Surveyor's Notebook

Fuel & lubricating oil fires – hot surface insulation protection

It is universally accepted that the majority of fires in engine rooms are caused by a lubricating or fuel oil pipe failing and spraying oil onto a hot exhaust. This could be because of a failed pipe connection or olive, a pipe fracture caused by fretting due to vibration or over tightening. The hot exhaust is available as the source of ignition because the insulation is either not adequate, already oil soaked or has not been fitted correctly. Often, the insulation is not there at all. For example, the turbo charger has just been overhauled or the generator has been opened up for survey and the insulation has not yet been replaced. Fuel or 'lub' oil pipe failure can occur at any time resulting in a major engine room fire.

SOLAS states that 'all surfaces above 220 deg Celsius which may be impinged as a result of a fuel system failure shall be properly insulated'. Consider also the exhaust insulation near lubricatin oil pipes. A fractured lubricating oil pipe can as easily cause a fire as a fuel oil pipe fracture.

What should you do? Keep to the basics

1. Masters should perform a weekly or fortnightly inspection that should include an inspection of the engine room. The master should not leave the inspection of the engine room to the chief engineer alone. The master can see if there are any major defective housekeeping issues, fuel/water/lub oil leaks, defective safety barriers and poor protective insulation on hot exhausts. Take a proactive approach to safety.

2. Good housekeeping is a major loss prevention tool. Keeping the engine room and other spaces clean, tidy and free of oil is vital for a safe ship.

3. Include, as part of a machine overhaul, a risk assessment requiring that the chief engineer checks that the insulation has been correctly replaced and fitted after the overhaul. Masters should know who checks that the insulation material has been correctly fitted.

4. The risk assessment and work permit must include a thorough check on the insulation when shore technicians have been used. Shore technicians are

notorious in cutting corners and not replacing the insulation correctly. Supervision of shore-side overhauls is a crucial safety procedure. Just because the protective covers have been placed does not mean that the insulation has been effectively fitted.

5. Consider as a company procedure that old insulation is always replaced with new insulation material. Trying to save a few dollars in not replacing damaged/unfit insulation is definitely not cost effective.

6. Train all the engineering staff in the importance of making sure that hot pipe work and exhausts are correctly insulated. The smallest gaps can result in a fire.

7. Superintendent inspections should formally include insulation checks.

What else? Thermal imaging cameras

8. A visual inspection is the main tool to prevent fires, but experience suggests that visual examination is not sufficient. What appears as good, tight insulation may have gaps where the insulation is not tight fitting. New technology has provided an answer. The use of infra red thermo-imaging cameras is one method of ensuring that the hot surface insulation protection is in good order. These are small, robust and easy to use. Senior ships staff can easily be trained to use this equipment, the data can be downloaded and presented on computer, Easily analysed and read in the management office. Alternatively outside Companies can be used to carry out a survey on the insulation at times of docking or repair periods. The use of the cheaper infra red guns is better than Just a visual check, however, unless great care is taken over the inspection it is easy to miss a gap in the insulation covering and their use can give rise to complacency.

For example: A major shipowner had a fire in early 2008 in the engine room caused by fuel oil spraying from a pipe connection to a differential gauge mounted on a main engine duplex fuel filter. The high pressure diesel oil was deflected to hot surfaces. The resulting fire was extinguished using the CO2 system and the ship towed into port for repairs and general average declared. This company has initiated a fleet wide campaign to reveal ‘hot spots’ in exhaust systems using infrared thermography. The technology is there – use it.

‘Prevention is better than cure’. There can be no argument not to implement proper inspection techniques when you weigh up the potential human cost, dollar cost, downtime and loss of reputation versus the minimal prevention efforts required to prevent an engine room fire.

All shipowners and/or their managers should consider using infra red thermo-imaging cameras as part of their planned maintenance system.

(Article extracted from The Standard Club’s publication – Standard Safety)