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Casualty Circular No. 06 of 2012

Sub: Fire in engine room

1. What happened?

An Indian OSV was deployed for facilitating supplies to an oil reg, off the east coast of India during the month of July. While the vessel was proceeding to attend to 'helicopter duty', fire was observed in her No. 4 main engine. Immediately, all engines were 'tripped' from the ECR and emergency alarms including distress alert were activated. Vessel dropped her anchor and the rescue boat was kept ready for use. Halon gas was released and the fire was extinguished. Distress alert was cancelled.

1.1 Substantial damage was observed in way of blower side casing of No. 4 main engine turbocharger and overhead cablings.
There were no casualties or no environment damage.

2. How it happened ?

2.1 Main engine No. 1 and 2 connect to port propeller shaft and generator whereas, main engines 3 & 4 connect to starboard propulsion system. On the day of the incident, No. 3 main engine was non-operational due to problem with the governor and ship's electrical load of the shaft generator and starboard propeller was on No. 4 main engine. Perusal of temperature records of exhaust of various units of No. 4 main engine, post the incident, revealed, considerable difference, the lowest being 310 deg. and the maximum being 390 degrees.

2.2 At about 0920 hrs, both, the 2nd engineer and the electrical officer, were working very close to the No. 4 main engines. They noticed that the turbo charger blower side casing was ruptured and flames were gushing out. At almost the same time, thick black smoke was observed to be coming out from the starboard funnel. The fire alarm was sounded and emergency stations were called where a head count was taken and all crew were accounted for. Thereafter, emergency fire pump was started for boundary cooling, all openings/ventilators etc. to the engine room were closed and Halon gas was released to extinguish the fire.

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3. **Why it happened?**

3.1 Vessel's PMS records have indicated that the prescribed maintenance schedule of the engines was adhered to. Turbo charger was last overhauled 13 months back and was reported to be functioning normally. However, difference in exhaust temperatures, point to possible problems with fuel injection and fuel burning.

3.2 Post the incident, blower side casing and the rotor shaft were not available for inspection, as the blower had completely melted down. However, the inspection of turbine casing revealed a) damage to the labyrinth seal bush (next to the turbine) and b) air seal passage coated with thick sludge. Further, control cables of both the thrusters and other equipments that were passing above the No. 4 main engines, were burnt down. Inspection also revealed that there were no local thermometers for measurements of exhaust temperatures of the individual units and all the recordings were taken from the remote electronic indicators in the Engine Control Room.

3.3. Damage caused due to the fire was repaired. However, on trial, considerable load was noticed on main engine No.4. Visual inspection of propeller revealed 3 fishing nets entangled with the propeller. Once these nets were removed, load on the main engine was observed to be normal.

3.4 At the time of the incident, the ship's electrical load and also the starboard propeller power were on the same shaft generator. The entangled fishing nets would have caused additional load. The damaged labyrinth seal bush of the turbo casing allowed the entry of oil rich exhaust gases into the seal passages at the time of 'over load'. This would have caused air pressure (momentarily) becoming less than the exhaust pressure and exhaust gases entering the air side and exploding.

4. Lessons learnt:

i. Operation and maintenance of turbochargers shall be carried out as per maker's instructions and recommendations. Overhauling of turbochargers, being very high-speed rotating mechanical equipments, shall be undertaken only by competent personnel as per maker's instruction and with original equipment manufacturers' spare parts.

ii. The exhaust gas temperatures of the turbo-charges shall be regularly monitored, particularly from the local measuring gauges, in addition to the remote gauges, if fitted.

iii. Chief engineer shall ensure judicious load management of the engine room machineries to confirm that the machineries are not unduly overloaded under any circumstances.

(Capt. H. Khatri)
Dy. Director General of Shipping(Tech.)