KISH P & I LOSS PREVENTION CIRCULAR KPI-LP-31-2012
(Notes on Avoidance of Engine Room Fires)

►Fire as a great danger:

Fires on board ships have led to loss of lives and severe damage to the ships and properties; burdening the companies & insurers with voluminous expenses. Most of fires on board ships originate from the engine room and malfunction or failure in a flammable oil system followed by impingement of oil onto a high temperature surface is the leading cause of engine room fires. There have been cases where left over oily rags were adjacent to hot surfaces and in occasions spontaneous combustions have taken place. In addition, many engine room fires have an electrical source, such as electrical short-circuits and thermal overheating in the switchboards.

Identification and protection of high temperature surfaces in the engine room is considered to be a very effective measure to prevent engine room fires and is also fairly easy to implement on board. This loss prevention circular aims to increase awareness of the potential dangers associated with exposed high temperature surfaces in engine rooms.

The existing regulatory requirements have been highlighted to direct the attentions on the responsibility of companies to ensure that the engine room systems are maintained in a safe and fire protected condition and in compliance with relevant regulatory requirements at all times during operations.

►Rules and regulations:

The IMO Safety of Life at Sea (SOLAS) Convention provides the key regulatory framework for fire safety on board ships and Ch.II-2/Reg.4 covers measures to reduce the probability of oil leaks igniting in engine rooms. SOLAS recognizes that if fuel oil, lubrication oil or other flammable oil systems leak, the chances of preventing the outbreak of a fire will be greatly increased if all potential ignition sources have been identified and removed, or properly insulated.

In addition and supplementation to requirements of the International Code for Fire Safety Systems [MSC.98 (73)], the following key safety measures have been mandatory SOLAS requirements for all ships from July 2003:

- ✓ -Jacketed (double) pipes in high pressure fuel oil delivery lines;
- ✓ -Insulation of all high temperature surfaces (> 220oC) at risk of flammable oil impingement after a failure of an oil line; and
- ✓ -Spray shields for flammable oil lines (fuel, lubrication and hydraulic oil) located immediately above or near potential ignition sources.

Compliance with rules and regulations is normally checked by classification societies/flag administrations and port authorities and fire safety in general is of course one of the main issues during their inspections on board. But the time available to complete a full survey on board is often short and when it comes to verification of the integrity/ functioning of machinery and systems, it may appear that the surveyors' inspection is often limited to spot checks of known high risk areas and hazards in the engine room.

Class and port state control surveyors and inspectors normally attend on board while the ship is in port and the engines are therefore not running at full load. High temperature surfaces in the engine room are not always detectable in these conditions, even where more sophisticated temperature measuring tools, e.g., thermo scanning cameras, are used as part of the inspection. Various Concentrated Inspection Campaigns are also conducted by the MOUs in this respect.

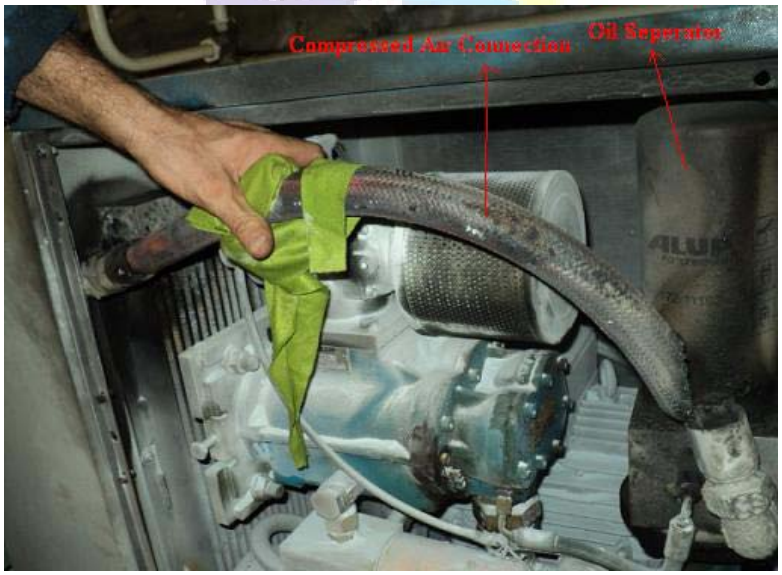
►Identifiable Ignition sources:

They are sources having enough energy to cause ignition. These include high temperature surfaces, sparks or flames from inefficient flanges or joints, electrical discharges caused from electrostatic atmospheres, or electrical contactor faults. Sources of these are for example exhaust gas piping of internal combustion engines, leakages from boiler furnace joints and electrical equipment within oil treatment rooms(quoted from MSC.1/Circ.1321).

So far none of the governing rules and regulations for ships has mandatory requirements for the use of infrared thermo scanning cameras to detect heated surfaces in engine rooms. Such measures may, however, be recommended, e.g., via classification societies or optional class notations.

Many companies go to considerable lengths to ensure safe conditions in their engine rooms and some also invest in use of temperature measuring tools to identify exposed high temperature surfaces.

It is important to bear in mind that the risks are at their highest when maintenance work is taking place or immediately thereafter. The risks involved with the execution of a specific repair or maintenance operation are not always readily identifiable and are sometimes underestimated due to the perceived simplicity of the work to be carried out. As a result, additional safety precautions may not be implemented during and after the repair work. Typical examples are missing hot-work permits and the absence of a fire watch. Following a period of maintenance, the time available to prepare the vessel and get her back in operation can be limited, and the refitting of removed insulation mats or spray shields is often left for the crew to complete during the voyage.



►Reiteration of important topics:

Fire safety in engine rooms is the result of both good design and the company's as well as personnel's continuous focus on fire prevention measures on board. Companies must therefore bear in mind that, although compliance with fire safety requirements is controlled by authorities and classification societies, it is the company's responsibility to establish procedures to ensure that the ship is maintained in compliance with the provisions of the relevant rules and regulations (ISM Code Ch.10) and that the crew

is properly trained and provided with adequate resources/tools to perform their tasks in accordance with the required standards (ISM Code Ch.6 and Ch.3 respectively).

The following specific measures related to fire prevention may be reminded amongst other points:

- ✓ ***High standards of cleanliness in the engine room are essential for fire prevention and any leakages in fuel, hydraulic, or other flammable oil systems must be dealt with promptly. The position and condition of spray shields for both high and low pressure flammable oil lines should be checked regularly, as should the drainage arrangements for jacketed fuel oil pipes.***
- ✓ ***High pressure pipes & joints should be properly maintained & checked through a devised Planned Maintenance Programme.***
- ✓ ***Materials used for insulating high temperature surfaces may degrade over time and regular checks should be carried out, both visually and using temperature measuring tools. Measurements using infrared thermo scanning cameras can be very useful to identify surfaces with temperatures in excess of 220oC in the engine parts, exhaust ducts and electrical equipment. Regular (e.g., annual) measurements are recommended to be taken as part of the standard maintenance and inspection routines, undertaken either by specialist firms or by trained crew.***
- ✓ ***Particular attention must be paid to fire risks when repairs and maintenance are carried out. Prior to the execution of an operation, the risks involved should be identified and additional safety precautions taken. Special attention should also be given to the immediate and proper refitting of spray shields and insulation materials upon completion of maintenance.***
- ✓ ***Recommendations in IMO MSC.1/Circ.1321 "Guidelines for measures to prevent fires in engine-rooms and cargo pump-rooms" should be consulted to define integrity standards acceptable under the SOLAS Convention. Standards covering maintenance of electrical systems should also be defined.***
- ✓ ***Serious fires have arisen because of failure to recognize potential fire hazards, and above all, the best fire prevention is a well trained crew. Training and experience transfer between crew should aim to create a common understanding of all hazards present in an engine room and their potential consequences.***

KPI Loss Prevention Team
September 2012