paxman Ltd. This is a matter of some urgency, since a decision on the piston replacement question is now needed. A failure has occurred in *Wrangler* of the bypass thermostat on the jacket cooling system of one engine. The automatic cut-outs on these engines are not altogether reliable as regards temperatures, especially in *Wrangler*, and in the above instance quite serious overheating of the engine occurred. The engine is now being stripped for examination, being in any case almost due for a 2,000 hour routine.

Comment

The good performance of these machines is most encouraging. It can obviously be attributed, at least partially, to rigid adherence to maintenance routines.

The question of the 1,000 hour routine has been investigated, and considerable changes are being made to the maintenance schedule which will be promulgated shortly.

The desirability of having individual exhaust pyrometers is agreed, but, unfortunately, it is not possible in the case of these engines without a new design of manifold.

The question of piston ring groove wear has been discussed with Paxmans, who maintain that if excessive wear is taking place, it must be an isolated instance. Early reports of any further cases, with details of hours run and extent of wear, would be welcomed.

Reports such as these are invaluable in enabling maintenance schemes to be realistically amended, it being remembered that initially such schemes must inevitably be based on intelligent guesswork. When, in due course, the Class Authorities are established, such reporting and amending will be almost automatic.