NOTES FROM SEA

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

Tailshaft Failure in Type 61 Frigate

Failure of a Type 61 frigate tailshaft recently occurred resulting in the loss of the controllable-pitch propeller. The ship is fitted with both C-P propellers and Agouti and the propeller shaft installation consists of a short 'A' bracket shaft flanged to the tailshaft immediately forward of the 'A' bracket. The tailshaft failed about 18 inches forward of this flange, coincident with the end of the Araldite protective covering.

Inspection of the other shaft in the same ship revealed that due to corrosion cracking, failure of this shaft was imminent.

The split fairing covers extend forward of the flange and the Araldite covering ends just inside the covers, thus allowing the possibility of corrosive attack on the unprotected 18-inch length of shafting. There is also in this region of the shafting a high bending stress, caused by the large overhung weight of the C-P propeller hub, and this promotes conditions conducive to fatigue failure.

While this failure occurred in a C-P propeller installation, it is emphasized that the regular and strict examination of the condition of the protective coating on the shafts in all classes of ship is of the utmost importance. Particular attention should be paid to sections of the shaft which are covered by fairing plates, etc., and at the ends of the protective coatings.

Management

A Fleet Staff Officer arrived on board to help in the investigation and rectification of a defective piece of steam propulsion equipment in a DLG. He was met at the gangway by the Officer of the Day who was also the Section Officer concerned.

Should he be worried?

Did it Fall or Couldn't it be Pushed?

In a *Whitby* Class the failure of one turbo alternator can create an electrical power failure to the main Arca pump which controls the closed exhaust steam system, the deaerator extraction pump and the combined pumps for an evaporator. The results should be that the closed exhaust system relieves to atmosphere, the closed feed system by-passes the deaerator and the evaporator will cease to operate.

The actions that should be taken are: firstly, to start the stand-by Diesel generator to restore power to other services; secondly, to change over the Arca supply pressure to main engine lubricating oil supply to regain control of the exhaust system; and thirdly, to shut steam off the evaporator. From then onwards there should be no further effects on the main propulsion plant.

On one occasion, the closed exhaust system relief valve was not in the free-to-open position. It was in the positively held shut position. The exhaust steam pressure, therefore, increased rapidly with the following results:

(*a*) The speed of all steam driven auxiliaries exhausting to the system decreased

(*b*) Exhaust steam entering the deaerator was at a higher pressure than the main extraction pump discharge pressure and was therefore able to pass through the deaerator extraction pump and into the closed feed system

(*c*) The main feed pump lost suction, oversped and tripped

(*d*) The water level in both boilers fell

(*e*) The closed exhaust relief valve was opened by hand

(*f*) The TWL feed pump in the boiler room was started at the same time as the main feed pump in the engine room was re-started

(*g*) The TWL feed pump non-return discharge valve failed to prevent a pressure build-up in the TWL pump suction. Flange bolts were stretched and broken by the excessive pressure.

Comment

This episode highlights the necessity to:

(*a*) Ensure that the exhaust steam relief valve in this and some other classes of ship is in the correct position, particularly after raising steam

(*b*) Use a stand-by feed system which is totally separate from the main system. Where a reciprocating feed pump is fitted, it is better to use this pump on reserve feed tank suction.

If in Doubt

On reducing power on the G.6 gas turbines in a GMD the GTCR ERA heard a pronounced vibration and noticed that all the turbine entry temperature thermocouples on one engine were reading in excess of 1150 degrees C when the normal temperatures for the condition pertaining should have been between 600 and 650 degrees C. He reported this to the EOOW in the MCR by intercom and said that he intended tripping the engine.

The EOOW instructed the ERA not to do so until he (the EOOW) arrived in the GTCR, and on arrival, some seconds later, the EOOW shut down the engine. It was therefore concluded that the engine had run for at least 30 seconds with a turbine entry temperature of the order of 1200 degrees C.

The source of the trouble was later found to be the stripping of the compressor from the 7th row onwards. This had been caused by vibration of the 7th stage bleed belt liner which caused fretting of the liner and key-way and eventual fracture of the liner.

Obviously, the compressor had to be changed; but so also did the compressor turbine due to the time the machine had been run at so high a turbine entry temperature.

Comment

This case brings to light the importance of establishing the fault conditions under which a machine must be stopped at once, and then leaving the qualified watchkeeper on the spot to take the necessary action.

An Unnecessary Repetition

During trials of a large Diesel engine after a major overhaul, low lubricating oil pump discharge pressure was found to be due to damage to the rotary gear wheel type pump by a foreign body. The pump was replaced by a spare unit and trials were satisfactorily completed.

At a later date the same low pump discharge pressure was experienced and when the pump was opened out for examination, similar damage to that which had previously occurred was found.

More detailed investigation then followed and a 'mangled' bolt was found in the pump suction pipe. It is fair to assume that this bolt was responsible for the damage to both pumps.

Comment

This case yet again emphasizes the importance of thorough investigation into the cause of all defects in an attempt to prevent repetition.

Incorrect Lubrication

Heavy 'juddering' and some limitation of trend of one fin of a set of retractable stabilizers was experienced by a Diesel frigate shortly after completion of refit when the stabilizers were housed.

On the next occasion of docking, the outboard gear was examined and the greasing arrangements checked. One of the four grease pipes was found to be choked and the slide and guide supplied by this pipe was grease free. Since refit the ship has been using G.S. grease, although the handbook for the equipment specifies Neox oils. This has since been emphasized by DCI 1612/68.

Clearing the grease pipes and recharging with the correct lubricant rectified the defect without further stripping.

Comment

The case of 'any old lubricant' will not provide the necessary answer.