THE FAIRY 'GANNET'

NOTES FROM SEA

The following notes are compiled, usually with comment, from letters and other information by those Admiralty Departments which deal with matters that fall within the purview of the Engineering Branch. The original phraseology is sometimes altered or amplified, but the original sense and substance is unchanged.

Readers are invited to discuss either the extracts or the comments in the correspondence section of the *Journal*.

MARINE ENGINEERING

Comments by E.-in-C.

Main Engines—H.M.S. 'Bulwark'

These have had pretty strenuous treatment with almost daily lighting up and shutting down, and the weather has necessitated long periods of standing by at short notice. After one such period of 32 hours the after H.P. turbine seized. Steam was shut off to allow it to cool and after $\frac{3}{4}$ hour it could be turned normally. Vacuum was again raised, the engine was turned under steam and no further trouble was experienced. Since this occurrence, whenever main

engines are being prepared for sea, after the usual draining and warming through, once 20 inches of vacuum has been raised they are revolved continuously until ' Obey Telegraphs '. If the first movement has not been rung down within 10 minutes, permission is sought to move main engines slowly.

Comment

It is considered that one cause of this seizure may have been stickiness in the non-return valve from the after unit nozzle box drains, which allowed water to be drawn into the turbine from the drain system, when the units were shut down. Drawings of the drain system held in the department are not very clear on this point. In the circumstances, the warming through procedure is concurred in.

Spare Boat Propeller Shafts—H.M.S. ' Bulwark '

No spare propeller shafts are provided in the authorized spare gear, and it is felt that they should be included in normal spares.

Comment

The policy is that ships should carry spare shafts during periods of detached duty. Their addition to the spares of all ships, including those in reserve, would result in considerable unnecessary expense. For this reason, ships should conform to the normal procedure by requesting, through their Administrative Authorities, prior approval to increase their ' on board ' spares, so that each request can be dealt with on its merits.

Donkey Boilers—H.M.S. ' Bulwark '

The supply of steam was entirely satisfactory. The ship, however, was permeated by soot and fumes, within and without, by the boiler itself. This discourages attempts at economy by the use of shore boilers.

Comment

It is fully appreciated by D. of D. that there are many snags in operating these boilers. Future policy is directed towards providing steam direct to berths alongside. Where this is impracticable the use of a new type oil-fired portable boiler is under investigation.

Arrester Gear—H.M.S. ' Bulwark '

An incident occurred when the centre span connection circlips of the starboard side of No. 3 wire fractured, allowing the outboard sleeve to slide off and the split sleeve to open up, parting the main reeve from the centre span.

Although little Wyvern flying has been carried out, it is believed that the consumption of centre spans is so excessive with these aircraft that it is surprising that made-up centre spans are not made *Rate Book* or spare gear items, especially as most carriers now have the same centre span lengths.

Comment by D.N.C.

The incident referred to in the first paragraph occurred because the outboard sleeve on the split socket connection struck the side of the lift platform, where it projects above the flight deck level at the forward end, causing the fracture of the circlip. Fairing has now been fitted at the edge of the lift in all ships of the *Centaur* Class to prevent a recurrence.

With regard to the consumption of centre spans when operating Wyvern aircraft, the usage rate does not, in fact, appear to be as high as was originally thought probable. However, the question of making centre spans *Rate Book* or spare gear items has been under consideration for some time. Trials are being carried out to determine the best type of rope construction for use in centre spans and when this question has been resolved it is expected that arrangements will be made for ships to be supplied with made-up centre spans.

Contamination of Lubricating Oil System with F.F.O.—H.M.S. ' Newfoundland '

The following points are of general interest :—

(*a*) There is no known flushing procedure for cleaning lubricating oil systems which are contaminated with F.F.O.

(*b*) Detailed examination of the lubricating oil system revealed heavy sludge deposits, and six main bearings had wiped.

It would appear that the main danger from such contamination is the deposit of wax and low distillate products on bearings, causing temporary breakdown of the oil film. Throughout, laboratory tests showed the water content to be nil and the acidity negligible.

Comment

(*a*) For minor contamination, circulation of hot OM.100 would probably be sufficient to flush the system. For larger degrees of contamination it would be necessary to use Shell turbo cleaner, but official instructions regarding its use will not be promulgated until further experience has been gained.

(*b*) The sludge deposit formed and the subsequent damage to bearings is not considered primarily due to the 2 per cent F.F.O. contamination. The quantities of grit found in the oil appear to be the main cause of the trouble.

Clothing for Water Washing—H.M.S. ' Newfoundland '

(i) *Oilskin Suits.* The light type of oilskin combination suit is used to protect mechanics from hot water (usually 140–150°F.), but these suits tear easily and deteriorate rapidly under tropical conditions. More durable suits of the same pliancy are required.

(ii) *Eyeshields.* Anti-gas eyeshields and other naval store types have been tried, but none have been found suitable for this work. The best answer, so far, has been the use of goggles supplied for use with Salvus apparatus, but even these do not prevent sweat running down into the eyes carrying soot with it.

(iii) *Gloves.* Both fearnought and leather have proved unsuitable and special rubber gloves are really required.

Comment by D. of V.

(i) It is appreciated that the present pattern of oilskin combination suit is not entirely satisfactory when water washing boilers and it has been agreed, pending new equipment being developed, that various alternative assemblies may be used if preferred (A.F.O.2511/55, para. 9, refers). Sample garments of P.V.C. coated nylon fabric have been made for trials which will be carried out in the near future.

(ii) It was not hitherto thought that goggles would be required ; it is suggested that ' Panarama ' goggles or collapsible goggles (Flight Deck,

clear, Vocab No. 25K15 type) would be suitable. These two types will be tried out with the new assemblies referred to above.

(iii) A special light flexible P.V.C. type of glove will also be tried out during the trials.

Equipment for Water Washing—H.M.S. ' Newfoundland '

The wirebound rubber, air type hose is unsuitable for carrying hot water at 150 lb/sq in because the rubber deteriorates. It is suggested that a light, flexible, metallic hose should be developed and supplied for this particular job.

Comment

No previous complaints about this type of hose have been received. The deterioration may be due to frequent use over a long period. A reinforced hose of pattern C.2441 may prove a more suitable alternative.

Auxiliary Fans in Boiler Rooms—H.M.S. ' Newfoundland '

An electric auxiliary fan would greatly increase the habitability of boiler rooms when refitting, boiler cleaning, etc., in tropical climates, by providing a circulation of air. It would prevent the continuous sweating of metal as well as men. Although it is appreciated that the age of this ship may preclude the installation of this additional machinery, it is considered that it should be installed in new construction.

Comment

In new construction ships, with trunked air to boilers, ventilation fans have been provided which are suitable for use when lighting up from cold.

Evaporators—H.M.S. ' Bermuda '

Keeping brine densities to acceptable limits caused so much anxiety that it was decided to re-design and renew the brine systems without so many right-angled bends. The results are satisfactory.

The combined pumps have required constant attention. One has now been completely refitted. Lining up the pumps and assembly is not an easy operation, neither, in service, is descaling the brine impeller.

Comment

The difficulties associated with the combined pumps are appreciated and it is not intended to fit these in future distilling plants.

Lubricating Oil Separators—H.M.S. ' Bermuda '

The De Laval separators have required considerable maintenance in order to achieve the 12-hours running per day at sea. It is noted that the ferodo clutch linings have been withdrawn from the *Rate Book* and, in consequence, these have to be made up from sheet asbestos. This is uneconomic. It is suggested that separators of a more robust construction could profitably be fitted in this class of ship.

Comment

The incidence of defects with De Laval machines is, nowadays, very small. If, however, a full report of the present failings is forwarded, it may be possible to rectify the defect.

Regarding ferodo clutch linings, these are available at S.P.D.C. (U.K.), being held under Admiralty Cat. No. 202036.

L.P. Air Compressor—H.M.S. ' Bermuda '

The L.P. compressor has to run practically continuously for the laundry. Using OM.100, the valves and head carbon up rapidly and cause failure of the plate valves. Changing to OMD.111 has eliminated carbon formation and in consequence very little maintenance has been required.

Nevertheless, the fitting of a small air compressor for the laundry in accordance with A. and A. 597 is eagerly awaited.

Comment

The action in changing to OMD.111 is concurred in and existing instructions will be amended in due course.

Domestic Refrigerators—H.M.S. ' Bermuda '

The replacing of compressor type D.A.R.s with absorption type is a great boon and saves hours of maintenance. Without wishing to appear ungrateful for this, it is hoped that the policy of fitting absorption type refrigeration machinery will, in future, be extended to water coolers and air conditioning plants.

Comment

Unfortunately, the absorption circuit cannot be used in air conditioning plants or water coolers, but as far as the latter are concerned, it is the policy to fit sealed-unit A.C. coolers with D.C./A.C. converters whenever possible. E.-in-C. is pressing hard to get rid of the small compressor air conditioning plants and to instal centralized systems.

Motor Boats—H.M.S. ' Bermuda '

The 16-ft slow motor boat fitted with an Enfield V51 engine has proved most reliable. The engine was a little difficult to start when new and stiff, but has since become easier and no trouble was experienced under Mediterranean conditions. A small modification to the position of the ether starting cock has been made, since, as fitted, the ether has to be poured upwards. The decompression lever has also been modified to enable the engine to be started by one man. The provision of ether for starting these engines is essential, but, at the moment, there are no rules and regulations for its supply or use.

Comment

An efficient cold starting device has been purchased for use with Enfield engines. An A.F.O. introducing this equipment for use with all Enfield engines is being prepared. The ignition-promoting fluid used in this equipment is ether based and is supplied in capsules which will be introduced as a naval store item.

Sleeve Packed Cocks and Drain Traps—H.M.S. ' Bermuda '

Klinger sleeve packed AB 12 and AB 18 cocks comprise about 70 per cent of the total steam cocks fitted in the ship. It is not understood why these widely used cocks are not standard *Rate Book* articles.

Yarway traps and spares are not yet *Rate Book* articles although it is understood that these are being introduced into the Service in large numbers.

In both instances, when ordered as spare gear, the delay in obtaining supplies is unacceptably long.

Comment

An improved type of drain valve is gradually being introduced into service which will eventually replace the sleeve packed cocks of the Klinger type. It is not, therefore, worthwhile making these cocks *Rate Book* articles now.

Regarding Yarway (or Drayton-Armstrong) steam traps, stocks are held in store and replacements can always be demanded if required.

No action has yet been started to patternize Dewrance-Yarway steam traps and the only bulk supplies of $\frac{3}{4}$ in size (400 lb/sq in, forged steel) have been arranged by E.-in-C. for replacing obsolescent MacAuto adjusticators. Ships are, however, now demanding these traps for general use and the matter of making them store-pattern articles or, failing that, to get internal parts into S.P.D.C. stocks, will be raised.

While there is no objection in principle to a small number of spares for the above cocks and valves being held in the ship, it is considered that any concrete proposals on this subject should be held in abeyance, until the situation regarding the number of cocks or valves of the various types that are, or will eventually, be fitted, has been clarified.

Main Engines—H.M.S. ' Superb '

A satisfactory basin trial was carried out on 16th May, on completion of four weeks self-maintenance period. During this period the starboard inner cruising turbine, gearing, clutch and H.P. sliding feet were jacked up for removal of the rigid resilient mountings, and the solid chocks were fitted. This was done because the forward end of the H.P. turbine had dropped 44/1000 inch relative to the Vulcan clutch, and the after end of the cruising turbine relative to the gearcase. An item is in the defect list for the fitting of modified rigid/resilient mountings similar to those fitted to the starboard outer set during last refit. Before fitting solid chocks, definite vibration could be traced to the H.P. turbine and clutch. Since fitting the solid chocks this vibration has ceased.

Comment

The rigid/resilient type mounting relies on the rubber pads or washers to maintain alignment after the corrugated plates have crushed due to any underwater explosion. The defective corrugated plates in *Superb* may have simulated these conditions and the weight of the turbine and gearing may partially have been taken on the rubber washers. The mounting is only designed to maintain alignment for a limited period after shock damage, due to the creep of the rubber. This incident emphasizes the need for regular inspection of this type of mounting, particularly as the old type of corrugated plate has proved unsatisfactory over very long periods.

Water Washing Uptakes and Economizers—H.M.S. ' Superb '

Canvas troughs with hose connections have been made for slinging under the economizers and they, and the funnels, can be washed in a very short time without having to coat the furnace with bitumastic. More frequent water washing of these parts has been made possible and their efficiency has consequently been improved and the upper deck soot menace has been greatly reduced. Economizers have been cleaned in this way at 500-hour intervals, or twice the frequency of the rest of the boiler. When washing the uptakes and

economizers, water is supplied from the boiler by subjecting it to 120 lb/sq in air pressure and using a running-down hose connection. This simplifies the whole procedure and gives a very useful low pressure air test of the boiler at the same time. Higher pressure and warmer water is, of course, used for washing main tanks and superheaters, where bonded deposits tend to form. Specially shaped lances are used for the almost inaccessible tube ends at the front of the water drums, and a very high state of cleanliness throughout has been achieved.

Comment

This procedure sounds an excellent idea but care should be taken, in view of the heavy compound content of the boiler water, to keep it well away from the boiler brickwork.

Evaporators—H.M.S. ' Superb '

After passing through the Panama Canal, the brine suction systems of both sets suffered from frequent choking, and a very hard scale was found to have formed on the coils. Output dropped rapidly. This was attributed to distilling fresh water in the canal and lakes and, during the subsequent two transits, the evaporators were shut down between the first and last lock gates. Immediately after these passages, slight choking occurred, but after clearing, did not recur. No hardening of the scale was observed. It is therefore considered that distilling while passing through the canal should be avoided. It is probably best avoided whenever possible in fresh water.

Comment

It is often the case that river water contains more scale-forming salts than sea water, although the reason for the more rapid scaling under these conditions is sometimes the higher forcing rate that can be obtained and the difficulty, due to the absence of NaCl, of establishing the correct brine retention time—this is normally done by maintaining a fixed brine density.

Air Conditioning Plant and Water Coolers—H.M.S. ' Superb '

For the first three months on the station, only two or three of the 24 plants fitted could be relied upon and a drive was made to improve the situation. Because of a generous complement of E.R.A.s (obtained by accepting a considerable number for training), each plant was worked on, in order of priority. This work was begun after the E.R.A.s had completed their initial training and were consequently more available for refitting work.

Comment

It is the policy of E.-in-C. to do away with large numbers of type A plants because of the maintenance burden ; in future, centralized plants will be fitted.

Logistic Support—H.M.S. ' Superb '

Mention must be made of the very good logistic support given by the Admiralty, S.P.D.C. (U.K.) and M.E.D., Chatham, during *Superb's* year on the American and West Indies Station. Delivery of spare gear by sea-mail was regularly effected after about 3 months advance warning, while more urgent requirements were met very rapidly by air freight after ordering by signal. The delivery of the main circulator spares to San Diego, California, by the time the ship arrived, is a classic example of good logistic support.

Comment

It is gratifying to learn that the efforts made by the spare gear organization to satisfy the customers have been appreciated.

Auxiliary Machinery—H.M.S. ' Shackleton '

Internal micrometers, so essential for the accurate measurement of cylinders and barrels, were not previously allowed, but a letter to the Director of Stores has put the matter right.

Comment

Increases in the allowances of micrometers and similar tools have been approved by the Board and supply will be made in due course, probably during 1956/57.

Surveying ships will be allowed the following :—

Dial gauge test set		—New Pattern No.
Clock gauge–crankshaft alignment		—Pattern 5261
Inside micrometer	2 in–32 in	—Pattern 3872
Outside micrometer	4 in– 8 in	—Pattern 2394
,, ,,	0 in– 4 in	—Pattern 2393
,, ,,	0 in– 2 in	—Pattern 770B
Morse valve reseating gear		—Pattern 10

Boats—H.M.S. ' Shackleton '

After a bit of ' beginning of the season ' trouble, the Perkins and Dorman engines have given reliable service. It is thought, nevertheless, that two engines of the same type would be better than the existing arrangement, the duplication of spares carried seem needless.

The Stuart-Turner petrol engine in the 16-ft slow boat gave a lot of trouble at first. This was finally traced to the separation of the ingredients in the Petroil. Now, the tank is emptied after each period of use into a can. The can is shaken up and poured into the tank immediately before the boat is to be used. The engine works well, although of course, a lightweight Diesel engine would be more desirable.

Comment

Unless the actual boats carried are altered, there is no possibility of standardizing the engines.

Regarding the 16-ft slow boat, when next a replacement is required, the demand should be made in accordance with B.R.1986, Art.0201, para. 6, and a suitable Diesel replacement will be supplied.

Vibration—Eighth Destroyer Squadron

Vibration is something that is always present in rotating machinery to a greater or lesser extent, and indirectly, it is probably one of the major factors in causing breakdown of machinery ; yet there is no ready means by which a ship's Engineer Officer can obtain either a qualitative or quantitative assessment of it, in any particular machine. The degree of vibration acceptable remains a matter of personal opinion. On three occasions in the last nine months a means of obtaining an indication of the amplitude of frequency of vibration would have established the existence and cause of potential, or actual, defects.

Comment

Action to supply administrative authorities, dockyards, depot ships and cruisers and above with reed type vibrometers for the comparative measurement of machinery vibrations is now being considered by this department.

Main Refrigerator—H.M.S. ' Cockade '

At the beginning of the commission the compressor of the main refrigeration plant (Weir's) seized. On examination it was found that the big end bearings had wiped and the sump was empty of oil. At the time, the plant was on automatic control and, when the plant was started originally, the oil in the sump was correct. It is thought that the reason for the seizure was a choked expansion valve strainer, causing pumping of the evaporator and a consequent carry-over of oil.

During trials after refitting, trouble was experienced with the pumping of liquid and it was discovered that, if the plant was shut down for any length of time (1 hour), on starting up, the pumping of liquid recommenced and oil was lost from the sump. The reason for this peculiarity is considered to be that, when on automatic control, the compressor cuts out when the desired temperature in the room is reached and, at this temperature, the expansion valve is still open, allowing gas to flow into the evaporator. When the compressor restarts, the liquid gas in the flooded evaporator tends to expand in the crankcase, causing the oil in the sump to be carried over with the gas and, as the gas circuit is so long, damage is caused before the oil returns to the sump. To overcome this trouble the plant is now worked under hand control and, on stopping the compressor, the liquid stop valve is shut and opened again on restarting the plant. Since this procedure has been adopted, no further trouble has been experienced. It is suggested that, if this type of plant is to run satisfactorily on automatic control, a solenoid operated liquid stop valve and a low pressure cut out should be incorporated in the system.

The following comment was made by F.E.O. on the staff of C.-in-C. F.E.S. in his covering letter :—

' This has been discussed with the Refrigerator Section, C.E. Dept., H.M. Dockyard, Singapore, and it is thought to be a possible cause, and the idea of a solenoid operated liquid stop valve is supported.'

Comment

The circuit as now fitted in *Cockade*, and which has proved unsatisfactory recently, is presumably that which was installed when the ship was built. The bearing failures and oil carry-over are undoubtedly due to the presence of excessive quantities of liquid refrigerant in the compressor crankcase, as suggested. The presence of this liquid in the crankcase is due, also as suggested, to failure of the expansion valve to close during the ' off ' cycle of the plant. The refrigerant flow control (expansion valve) operates through a pressure difference created between the temperature of the evaporator and the suction gas, usually about 10°F. during the ' on ' cycle. When the plant stops, the temperature of the evaporator and suction gas equalizes and the valve closes.

Cockade's trouble can be remedied, therefore, by the following :—

(*a*) Testing the expansion valve and replacing it if necessary.

(*b*) Ensuring that the phial of the valve is securely clipped, in good thermal contact, to the suction pipe, as near to the cold room as possible.

(*c*) Ensuring that the phial is adequately insulated from the machinery room temperature, and that any part of the suction pipe between the phial and the cold room is also insulated (the object being to keep the phial as cool as possible).

A solenoid valve could, of course, be employed but, in a single circuit plant, is considered to be unnecessary.

GANNET AIRCRAFT—826 SQUADRON

Comments by D.A.M.R.

As might be expected with a relatively new aircraft a considerable number of defects were encountered. Some of the more interesting ones are noted below.

Tanks

Main fuel tanks gave little trouble but many inner wing tank failures occurred. The most frequent types of defects were a split in the vicinity of the filler neck and seepage of fuel through the seams. The usual symptom of a tank failure was fuel leaking from the underside of the mainplane, but sometimes the first warning was failure of the affected tank to transfer fuel. These troubles began quite suddenly when the aircraft arrived in the warm climate of the Mediterranean and lessened considerably when they returned to a cooler climate. Diagnosis of fuel leaks was sometimes made more difficult by the fact that the Gannet is susceptible to heavy fuel venting in hot weather. This is undesirable, particularly in an aircraft carrier, because of the fire risk. Another defect, which did not appear to be affected by climatic conditions, was failure of the pacitor fuel contents units in the wing tanks. The affected tank has to be removed to get at this unit.

Comment

These defects were traced to fitting too small tanks for the tank bays. Locating buttons pulled out of their sockets, threw excessive loads on to the filler necks and thus caused failure. It is suspected that the defect was aggravated by unequal expansion in hot weather. Modifications to fit tanks of the correct size are being introduced. They will carry more locating buttons of a more positive type, will have reinforced outlet connections, and will be treated with ozone resisting paint. The vent pipes are being re-run so that the outlet will be above the fuel level when the wings are folded.

Starters

The turbo starters fitted to the Double Mamba proved generally unsat s-factory. It was found necessary to use two cartridges for almost every start, even on the hottest days. This is wasteful in cartridges and reduces the life of the starter, which has to be removed for stripping and cleaning after every hundred shots. Removal of the starter is a big job because the heavy nose cowlings have first to be taken off. Several cases of suspected failure of the rotor bearings have occurred.

The starter safety discs burst with distressing frequency and, at times, this has reached such proportions that serious delays in the operation of the aircraft have been caused and many flying hours lost. Defective cartridges may have been responsible for this defect. In addition, the combustion of these large cartridges produces so much carbon that it is very difficult to keep the starter breech clean.

Comment

The basic trouble with the Gannet starter is that it was designed to start a Mamba engine with less starting resistance than the present one. Unless the engine is already warm, two cartridges must be fired to provide the necessary effort to rotate it until it has lit up and reached, and passed, its self-sustaining speed. Experience of operating in the U.K. indicates that fully trained pilots need to use two cartridges for the first start of the day only and thereafter only one, because the engine has been run and is warm. The frequent use of two cartridges per start in the Mediterranean is thought to be due to the inefficiency of the cartridge under warm conditions. To eliminate the need for two cartridges per start, there are two possible solutions :—

(i) To increase the power of the starter. This is impracticable because a larger cartridge would be necessary and would involve a virtual re-design of the starter.

(ii) To improve the lighting up qualities of the engine. At the time of writing a trial is being arranged on a number of engines with a modified fuel system (Mod. Double Mamba 172) which it is hoped will give single cartridge starts down to +5°C.

The use of two cartridges has the following effect on the starter :—distortion of the turbine shroud ring, general over-heating of the turbine end of the starter, and possible damage to the overspeed mechanism in the event of overspeeding, if the second cartridge is fired at too high an engine speed.

The repeated failure of discs is associated with poor cartridges and is assumed due, in the main, to higher climatic temperatures. Failures have been frequent in the U.K. during the summer, but there is every indication that the effects are not so pronounced in the colder months of the year. A safety disc failure on most cartridge turbo starters will invariably cause heavy carbon deposition. This tends to choke the gas ports and turbine nozzles, with the result that repeated disc failure will subsequently occur, due to the build up of excessive pressure. This defect is inherent in the turbo starter and, although improvements to the cartridge are being sought, it can never be entirely eliminated.

To keep the interior of the starter under observation for the above effects and defects, a ' hundred shot servicing ' has been introduced. In addition, certain simple improvements to the starter are being introduced by the manufacturer. The ultimate solution to the problem is, however, the elimination of two cartridge firing and, as has already been mentioned, some progress in this direction seems possible.

Brakes

In the early days of operating the aircraft, the weakest part of the brake system was found to be the foot motors. Failure of a foot motor can produce complete port or starboard brake failure, with little or no prior warning to the pilot. A number of these failures occurred and were traced to the kinking of a rubber seal in the foot motor. A new type of seal failed to overcome the trouble at first but, later on, an S.T.I. was introduced on the foot motor, after which no further trouble was experienced.

Comment

A trial of improved brake motors has been completed satisfactorily and retrospective embodiment should begin shortly.

The Jet Pipe Temperature Control System

It was found that the type A.112 or A.113 amplifier fitted in this system had a tendency to wander, and adjustment was necessary. The situation was made more difficult at first because the correct test equipment was not available, and because of the lack of experience of personnel in servicing this type of installation. This difficulty has now been overcome.

Comment

This equipment is being modified and a publication is being issued, to cover its servicing.

Rolling Out the Engine Change Unit

The Engine Change Unit in the Gannet is designed to be rolled out on rails which are specially fitted when required. This undoubtedly reduces the time taken to change the unit, but tends to increase the time taken on other types of maintenance work, because of the frequent occasions on which a roll-out is necessary to obtain access to various engine components. The provision of additional access panels in the fixed cowlings would be of great help.

Comment

The frequency with which the E.C.U. has to be used is due to failings in the detail design of parts, which it was at first considered would be reliable. Some small improvements may be possible, but the ultimate solution will be the development of more reliable components which require less attention.

The Double Wing Fold

In the Squadron's early days on board, two mainplane changes were necessary after slipstream from aircraft, ahead on the flight deck, blew the outer mainplanes into the ' spread ' position. It is considered desirable that the outboard wing fold rods and their attachments in the mainplanes should be strengthened. The double wing fold and the retraction of the undercarriage legs are very slow in operation. The only suggestion for speeding them up would be to fit larger diameter hydraulic pipes and a pump of greater capacity.

Comment

A modification has been prepared to strengthen the wing folding mechanism and to supply covers. No other complaints of slow operation have been received and no action is contemplated pending receipt of Forms A.21.

Undercarriage Mechanism.—A modification has been raised to introduce larger bore hydraulic pipes to speed up the retraction.

Cracks

The principle cracks which have been observed to occur in the airframe are :—

(i) Vertical cracks in the wheel wells.
(ii) In the air intake ducts.
(iii) In the retractable footstep.
(iv) On the fin just above the tailplanes.

In addition, cracks have occurred on many occasions in the heat shield cooling ducts. It is considered that these could be cured by the introduction of ducts made of different material to the metal at present used. Fibre-glass has been suggested.

Comment

Modifications have been raised to eliminate all the cases of cracking mentioned in the report. In addition, the heat shield cooling ducts have been re-designed in fibre-glass. Other applications of this material are being considered as, in addition to advantages of weight and strength in some cases, it reduces cost and facilitates production.

Metal in Oil Filters

Several instances have occurred of considerable quantities of metal particles being found in the filters, and each case resulted ultimately in an E.C.U. change. Some of these cases may have been due to failure of starter bearings.

Comment

Investigation reports have already been passed to the Service.

Engine Oil System

The provision of a filler cap on the port engine header tank would facilitate oil replenishment. At present a filler cap is fitted on the starboard tank only. Oil replenishment is made more complicated because the level of oil in the tanks is not necessarily an indication of the oil state of the engine as a whole. (For example, the operation of the propeller feathering pump while the engine is not running causes oil to drain down into the sump). On a number of occasions, oil was found to be running out of the air intakes while the engine was not running. Loss of oil was small, though the condition was accentuated in the hot weather. No satisfactory solution to this problem was obtained.

Comment

Filling tests are under way and a modification to the transfer ports is likely. Consideration is being given to re-designing the filler cap and spanner.

General

Aircrews like the Gannet. It is a pleasant aircraft to fly and its deck landing characteristics are excellent. On the technical side it is a complicated aircraft and has needed much careful maintenance, the incidence of petty unserviceability has been high and the rate of component replacement has been rather heavy. There should be a considerable improvement as the more important defects are overcome.