

No. 18 Fire Prevention in Machinery Spaces of Ships in Service – Guidance to Owners

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1. Introduction

1.1 Based on past experience it is known that the combination of combustible materials and sources of ignition are the main cause of machinery space fires. The combustible material involved is in the majority of cases oil, i.e. fuel oil, lubricating oil, thermal oil or hydraulic oil. However, plastic materials in electrical installations may also be combustible material causing outbreak of fires.

1.2 There is a large variety of potential ignition sources and the most common are hot surfaces, e.g. exhaust pipes and steam pipes, over-heating of machinery or ignition from electrical installations due to short circuiting or sparks caused by operation of switchgear. Other frequent ignition sources are those associated with human activities, e.g. smoking, welding and grinding.

1.3 The experiences of classification societies confirm the importance of machinery space fire prevention and the reports of survey - class surveys as well as Passenger Ship Safety Surveys and Cargo Ship Safety Equipment Surveys - contain frequent references to lack of maintenance of fire safety of machinery spaces.

1.4 Where there is any doubt in applying this Guideline, clarification should be obtained from the individual classification society. Attention is directed to the separate published Rules of each. This Guideline is not meant as a substitute for the society's Rules or the independent judgement and experience of Owners and Surveyors.

2. Contributing Factors to Machinery Space Fires

2.1 Failures resulting from the daily use of machinery space installations, such as e.g. oil leakages, breakage of flexible pipes.

2.2 Lack of adequate cleanliness adds to the fire hazard in two ways.

a) In the first place the probability of occurrence of fire, in particular due to ignition caused by human activities is increased because of the widespread presence of the combustible material in the form of oil spill/oily deposits.

b) Secondly, an unclean machinery space may cause a small fire to spread, e.g. a fire in an electrical switchboard or panel may develop into a full machinery space fire due to the presence of oil spills/oily deposits.

3. Measures to Reduce the Fire Risk

3.1 The classification requirements for the construction and inspection of machinery spaces cannot, alone, ensure the fire safety at all times; the effort of all parties concerned is necessary.

3.2 The Shipowners and their crews should apply a programme of maintenance and housekeeping.

3.3 Where leakage of flammable liquids occurs during normal service or routine maintenance work, special arrangement and early clean-up should be made by the crew to

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prevent these fluids from reaching other parts of the machinery where danger of ignition may arise.

4. What is IACS Doing?

4.1 At the occasion of the class periodical surveys a machinery and electrical plant survey is carried out as prescribed in the Chapter I, regulations 7 and 10 of the International Convention for the Safety of Life at Sea, 1974, as amended.

4.2 The periodical surveys should mainly ensure that the standard to which the installation was originally built is maintained.

4.3 The Surveyor can only assess the actual condition of the machinery space fittings at the time of survey. In between two inspections the proper maintenance must remain the owner's responsibility.

4.4 Reference document: UR F35, Rec. No.58 and MSC.1/Circ.1321.

5. Defects to Machinery Space Installations

5.1 This part deals with various types of defects found in machinery spaces, which for the most part are caused by a lack of proper maintenance or by improper operation.

5.2 Shielding of high pressure fuel oil pipes

Typical defects found may be of the following nature:

- Partially lacking or damaged shielding.
- Loose or defective end attachments of shielding.
- Flexible pipes used for shielding fitted in such a way that contact between high pressure fuel pipe and flexible pipe causes wear damage.
- Defective drainage arrangements.

5.3 Insulation of Exhaust Pipes, Thermal Oil Pipes and Steam Pipes. Commonly found defects are:

- Partially lacking insulation, typically in way of flanges or at locations where removal of insulation is necessary for maintenance.
- Oil soaked insulation due to damage or the lack of steel sheeting.

The standard of insulation and protection against oil penetration into the insulation is an area where the general standard has improved over the years. In earlier days it was not uncommon for flanges to be left uninsulated and that metal sheeting of the insulation was incomplete. In cases where incomplete insulation or unsheeted insulation is found in locations where oil leakages may occur, the owner and operating personnel should make improvements regardless of the original standard.

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(cont)**5.4 Shielding of electrical equipment against oil and water leakages**

Oil leakages into electrical equipment may be ignited due to sparks normally generated by operation of switchgear (fine oil spray is probably most susceptible to ignition). Water leakages may cause short circuiting and ignition of insulation or other material of plastic type. The owner and operating personnel should in particular look for signs of leaking flanges, deterioration of pipes and leakages from other machinery which may come into contact with subject electrical equipment.

6. Crew's and Owner's Duties with Respect to Machinery Space Installations

6.1 Attention should be directed at the condition of flexible pipes used in oil systems, e.g. in connection with hydraulic power arrangements, flexible pipes are used to prevent harmful vibrations and noise. High pressures in combination with pulsations may cause breakage of the flexible pipes, particularly in way of end attachments.

6.2 Also, flexible pipes for connecting fuel oil supply to oil burners are extensively used. Any signs of deteriorating conditions being revealed, should be replaced or at least temporarily repaired.

6.3 Broken or loose fastenings of oil pipes should be repaired because they may result in future damage.

6.4 It is Owner's responsibility to ensure that the machinery space is maintained in a clean condition.

A cleanliness level is not acceptable in cases where floor plates are slippery from extensive oil spills, or oil is seeping from machinery, or if painted surfaces have an oil layer, or when a fire hazard exists due, for instance, to accumulation of rags or other similar materials or presence of oil on bilge water surface.

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