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GUIDELINES FOR FLOODING DETECTION SYSTEMS ON PASSENGER SHIPS

1 The Maritime Safety Committee, at its eighty-fifth session (26 November to 5 December 2008), approved the Guidelines for flooding detection systems on passenger ships, as set out in the annex, following the recommendations made by the Sub-Committee on Stability and Load Lines and on Fishing Vessels Safety, at its fifty-first session. The Guidelines provide guidance for the flooding detection systems for watertight spaces below the bulkhead deck, required by SOLAS regulation II-1/22-1 for passenger ships carrying 36 or more persons and constructed on or after 1 July 2010.

2 Member Governments are invited to use the annexed Guidelines for flooding detection systems on passenger ships when applying the relevant provisions of SOLAS regulation II-1/22-1 and to bring them to the attention of all parties concerned.

ANNEX

GUIDELINES FOR FLOODING DETECTION SYSTEMS ON PASSENGER SHIPS

Introduction

1 SOLAS regulation II-1/22-1 requires passenger ships carrying 36 or more persons constructed on or after 1 July 2010 to be provided with flooding detection systems for watertight spaces below the bulkhead deck based on guidelines developed by the Organization.

2 These guidelines are intended to provide detailed requirements for flooding detection systems to provide information in the case of flooding in order to assess the actual flooding situation and support the decision-making process.

Definitions

3 *Flooding detection system* means a system of sensors and alarms that detect and warn of water ingress into watertight spaces. Continuous flood level monitoring may be provided, but is not required.

4 *Sensor* means a device fitted at the location being monitored that activates a signal to identify the presence of water at the location.

5 *Alarm* means an audible and visual signal which announces a flooding condition requiring attention.

System installation

6 A flooding detection system should be fitted in all watertight spaces below the bulkhead deck that:

- .1 have a volume, in cubic metres (m^3), that is more than the ship's moulded displacement per centimetre (cm) immersion at deepest subdivision draught; or
- .2 have a volume more than $30 m^3$,

whichever is the greater.

7 Any watertight spaces that are separately equipped with a liquid level monitoring system (such as fresh water, ballast water, fuel, etc.), with an indicator panel or other means of monitoring at the navigation bridge (and the safety centre if located in a separate space from the navigation bridge), are excluded from these requirements.

Sensor installation

8 The number and location of flooding detection sensors should be sufficient to ensure that any substantial water ingress into a watertight space requiring a flooding detection system is detected under reasonable angles of trim and heel. To accomplish this, flooding detection sensors required in accordance with paragraph 6 should generally be installed as indicated below:

- .1 **Vertical location** – sensors should be installed as low as practical in the watertight space.
- .2 **Longitudinal location** – in watertight spaces located forward of the mid-length, sensors should generally be installed at the forward end of the space; and in watertight spaces located aft of the mid-length, sensors should generally be installed at the aft end of the space. For watertight spaces located in the vicinity of the mid-length, consideration should be given to the appropriate longitudinal location of the sensor. In addition, any watertight space of more than $L_s/5$ in length or with arrangements that would seriously restrict the longitudinal flow of water should be provided with sensors at both the forward and aft ends.
- .3 **Transverse location** – sensors should generally be installed at the centreline of the space (or alternatively at both the port and starboard sides). In addition, any watertight space that extends the full breadth of the ship or with arrangements that would seriously restrict the transverse flow of water should be provided with sensors at both the port and starboard sides.

9 Where a watertight space extends in height over more than one deck, there should be at least one flooding detection sensor at each deck level. This provision is not applicable in cases where a continuous flood level monitoring system is installed.

Unusual arrangements

10 For watertight spaces with unusual arrangements or in other cases where these guidelines would not achieve the intended purpose, the number and location of flooding detection sensors should be subject to special consideration.

Alarm installation

11 Each flooding detection system should give an audible and visual alarm at the navigation bridge and the safety centre, if located in a separate space from the navigation bridge. These alarms should indicate which watertight space is flooded.

12 Visual and audible alarms should conform to the Code on Alarms and Indicators, 1995, as may be amended, as applicable to a *primary alarm* for the preservation or safety of the ship.

Design requirements

13 The flooding detection system and equipment should be suitably designed to withstand supply voltage variation and transients, ambient temperature changes, vibration, humidity, shock, impact and corrosion normally encountered in ships. Sensor cabling and junction boxes should be suitably rated to ensure operability of the detection system in a flooded condition. In addition, the detection system should be designed on the fail-to-safety principle, where an open sensor circuit should result in an alarm condition.*

14 The flooding detection system should be continuously powered and should have an automatic change-over to a stand-by power supply in case of loss of the normal power supply. Failure of the normal power supply should be indicated by an alarm.*

* Refer to the Code on Alarms and Indicators, 1995, as amended.

Detector maintenance, accessibility and testing

15 Documented operating, maintenance and testing procedures for the flooding detection system should be kept on board and be readily accessible.

16 Flooding detection system sensors and equipment should be installed where they are accessible for testing, maintenance and repair.

17 The flooding detection system should be capable of being functionally tested using either direct or indirect methods. Records of testing should be retained on board.
