

MARITIME SAFETY COMMITTEE
92nd session
Agenda item 6

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PASSENGER SHIP SAFETY

Preliminary recommendations arising from the Costa Concordia marine casualty investigation

Submitted by Italy

SUMMARY

Executive summary: This document provides the preliminary recommendations arising from the marine casualty investigation into the loss of the passenger ship **Costa Concordia** for consideration by the Committee

Strategic direction: 5.1, 5.2, 5.4

High-level action: 5.1.1, 5.1.2, 5.1.3, 5.2.1, 5.2.2, 5.4.1

Planned output: No related provisions

Action to be taken: Paragraph 15

Related documents: MSC 91/7/5, MSC 91/9/7, MSC 91/WP.2 and MSC/92/INF.6

BACKGROUND

1 At its ninety-first session, the Committee noted with appreciation the progress reports on the ongoing investigation into the loss of the **Costa Concordia** presented by the Government of Italy (MSC 91/7/5 and MSC 91/7/7). The Committee also considered document MSC 91/WP.12 (Secretary-General) which addressed the most urgent management and operational issues upon which the Secretary-General considered the Organization already had enough information to take action.

2 Based on the outcome of a working group it established at that session, the Committee agreed to establish mandatory measures on the issue of muster policy for ships engaged on a voyage where passengers are scheduled to be on board for more than 24 hours and approved draft amendments to SOLAS regulations III/19.2.2 and III/19.2.3, and requested the Secretary-General to circulate them in accordance with SOLAS article VIII, with a view to adoption at MSC 92.

3 In considering the issue raised in regard to unnecessary disruptions and distractions to the bridge team, the Committee considered that this was already adequately covered by SOLAS regulation V/15.6, the additional guidance contained out in MSC.1/Circ.1446 and the



appropriate sections of ship safety management systems developed and approved under the ISM Code. In regard to the conditions under which a master may deviate from the approved voyage plan for reasons other than safety or environmental protection, the Committee noted the group's discussion on whether companies, as defined in SOLAS regulation IX/1.2, should develop policies and procedures to specify the aforementioned conditions and concurred with the view of the group that mandatory measures should not be prepared at this stage.

4 In establishing the working group, the Committee emphasized that these actions did not preclude the Committee from taking further substantive actions on both operational and technical issues following receipt of the casualty report into the loss of the **Costa Concordia**.

PRELIMINARY OUTCOME AND RECOMMENDATIONS OF THE CASUALTY INVESTIGATION

5 The following recommendations have been made, notwithstanding that issues related to the human element are at the root of the loss of the **Costa Concordia**. Nevertheless, following the investigation, Italy considers it appropriate to bring to the notice of the international maritime community its views regarding the growing size of passenger cruise ships and believe that investigation of issues relating to:

- .1 mitigating the human contribution factor with education, training and technology;
- .2 improving day by day the standards of construction, through modern technology; and
- .3 the need for the maritime community to make the maximum contribution to the related study and consequent technical research.

The following recommendations must be considered the starting point of the actions to be taken consequent to this extraordinary tragedy, since we believe that many other issues could arise, reflecting the need to consider further the three issues above.

6 It should be recalled that in the interim period from the beginning of the investigation and the publication of the final report, some of the issues identified by the investigation have already been implemented on ships flying the Italian flag and taken on board by the Organization (e.g. MSC.1/Circ.1446/Rev.1, and in the long-term action plan on passenger ship safety).

Preamble

7 The immediate flooding of five watertight compartments, where most of the vital equipment of the ship was located, makes the **Costa Concordia** casualty quite a unique event. The extent of damage is well beyond the survivability standard applicable to the ship according to her keel laying date. However, the investigation has allowed the identification of some recommendations, the adoption of which could constitute an improvement of the current requirements. The aim of some recommendations is already taken into account by the SOLAS Convention for new buildings or existing ships, through various amendments to the Convention including:

- .1 requirements for segregation and redundancy of vital equipment for propulsion, steering and navigation, i.e. SOLAS regulations II-1/8-1, II-2/21 and II-2/22 on the safe return to port, applicable to ships built on or after 1 July 2010;

- .2 onboard stability computer (or shore-based support), applicable to passenger ships subject to the safe return to port requirements and built on or after 1 January 2014, i.e. SOLAS regulation II-1/8-1.3 as contained in resolution MSC.325(90);
- .3 flooding detection system, for ships built on or after 1 July 2010 as per SOLAS regulation II-1/22-1; and
- .4 use of Electronic Chart Display System (ECDIS), SOLAS regulation V/19.2.2.3.2 applicable to all passenger ships (for those constructed before 1 July 2011, the requirement shall be met not later than the first survey after 1 July 2012).

However, the recommendations given below may emphasize the necessity for reconsideration of some of the above requirements. It must be pointed out that the adoption of these recommendations may permit an improvement in the ship's survivability as a result of a casualty like the one involving **Costa Concordia**; although they may not be sufficient to render the ship unsinkable when more than two watertight compartments (WTC) are flooded.

Stability issues

8 It is recommended that the following items are considered with the aim of improving the existing requirements:

- .1 double-skin for protecting the WTCs containing equipment vital for the propulsion and electrical production;
- .2 limiting of the down flooding points on the bulkhead deck to be discussed in the light of part B-2 of SOLAS chapter II-1;
- .3 provision of a computerized stability support for the master in case of flooding; and
- .4 interface between the flooding detection and monitoring system and the on board stability computer, taking into consideration SOLAS regulations II-1/8-1 and II-1/22-1.

Items in .1 and .2 above, are to be addressed to new ships while the discussion on the content of items .3 and .4 above should be extended to both new and existing ships.

Vital equipment and electrical distribution

9 The following issues need to be discussed for possible improvements of the existing requirements:

- .1 discontinuity between compartments containing ship's essential systems (such as propulsion sets or main generators sets) in order to preserve their functional integrity (reference should be made to SOLAS regulation II-2/21);
- .2 more detailed criteria for the distribution, along the length of the ship, of bilge pumps and requirement for the availability of at least one pump having the capacity to drain huge quantities of water (reference should be made to regulation II-1/35-1, SOLAS 74 as amended); and

- .3 relocation of the main switchboard rooms above the bulkhead deck (reference should be made to SOLAS regulation II-1/41).

The above-mentioned recommendations are to be addressed to new ships only.

Emergency power generation

10 Regarding the emergency source of electrical power (ref. SOLAS regulation II-1/42), the following should be considered:

- .1 increasing the emergency generator capacity to feed also the high capacity pump(s) mentioned in the previous paragraph (Vital equipment and electrical distribution);
- .2 provision of a second emergency diesel generator located in another main vertical zone in respect to the first emergency generator and above the most continuous deck. In this respect, consideration of the definition of "most continuous deck" in the light of SOLAS regulation II-1/42.1.2 seems to be necessary. This second generator could be dimensioned on the basis of selected services. The related manufacturing and handling should be as follows:
 - .1 new emergency diesel generators are made according to aimed and specific building techniques in order to guarantee unfailing and long-lasting functioning;
 - .2 regulate in an optimal way the functioning tests, planning them once a week, under a significant load (at least 50%) and of at least two hours duration for both the emergency diesel generators; and
- .3 provision of an emergency light (both by UPS and emergency generator) in all cabins in order to directly highlight the life jacket location.

Although the above recommendations are to be addressed to new ships, consideration on the applicability of items .2 and .3 to existing ships is also suggested.

Operational matters

11 The **Costa Concordia** casualty demonstrated that there is the need for verifying the actuality of provisions contained in international instruments, such as SOLAS, STCW and ISM Code related to different issues such as:

- .1 bridge management, considering aspects such as the definition of a more flexible use of the resources (that may be tailored for responding to ordinary, critical, emergency conditions), an enhanced collective decision making process and "thinking aloud" attitude;
- .2 *Principles of Minimum Safe Manning* (resolution A.1047(27)) should be updated to better suit large passenger ships. A mandatory application of these principles is also considered desirable;
- .3 Bridge Team Management course for certification renewal should be mandatory by the 1 January 2015;

- .4 muster list, showing the proper certification/documentary evidence necessary for crew members having safety tasks;
- .5 relocation of the UHF radio switchboard above the bulkhead deck, for all existing ships which are provided with this equipment below that deck, and related installation of that equipment there, for new ships; and
- .6 inclusion of the inclinometer measurements in the VDR.

The above items could be applicable to both new and existing ships.

Evacuation analysis

12 Regarding evacuation analysis, the following should be considered:

- .1 for new ships, it would be useful to require an evacuation analysis to be carried out at the early stage of a project (ref. regulation II-2/13-7.4, SOLAS 74 as amended), extending in a mandatory way the above regulation, which is currently limited to ro-ro passenger ships; and
- .2 with respect to embarkation ladders: with the ship listed at an angle exceeding 20°, it was demonstrated that traditional embarkation ladders were more useful. Therefore, in the light of this it may be necessary to consider whether the minimum number of embarkation ladders (one) on each side should be increased (SOLAS 74 as amended reg. III/11.7).

Search and rescue

13 This casualty provides special lessons in terms of SAR experience. Despite the main and unbelievable lesson learned, that is, the delay and the missing information provided by the ship, other issues have come to light related to SAR resources leading to recommending provision of the following:

- .1 SAR patrol boat fitted with fixed fenders, blocked in the upper side of the hull, to safely approach other ships and boats in case of extraordinary evacuation of persons. This boat should be able to load at least 100 passengers on their deck; and
- .2 divers, particularly those familiar with working in confined spaces underwater (speleologists), able to rescue, even in dark condition, persons located in such spaces.

FINAL REPORT AND RECOMMENDATIONS

14 The final casualty investigation report with its analysis and recommendations will be presented to the Committee in an information document in due course and available on the GISIS and EMCIP platforms.

Action requested of the Committee

15 The Committee is invited to consider the information provided and decide, as appropriate.