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**REVISED GUIDANCE FOR WATERTIGHT DOORS ON PASSENGER SHIPS
WHICH MAY BE OPENED DURING NAVIGATION**

1 The Maritime Safety Committee, at its ninety-eighth session (7 to 16 June 2017), adopted resolution MSC.421(98), containing, inter alia, amendments to the SOLAS chapter II-1 subdivision and damage stability regulations. In this regard, one of the amendments removed a provision in regulation II-1/22 that had permitted certain watertight doors to remain open during navigation, if authorized by the Administration.

2 Consequently, the Committee, with a view to providing updated guidance for watertight doors on passenger ships which may be opened during navigation under SOLAS regulation II-1/22 and their impact on the damage stability survivability, approved the annexed *Revised guidance for watertight doors on passenger ships which may be opened during navigation*, prepared by the Sub-Committee on Ship Design and Construction, at its second session.

3 The Revised guidance contains the following appendix: Floatability assessment.

4 Member States are invited to apply and bring the annexed Revised guidance to the attention of passenger shipowners, operators and all other parties concerned for application to passenger ships constructed on or after the date of entry into force of the associated amendments to SOLAS regulation II-1/22.

ANNEX

REVISED GUIDANCE FOR WATERTIGHT DOORS ON PASSENGER SHIPS WHICH MAY BE OPENED DURING NAVIGATION

1 Preamble

1.1 Watertight subdivision is vital to ship stability and survivability to protect life, property and the marine environment in cases of hull damage after collision or grounding. The number of openings in watertight bulkheads on passenger ships is to be kept to a minimum in accordance with SOLAS regulation II-1/13.1.

1.2 In order to maintain watertight subdivision, while allowing for the safe and effective operation of the ship, all watertight doors are to be kept closed during navigation, except in certain limited circumstances. SOLAS regulation II-1/22.3 allows a watertight door to be temporarily opened to permit the passage of passengers or crew, or when work in the immediate vicinity of the door necessitates it being opened. In this case, the door must be immediately closed when transit through the door is complete or the work is finished.

1.3 The SOLAS chapter II-1 regulations referred to in this guidance means SOLAS chapter II-1 regulations amended by resolution MSC.421(98) (entry into force on 1 January 2020).

2 Introduction

This guidance is intended to ensure that watertight doors which may be opened during navigation do not inadvertently provide a weak link in the required damage stability survivability of passenger ships.

3 Importance of watertight doors

3.1 Failure to recognize the importance of watertight doors can have great impact on the watertight integrity of the ship and have catastrophic consequences. When structural damage occurs to a ship, especially during collision or grounding, there is potential risk for bulkheads and decks to be deformed, thus rendering watertight doors not able to be closed. The risk of progressive flooding following such deformation of the ship's structure may increase if watertight doors are either left open or unable to be closed.

3.2 Another potential risk to ship survivability is when large amounts of water flood a ship, especially after extensive structural damage. The rate of water ingress, which depends on the size of the damaged opening and the water pressure, can quickly flood a compartment. It is therefore essential that a ship has sufficient survivability in case of damage, keeping in mind that when adjacent watertight doors are open, several compartments may be flooded as watertight doors have up to 60 s to close per SOLAS regulation II-1/13.5.1.

4 Operation of watertight doors

Power-operated watertight doors are designed to be remotely closed in a short period of time with a force the magnitude of which is sufficient to overcome not only the weight of the door but also water flowing through its opening, both while a ship is listing 15° in either direction. The operation of watertight doors involves possible dangers to persons passing through a closing door and injury or loss of life is likely to occur to anyone trapped in the door's path. The audible alarm that sounds for a few seconds before the door starts moving, and continues sounding while the door is in motion, is intended to reduce the human element risk.

5 SOLAS regulations and technical standards for watertight doors

SOLAS regulation II-1/13 provides the technical standards for watertight doors in passenger ships. The basis of this regulation is that all watertight doors shall be kept closed during navigation according to SOLAS regulation II-1/22.1, except as follows:

- .1 watertight doors may be opened during navigation to permit the passage of passengers or crew. The door must be immediately closed when transit through the door is complete; and
- .2 watertight doors may be opened during navigation when work in the immediate vicinity of the door necessitates it being opened. The door must be immediately closed when the task which necessitated it being open is finished.

6 Categories of watertight doors

In order to assist Administrations, passenger ship owners and operators in determining to what extent watertight doors may be opened during navigation, watertight doors may be categorized into one of three different types of doors:

- .1 Category B watertight doors:

A watertight door that may be opened during navigation when work in the immediate vicinity of the door necessitates it being opened, according to SOLAS regulation II-1/22.3. The door must be immediately closed when the task which necessitated it being open is finished.
- .2 Category C watertight doors:

A watertight door that may be opened during navigation to permit the passage of passengers or crew, according to SOLAS regulation II-1/22.3. The door must be immediately closed when transit through the door is complete.
- .3 Category D watertight doors:
 - .1 A watertight door of a width of more than 1.2 m in machinery spaces as permitted by SOLAS regulation II-1/13.10, shall remain closed during navigation except in case of urgent necessity at the discretion of the master according to SOLAS regulation II-1/22.4.
 - .2 Additionally, watertight doors fitted in watertight bulkheads dividing cargo between deck spaces in accordance with SOLAS regulation II-1/13.9.1 or dividing cargo spaces in accordance with SOLAS regulation II-1/14.2, shall be closed before the voyage commences and shall be closed during navigation according to SOLAS regulation II-1/22.5.

7 Considerations to be made on categories B and C watertight doors which may be opened for limited periods, or for passage

7.1 A watertight door of category B or C should be clearly indicated in the ship's stability information and should always be ready to be immediately closed. Category D doors should also be clearly indicated in the ship's stability information.

7.2 Category B watertight doors could potentially be open for extended periods of time when navigating in non-hazardous areas if necessitated by work in the immediate vicinity of the door. Therefore, in order to provide a measure of residual stability, all category B watertight doors should undergo a floatability assessment as set out in the appendix, and meet the specified floatability criteria in section 3 of the appendix.

8 Factors restricting the operation of watertight doors

Certain operating conditions, or combinations of several factors, should necessitate categories B and C watertight doors being closed during navigation to preserve survivability. In particular, the area in which the ship is operating should be continually evaluated for associated risks with any potentially hazardous conditions. It is recommended that categories B and C watertight doors are kept closed during navigation while the ship is operating:

- .1 in waters with high traffic density;
- .2 near coastal waters;
- .3 in heavy weather;
- .4 in dangerous ice conditions;
- .5 in waters where soundings are unreliable;
- .6 during periods of restricted visibility;
- .7 within port limits or compulsory pilotage waters;
- .8 when loose objects are nearby, which could potentially prevent the watertight door from being closed; or
- .9 under any condition when the ship's master considers the situation to necessitate all watertight doors to be closed.

9 Operational instructions, markings and postings

9.1 Operational instructions

Operational instructions for watertight doors should be included in the ship's stability information and address the situations described in paragraphs 9.2 and 9.3. Additionally:

- .1 a copy of the operational instructions should be located at the central operating console at the navigation bridge so as to be readily available to the officer in charge of the navigation watch;
- .2 the operational instructions should state the means of verifying the correct position of all watertight doors; and
- .3 the operational instructions should cover procedures for operating watertight doors to permit safe passage of passengers, in particular, that watertight doors should only be operated by qualified persons and not by passengers.

9.2 *Operational instructions in potentially hazardous situations*

9.2.1 A potentially hazardous situation is defined as a situation when the ship is on a voyage and operating in conditions as described in paragraph 8.

9.2.2 The operational instructions should specify that, while the ship is navigating in potentially hazardous situations, every watertight door of category B or C be closed except when a person is passing through it. If such doors are opened for passage then it should be closed immediately after passage.

9.3 *Operational instructions in normal situations*

9.3.1 A normal situation is defined as a non-hazardous situation when the ship is on a voyage and operating in conditions other than as described in paragraph 8.

9.3.2 The operational instructions should specify that while the ship is navigating in normal situations each watertight door of category B or C be operated in accordance with the assigned category (see paragraph 6).

9.4 *Markings and postings*

9.4.1 The assigned category and meaning of each category should clearly be marked on both sides of either the watertight door or the bulkhead adjacent to the door in order to ensure correct operation.

9.4.2 The assigned category for each watertight door should be indicated on or near the central operating console located on the navigation bridge in order that the correct status of all doors can be ascertained.

APPENDIX

FLOATABILITY ASSESSMENT

1 Introduction

1.1 This floatability assessment is intended to provide a measure of residual stability if category B watertight doors are opened for extended periods of time when navigating in non-hazardous areas if necessitated by work in the immediate vicinity of the door.

1.2 Care should be exercised not to confuse the "floatability assessment" criteria used in this procedure with the requirements in the SOLAS chapter II-1 damage stability regulations.

2 Damage and flooding extent for the floatability assessment

2.1 A floatability assessment calculation should be performed for each category B watertight door. Only the individual category B watertight door under consideration need be assumed open for the calculation.

2.2 The extent of damage to be assumed for the floatability assessment should be as defined in SOLAS regulation II-1/8.3. In addition, watertight compartments inboard of the transverse extent of damage should be assumed flooded, irrespective of whether any longitudinal bulkheads are fitted with watertight doors, if:

- .1 the inboard compartment is within the longitudinal damage extent; and
- .2 the inboard compartment is connected by the watertight door under consideration.

If any lesser damage extents than indicated above would result in a more severe condition with respect to the floatability criteria, then such damage extents should be assumed in the calculations. In this context, the damage extent should be assumed as both penetrating and not penetrating the double bottom.

2.3 The floatability assessment should account for the worst case involving the additional flooding of the compartment connected by the category B watertight door under consideration.

3 Criteria for the floatability assessment

3.1 For each assumed flooding case described in section 2, the floatability criteria described below should be met at the deepest subdivision draught at level trim. For this loading condition, the limiting KG or GM should be assumed in the calculations.






- .1 The bulkhead deck may be immersed provided that no progressive flooding occurs (i.e. weathertight openings may not be immersed; only watertight openings may be immersed).
- .2 The maximum positive righting lever should not be less than 0.05 m.
- .3 The range of positive righting levers should not be less than 7°.
- .4 The maximum equilibrium heel angle should not exceed 15°.

3.2 The Administration may accept alternative methodologies if it is satisfied that at least the same degree of safety as represented by this procedure is achieved (reference is made to SOLAS regulation II-1/4.3).

EXPLANATORY SKETCHES

Notes:

In case of a ship carrying less than 400 persons, the breach should only be considered between transverse bulkheads (if spaced by more than 0.03L).

-  Category B watertight door under consideration and assumed open
-  Other category B watertight doors assumed closed
-  Direct flooding (paragraph 2.2)
-  Additional inboard compartment flooding according to paragraph 2.2
-  Additional flooding according to paragraph 2.3

