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EQUIPMENT
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Agenda item 17

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BIENNIAL STATUS REPORT AND PROVISIONAL AGENDA FOR SSE 11

**Proposal to include the output "Review and update of the Code of practice for
atmospheric oil mist detectors (MSC.1/Circ.1086)"
in the provisional agenda for SSE 11**

Submitted by Denmark, Germany and CESA

SUMMARY

Executive summary: This document proposes to include the output "Review and update of the Code of practice for atmospheric oil mist detectors (MSC.1/Circ.1086)" in the provisional agenda for SSE 11.

*Strategic direction, 5
if applicable:*

Output: Not available

Action to be taken: Paragraph 8

Related document: MSC 107/17/13

Introduction

1 The Maritime Safety Committee, at its 107th session, considered document MSC 107/17/3 (Denmark et al.) and agreed to include in its post-biennial agenda an output entitled "Review and update of the *Code of practice for atmospheric oil mist detectors* (MSC.1/Circ.1086)" with two sessions needed to complete the item, assigning the SSE Sub-Committee as the associated organ (MSC 107/20, paragraph 17.39).

Background

2 Document MSC 107/17/3 describes that fires on board ships are often caused or enhanced by leaks of oil in engine-rooms. The emitted oil evaporates into the air, in many cases undetectable to the seafarers. At a certain point, it becomes a fire risk when the level of oil content reaches a saturation level and the oil may be ignited due to the heated surfaces in the engine-room.

3 Studies of fires in engine-rooms have shown that the majority of fires in engine-rooms are generally caused by a leak or fracture from a flammable liquid system. Most engine-room fires begin as a result of the ignition of airborne hydrocarbons. Liquid oil can be airborne as a mist or vapour. Oil spray and mist (airborne drops) may result from leakages in high pressure systems, such as pipes. In addition, airborne oil particles may also appear as leaking oil is vaporized due to heat. At high temperatures and high concentrations such vapours may be detected by mist detectors.

Discussion

4 The Code of Practice (MSC.1/Circ.1086) was developed based on the available technologies at the time. Today, the Code of Practice does not fully reflect the current principles and technologies which provide the possibility to detect airborne oil over the whole spectrum from a few particles of vapour to higher levels in the form of mist and airborne drops.

5 An updated Code of Practice for the performance and operation of atmospheric based oil leakage detectors would provide a consistent and reliable foundation as to what can be expected from these systems, as well as the installation, training and operation of such systems.

6 The co-sponsors are of the opinion that MSC.1/Circ.1086 is outdated due to the technological development as mist detection systems today can continuously monitor the machinery space atmosphere thereby giving early warning of a dangerous onset of oil mist accumulation in the engine-room thereby warning the crew of the situation and possibly preventing a dangerous situation from occurring.

Proposal

7 In view of the above discussion, the co-sponsors propose to include the work item in the provisional agenda for SSE 11. The co-sponsors are prepared to provide a draft revision of MSC.1/Circ.1086 for consideration by SSE 11 in order to simplify the work of the Sub-Committee. A first draft can be found in the annex. The co-sponsors are of the view that the review and update can be finalized relatively earlier than planned as the necessary information is already available.

Action requested by the Sub-Committee

8 The Sub-Committee is invited to consider the proposal above and take action, as appropriate.

ANNEX¹

DRAFT CODE OF PRACTICE FOR ATMOSPHERIC OIL VAPOURS AND DROPLETS/LEAKAGE MIST DETECTORS (REVISION OF MSC.1/CIRC.1086)

1 ~~In an ideal world, the~~ A simple solution for preventing oil mist fires is to ensure no leaks occur in the first instance, but the harsh reality is that oil mist fires do occur making it a ~~and the~~ problem that needs to be addressed. One practical answer is to install an oil or fuel leakage mist detection system that will detect ~~an oil or fuel leakage levels in the atmosphere mist before it can reach levels where it saturates the atmosphere to such an extent that~~ cause there is a risk of fire.

2 It is generally accepted that oil or fuel leakages can form in [a number of ways such as] ~~[different/variety/of ways] mist can be formed in one of two ways:~~

- .1 ~~As minor minute~~ leaks in pressurized oil or fuel lines which, ~~under pressure,~~ produce a ~~very fine~~ atomized spray or mist; or
- .2 Leaking oil or fuel producing vapour or gas, ~~when allowed to come into contact with a hot surface, will boil off producing a fine vapour.~~

3 ~~In the first instance, the~~ Danger occurs when the concentration of oil or fuel reaches the explosion level. It should be noted that the ~~particle size formed is between 3 to 10 microns and is allowed to form a mist in the atmosphere. When oil vapour reaches the range of flammability, the condition can be classed as truly hazardous and, if no action is taken, a fire may result. The~~ ignition temperature for oil or fuel mist or fine atomized spray ~~this type of oil mist~~ can be extremely low depending on the type of oil or fuel being atomized.

4 ~~Oil mists generated by being boiled off can produce particles between 3 to 10 microns. This mist is visible and is known as a blue smoke. Temperature and area of surface contact affect the rate of oil mist generation. At this stage, a temperature as low as 150°C could result in ignition.~~

4 Sources of fine atomized spray, oil mist and hydro carbon fumes include but not limited to ~~include~~ pump seals, leaking injectors; loose or incorrectly fitted pipe fittings, flexible connections between ship and engine, weld fractures and poor maintenance of machinery.

5 Possible ~~ignition heat~~ sources ~~causing the ignition~~ includes heat exchangers, exhaust pipes, turbocharger, electrical contacts, static electricity, faulty wiring and high- and low-pressure turbines.

6 Types [examples] of detection systems [methods]:

- .1 ~~single sampling units; and~~
- .2 ~~multiple sampling systems.~~

¹ This annex has been provided in the English language only and proposed modifications to MSC.1/Circ.1086 are indicated in grey shading.

- .1 an oil spray detection;
- .2 opacity measurements;
- .3 sampling, single sampling point or multiple sampling points;
- .4 gas level measurements;
- .5 a combination of technologies mentioned above; or
- .6 other proven technology.

7 Location of detectors and sampling lines

7.1 ~~In each case, the~~ The number of detectors ~~or sampling points~~ to be used is dependent on the size and layout of the particular engine-room or application. ~~For a single point application, the unit may be mounted next to the application or connected via a sampling line. Multiple sampling systems are fitted in a suitable location away from the application. Sample lines are fed to a common manifold with a suitable control unit to allow alternative samples to be taken from continuously flowing sample streams, thus one unit can be utilised to monitor several points. The oil mist may be drawn into the unit by its own built in fan or by an independent blower.~~

7.2 To determine suitable positions for mounting detectors ~~or for fitting sampling lines~~, a ~~smoke~~ test [a survey] ~~would~~ should be required to verify air movements in relation to application. ~~In general, air will move towards ventilation extractors and turbo chargers, so any detector or sampling line should be positioned as close as possible to the machinery. Likewise, detectors or sampling lines should not be sighted next to ventilation blowers as these will prevent mist formation from being drawn into the unit. On installation, if a smoke test is used it should be under normal operation condition. should be carried out with all engines, ventilation and machinery fully operational to ensure that detectors/sampling lines are correctly positioned.~~

7.3 If detector units are to be located close to the source of application, care should be taken to ensure that the detector unit is suitable for excessive vibration, high temperature, risk of ~~avoid locating the unit in places where: vibration is excessive; extremes of temperature may be experienced; it would be difficult for maintenance personnel to gain access; high levels of humidity and water may occur; and there is a risk of~~ electromagnetic interference, high levels of humidity and water which may occur. It has to be considered that maintenance can be carried out in a safe manner in the position in which the detector is mounted.;

7.4 Locating of any ~~equipment detector~~ in an explosive atmosphere should not be undertaken unless the equipment ~~unit~~ is certified ~~intrinsically safe~~ for the hazard area.

8 Setting alarm levels

8.1 ~~This may~~ To be determined by the requirements of the end user. In general, there are likely to be two stages: ~~first an early warning that something is wrong; and then a secondary alarm indicating a full alarm.~~, but one stage may suffice. ~~These~~The alarm given should be advisory and the monitor should be able to define the areas where a fuel leakage ~~oil mist~~ has been detected. In certain circumstances, alarms may be used to shut down individual sections of the plant if deemed necessary, but there should be an overriding control.

8.2 The alarm level set initially should take into account the atmospheric condition when there is no problem, for example there is always a small amount of hydrocarbon fumes ~~mist~~ generated within an oil purifier room. The initial level set will change with each application, but should not reach an explosive level for the specific oil or fuel used in the application. ~~exceed concentrations of greater than 2 ppm atmospheric oil content.~~ Alarms should be activated as the concentration reaches a ~~levels will be indicated as the level rises to~~ certain preset percentages of this set value.

9 Test procedure

9.1 ~~As with most electronic equipment, units~~ The equipment should have built-in calibration possibilities to verify and correct measurements. ~~be fixed by the components used in the design stage and have built-in calibration routines to correct slight deviations.~~

9.2 The manufacturer should calibrate the detector against a known oil or fuel leakage ~~mist~~ measurement.² ~~No adjustment to the ϵ Calibration may be done by the user in accordance with the manufacturer's instructions should be possible by the user. It is not satisfactory to set up a system against an electronic procedure or a piece of filter glass. If deemed necessary, a calibration certificate should be issued.~~

10 Maintenance

10.111.1 ~~There is very little maintenance which can be carried out on the units in relation to the electronic components. The main areas which will require attention are in-line filters either in the sample line or within the unit itself. These will require either cleaning or replacement depending on the type, and recommendations of the detector manufacturer. Sensor faces will also require cleaning periodically with approved cleaner to clean any oil film build up. Some detectors may have built-in fault diagnostic circuitry which will give an indication that cleaning is required or that filters need attention due to fall off in flow. Maintenance should be done in accordance with the manufacturer's instructions.~~

10.2 Some detection equipment may have built-in fault diagnostic circuitry or software which will give an indication that cleaning is required or that the equipment needs other attention.

² ISO 16437 or similar.