INTERNATIONAL MARITIME ORGANIZATION

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86th session
Agenda item 19

MSC 86/19/1
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GENERAL CARGO SHIP SAFETY

Comments on an FSA study

Submitted by Germany

SUMMARY

Executive summary:	This document comments on the initial steps of a formal safety assessment study on general cargo ships (GCS) relating to analysis of casualty data
Strategic direction:	2, 5.2 and 12.1
High-level action:	2.1.1, 5.2.1 and 12.1.2
Planned output:	12.1.2.2
Action to be taken:	Paragraph 17
Related documents:	MSC 72/16; MSC 83/INF.2; MSC 82/21/19; MSC 83/20/1, MSC 83/20/3, MSC 83/20/5, MSC 83/INF.3 and MSC 83/INF.8; MEPC 58/INF.2; MSC 85/19/1, MSC 85/19/2 and MSC 85/19/1

Introduction

1 At MSC 77, the situation of general cargo ship safety was brought forward to the Committee (MSC 77/25/4). A comparison based on the characteristics total loss and individual risk showed a lower safety level of general cargo ships than for other ship types, e.g., tanker, bulk carrier, container, ro-ro cargo, ro-pax and cruise ships.

2 At MSC 82, this issue of general cargo ship safety was again brought to the attention of the Committee (MSC 82/21/19). In document MSC 82/21/19, the disparity was highlighted between the fraction of general cargo ships of the world fleet (17% in number of ships) and the share of this ship type of all total losses (42%) and of all fatalities (27%) for the period 1999 to 2004. Additionally, the Paris MoU statistics was highlighted which documented that general cargo ships had the second highest rate of port State inspections with deficiencies (60% of inspections of general cargo ships compared with an average of 54% for all types of ships) and detentions (8% of inspections of general cargo ships compared with an average of 6% for all types of ships).

3 Under the agenda item 20 of MSC 83 several submissions were made providing results of investigations that show the obvious deficiencies in general cargo ship safety in comparison to other ship types.

4 At MSC, IACS, co-sponsored by Germany and Norway, submitted a report that summarized the results of a comprehensive statistical analysis of general cargo ship casualty reports (MSC 85/19/1). Germany highly appreciates the initiative by IACS to perform this investigation which forms the preparatory step of a formal safety assessment (FSA). The submitted results provide not only average values for fatalities and total losses, but considered and displayed the uncertainty too. Hence, this investigation addresses issues that were raised in conjunction with similar statistical investigations. Furthermore, the selection of the representative population was explained in detail which provides information also relevant for other IMO topics.

5 The results of the statistical analysis of historical data submitted to IMO (MSC 85/19/1) showed the:

.1 present safety situation of general cargo ships in relation to other ship types;

.2 significant contribution of occupational risk to the overall risk; and

.3 problem of availability of casualty reports (under reporting).

6 Hence, it is expected that the findings of this investigation may contribute to the ongoing discussion in the GBS Working Group as it addressed the issues of determination of the current safety level and the monitoring of the effectiveness of rule and regulations.

Characterization of safety of general cargo ships

7 The statistical analysis performed by IACS was focused on the following selection of general cargo ships:

.1 ships “due or delivered” after 31-12-31 and before 01-01-2007 (corresponding to a maximum ship age of 25 at the end of the investigation period);

.2 a gross tonnage greater than 499;

.3 classed by IACS society (based on the assignment in LRFP 2007); and

.4 casualty reports for IACS classed ships and classified as “severe” accident.

8 The statistical data in terms of accident frequency are produced for:

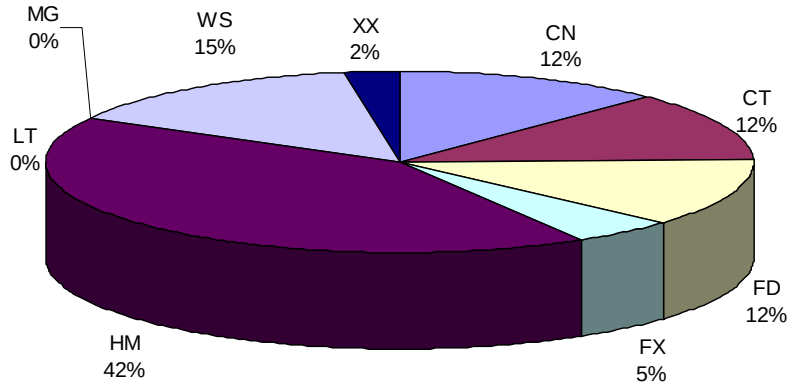
.1 The size categories:

- $500 \leq GT < 1{,}000$;
- $1{,}000 \leq GT < 20{,}000$; and
- $20{,}000 \leq GT$.

.2 The accident categories:

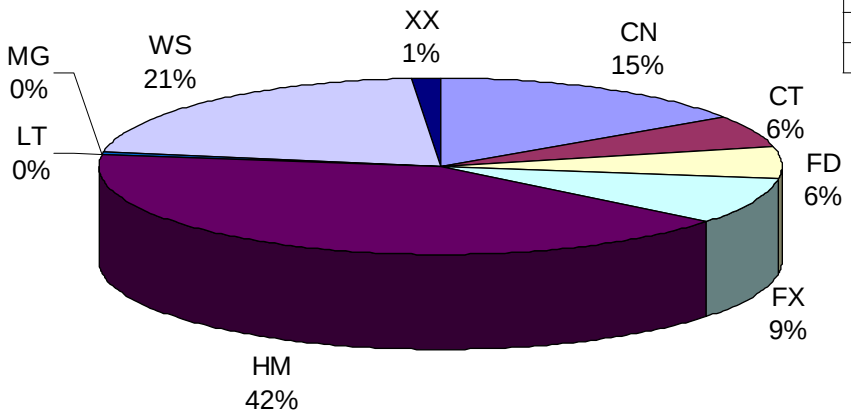
- all severe;
- total loss; and
- killed and missing.

9 The results with respect to the accident categories and to the defined size categories are shown in Figure 1 to Figure 3. This statistical investigation was based on 1,012 severe accidents for IACS classified ships listed in LRFP casualty database reported for a ten year interval between 1997 and 2007. For the size categories below 1,000 GT and greater or equal to 20,000 GT, only a limited number of accidents was available. However, the casualty reports available for ships of the size category ≤ 1,000 GT < 20,000 GT, 946 casualty reports were available which provide a sound basis for statistical investigations. As shown by Figure 2 the majority of the accidents reported were caused by hull/machinery incidents (42%). The next significant accident contributors are the categories wrecked/stranded (21%) and collision (15%).



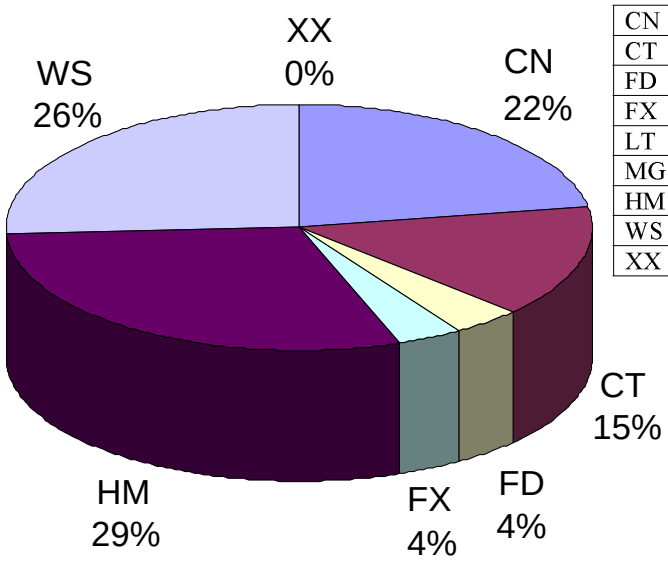
CN	Collision
CT	Contact
FD	Foundering
FX	Fire / Explosion
LT	War Loss
MG	Missing
HM	Hull / Machinery
WS	Wrecked Stranded
XX	Miscellaneous

Figure 1: Relative distribution of casualty reports over the different accident categories for IACS class ships of size 500 ≤ GT < 1,000. Total number of accidents 39



CN	Collision
CT	Contact
FD	Foundering
FX	Fire / Explosion
LT	War Loss
MG	Missing
HM	Hull / Machinery
WS	Wrecked Stranded
XX	Miscellaneous

Figure 2: Relative distribution of casualty reports over the different accident categories for IACS class ships of size 1,000 ≤ GT < 20,000 GT
Total number of accidents: 946



CN	Collision
CT	Contact
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LT	War Loss
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XX	Miscellaneous

Figure 3: Relative distribution of casualty reports over the different accident categories for IACS class ships of size 20,000 ≤ GT. Total number of accidents: 27

10 An additional analysis shows that for the ship size category 1,000 ≤ GT < 20,000 GT the following numbers of casualty reports classified into the different accident categories were provided in LRFP database.

CN	CT	FD	FX	HM	MG	WS	XX	Σ
140	52	52	78	406	4	202	12	946

11 The further analysis of the casualty reports for the ship category 1,000 ≤ GT < 20,000 GT showed that the number of accidents is not the relevant indicator to indentify the main risk contributors. Even if the majority of accidents (406) was categorized into hull/machinery the main risk contributors with respect to fatalities were foundering (41%), collision (21%), missing (16%) and wrecked/stranded (14%) which yields 92% of all fatalities due to ship accidents.

Investigation of accident causes

12 For all ship size categories, 44 accidents were reported causing 316 fatalities (killed and missing). Of these 131 fatalities were linked to the accident category foundering which yield an average of 2.5 fatalities per accident. It should be noted that, fortunately, only 18 of the 52 reported foundering accidents caused fatalities.

13 For the accident category the age of the ship at the data of accident is determined. The bar chart of this investigation is shown in Figure 4. The average age of a ship involved in a foundering accident is 14.4 years with a standard deviation of 5.8 years. These results show an accumulation for ships with an age between 15 years and 20 years. For this age category about 50% of all accidents were reported. A similar investigation was provided by A. Papanikolaou & E. Eliopoulou (Impact on ship age on tanker accidents, SNAME 2008) for crude oil tanker > 60,000 DWT. Even if this investigation led to deviating accumulations with respect to the age at the date of accident it was indicated that a relation between maintenance and foundering exists.

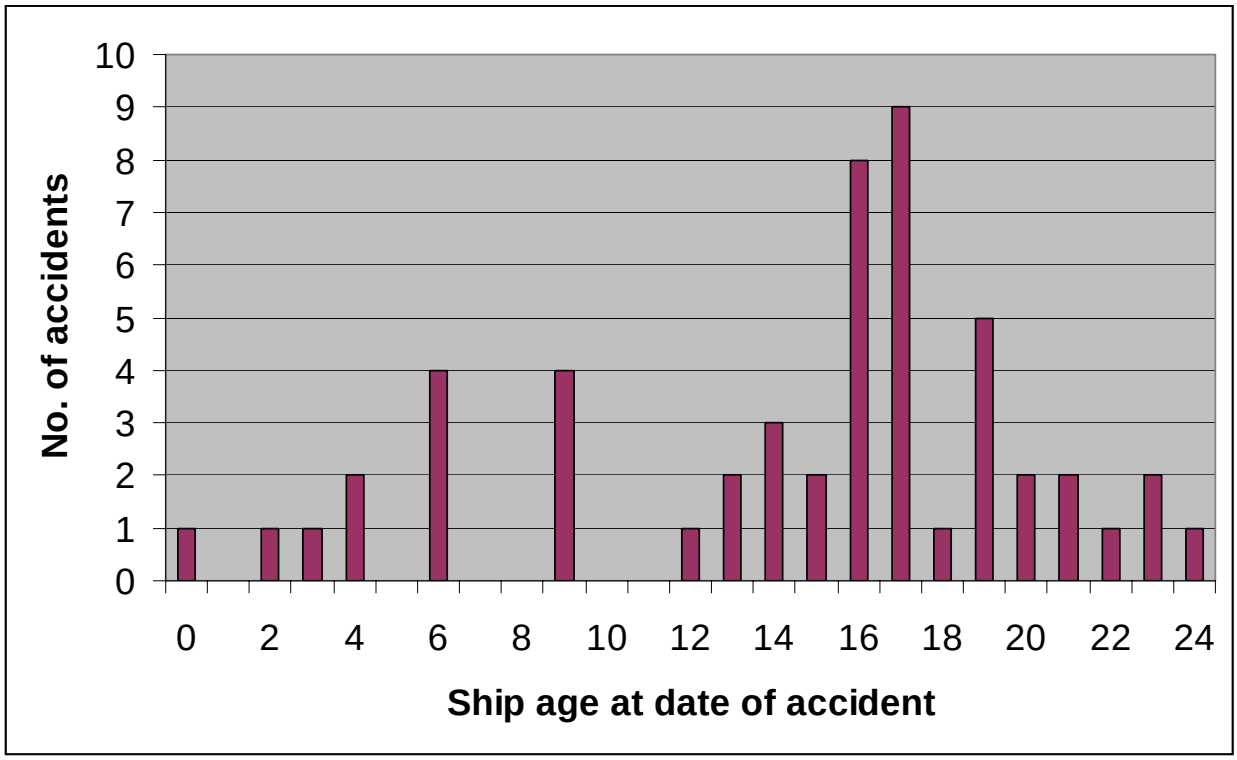

Figure 4: Bar chart of No. of foundering accidents vs the ship age at date of accident

14 A brief investigation of the casualty reports led to the result that the accident category "foundering" covers mainly accidents caused by:

.1 water ingress due to heavy weather or cargo shift or a combination of both;

.2 foundering in heavy weather; and

.3 foundering (no further causes provided by casualty reports).

Without any additional information with respect to the initial cause of the foundering accidents, it will hardly be possible to identify these initial causes by statistical analysis. Hence, substantial expertise should be used in the further FSA for General Cargo Ships to develop the risk model and to identify risk control measures.

15 The results for the investigation ship age at the date of collision accident are shown in Figure 5. As expected no relation between ship age and collision accident could be identified. The observed decrease in the number of accidents for older ships may be caused by the number of older ships operating in combination with the selection (only ships built after 1981) that considers no ships older than 25 years.

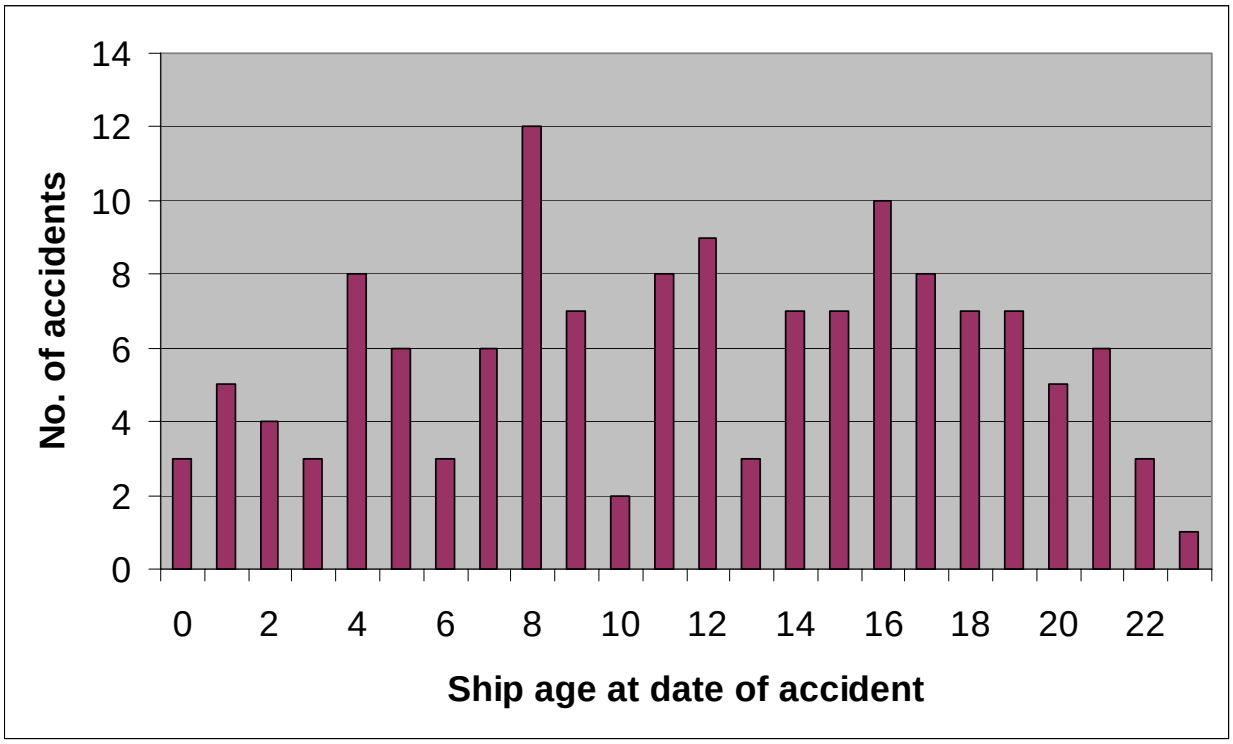

Figure 5: Bar chart of No. of collisions vs the ship age at date of accident

16 Germany offers the following observations regarding the study:

.1 the findings seem relevant to the monitoring safety (GBS WG) as such, including effects on goal-based standards;

.2 underreporting seems to be a problem that should be considered with respect to the monitoring of safety levels, determination of safety levels as well as any application of the formal safety assessment;

.3 the holistic risk should be taken into consideration in the further analysis and flag States should be requested to support the work by providing any available data; and

.4 the root causes for accidents should be investigated before RCOs are identified.

Action requested of the Committee

17 The Committee is invited to note the progress made on the above matter and decide as appropriate.