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CTT/300/04/04/TECH

25 Jan 23

The Commander-in-Chief
{for CTO (Marine)}
Headquarters
Andaman & Nicobar Command
Port Blair – 744 102

CAUSATIVE ANALYSIS OF FAILURE ON LPAC – INS KARMUK

1. Refer to HQANC fax ANC/42000/EG/CTT dated 21 Jan 23.

2. **Background**. INS Karmuk is a corvette class of ship fitted with one LPAC of Make – M/s Ingersoll Rand, Model – 7T4 with rated capacity of 0.175 to 0.186 m^3 /min. The compressor is a two stage, reciprocating unit designed with properly proportioned compression which can be used for any compressed air application requiring pressures from 34.5 to 68.9 bar. The high pressure discharge from compressor is reduced to 7 bar LP air for control air supply required for main propulsion. There are two modes of operation- manual and auto and SS have been operating the LPAC in auto mode. There is no manning of the equipment/compartment during operation.

3. **Defect History**. The ship had projected drop in main engine control air pressure when underway on 18 Jan 23 around 1900 h. SS observed that the LPAC motor was running and the driven pulley for compressor was rotating freely, but the compressor was not developing any pressure. As part of DI, SS opened the inspection cover of compressor and noticed that the crankshaft, connecting rods were damaged. During further DI by NSRY (Pbr), it was observed that crankshaft, connecting rods, pistons and associated components of the LPAC were damaged.

4. **Analysis**. A technical team from CTT (PB) was deputed towards undertaking causative analysis leading towards failure of LPAC onboard INS Karmuk. DART, Maintenance Schedule, EMAP, CBPM readings and POL report log were scrutinized for establishing the probable cause for failure.

5. **Observations**. Following observations relevant:-

(a) Log book for operating parameters of LPAC not held.

(b) Lub oil report of LPAC not held.

(c) CBPM readings of LPAC were recorded in CBPM reading log book held with SS. However, the same is not forwarded to CTT (Pbr) for monthly analysis.

(d) No major/minor defects observed during the last six months as per DART.

(e) Last major routine undertaken was 500 hourly in the month of Dec 21 as per EMAP whereas the 500H3 dockyard routine was carried out in the month of Jun 21 as per DL of SR-21.

(f) Next major routine due is NR-23. However, the LPAC is under ABER replacement during the forthcoming NR.

(g) Calibration certificate of instrumentation and safety devices not held onboard.

(h) As per manual, the lub oil grade should be 165 cSt at 37.8 deg C for the use in climate of temp range of 26.7 deg C to 51.7 deg C. However, the oil used is OMD 113 which has a viscosity of 124 cSt at 40 deg C. Authority for use of OMD 113 is not held.

6. **Way Ahead**. In order to progress with analysis, following details are pertinent:-

(a) Ship staff may be directed to land lub oil sample of LPAC at NSRY for analysis and forward report to this Unit.

(b) Calibration details w.r.t cut-outs, over load protection relay and gauges may be ascertained by SS.

(c) Relevant policy for use of OMD 113 in LPAC may be provided by SS.

(d) Serviceability checks of NR valve at discharge of stage-2 be undertaken.

(e) Defect history on LPAC of other ships of same class being obtained by CTT (pbr).

7. Cause of failure can be ascertained post availability of details mentioned in para 6 ibid.

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