



MARITIME SAFETY COMMITTEE
87th session
Agenda item 20

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GENERAL CARGO SHIP SAFETY

IACS FSA study – Step 2 (Risk analysis)

Submitted by International Association of Classification Societies (IACS)

SUMMARY

Executive summary:	This document provides a summary report of the Risk Analysis (FSA Step 2) from the FSA study that has been conducted by IACS regarding General Cargo Ship Safety
Strategic direction:	5 and 12.1
High-level action:	5.2.1 and 12.1.2
Planned output:	12.1.2.2
Action to be taken:	Paragraph 7
Related documents:	MSC 77/25/4; MSC 82/21/19; MSC 85/19/1; MSC 86/INF.4; MSC 87/INF.3 and MSC 87/INF.4

1 At MSC 77, the issue of General Cargo Ship Safety was brought to the attention of the Committee by RINA (MSC 77/25/4). IACS investigated the current situation of General Cargo Ships and submitted this evaluation of historical data to IMO (MSC 85/19/1 and MSC 86/INF.4). As reported in documents MSC 87/INF.3, MSC 86/INF.4 has subsequently been updated to include two additional years of historical data so that it now represents the period from 01/01/1997 to 31/12/2008. This evaluation is the step 1 of a Formal Safety Assessment study.

2 Subsequent to undertaking this step 1, the casualty records for General Cargo Ships have been investigated and the risk model developed for ships with a gross tonnage of 500 or above and built after 1982. This risk model, the step 2 of an FSA, is reported in detail in the annex to document MSC 87/INF.4.

3 This risk model has been developed for the ship accident categories of collision, contact, foundering, hull damage, fire/explosion, machinery damage and wrecked/stranded using the format of event trees. The risk model considers the risk categories of safety and environment. The consequences to property are not quantified in this report. This will be done during the cost-benefit assessment (FSA Step 4). The most important findings of the report provided in the annex to document MSC 87/INF.4 are:

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- .1 Collision scenarios represent about 16% of all identified accidents. This accident category is mostly observed in harbours, rivers/canals and coastal waters. The consequences to property vary between slight damage to the ship structure and total loss of the ship. On average, 6.3% of collision accidents result in fatalities. The probability of an oil release in a collision accident is calculated to be 5.4%.
- .2 Contact scenarios represent about 7% of all identified accidents. These accidents mostly occur in harbours and rivers/canals. The consequences vary, with the majority leading to small damages to the ship structure and have a relatively low importance for crew safety. The average number of fatalities per contact accident is estimated as 0.122. Only one accident with the release of fuel oil was reported in the period under consideration.
- .3 Foundering scenarios represent about 4% of all identified accidents. Typically, foundering occurs in open sea or coastal waters. Nearly 50% of all fatalities reported for General Cargo Ships in class with IACS Members for the evaluation period are related to this accident category with an average number of fatalities per accident as 5.4. The release of bunker oil is considered by postulating spill sizes with respect to the capacity of bunker tanks determined for an average 5,000 GRT vessel.
- .4 Hull damage scenarios represent about 16% of all identified accidents and are associated with heavy weather damage, structural degradation and listing most probable to cargo shift. Repairs were required for 86% of the cases, whilst the remaining 14% did not need repair. The average number of fatalities per accident has been calculated as 0.3. One total loss was recorded where it can be assumed that the release of oil is equal to the amount included in one tank (120 tonnes).
- .5 Fire and explosion scenarios represent about 8% of all identified accidents. Engine-room and accommodation fires are considered to be common for all cargo ship types. Explosions in engine-rooms are associated with crankcases (main engines) and boilers, whereas explosions in cargo holds are related to lack of knowledge or exact documentation of cargo content and which precautions should be taken into account for the transported cargo. Fire fighting by onboard means was successful for almost 64% of the cases. The average number of fatalities per accident has been calculated as 2.1. One incident was recorded with unknown spill quantity where it is assumed that the release of oil could be equal to the amount of oil in one tank (120 tonnes).
- .6 Machinery damage scenarios account for nearly 37% of all identified accidents. Most probable causes could be attributed to wear out of equipment (88%), maintenance procedures not being carried out properly (10%) and failure of gauging equipment (2%). The average number of fatalities per accident has been calculated as 0.8 and only one incident has been recorded with the release of oil (515 tonnes).
- .7 Wrecked/stranded scenarios represent about 22% of all identified accidents. These accidents are observed in harbours, rivers/canals and coastal waters and are distinguished as powered grounding caused by human or technical error (steering failure) and drift grounding followed by a blackout or loss of propulsion. Nearly 15% of all fatalities are caused by this accident category. The fatality rate per accident is 0.19, increasing with the damage extent (2.65 for total losses). In total, 5% of all reported accidents caused environmental pollution.

4 IACS will continue this FSA study. The next step (FSA step 3) is identification of Risk Control Options (RCOs). The most promising RCOs will be subject to cost effectiveness assessment (FSA step 4) and will be recommended for decision-making if cost effective (FSA step 5).

5 Flag States and non-governmental organizations are encouraged to use this report for their own internal RCO workshops, and for proposing promising RCOs for further assessment, or for decision-making.

6 The risk models in this report have been developed based on statistics for the IACS fleet. As indicated in document MSC 82/21/19 and further discussed in document MSC 87/INF.3, the non-IACS General Cargo Ships may have a higher fatality and loss rate. It therefore seems advisable for IMO to look closer into this fleet.

Action requested of the Committee

7 The Committee is invited to note the report as set out in the annex to document MSC 87/INF.4 and take it into account, as appropriate, in its further consideration of this issue.
