INTERNATIONAL MARITIME ORGANIZATION

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SUB-COMMITTEE ON CARRIAGE OF CARGOES AND CONTAINERS
11th session
Agenda item 15

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ANY OTHER BUSINESS

Enclosed space fatalities by rank for the period 2000 to 2024

Submitted by IBTA

SUMMARY

Executive summary:	This document provides an analysis of crew member fatalities by rank in enclosed spaces on all ship types for the period 2000 to 2024. It aims to support the provisions in the *Revised recommendations for entering enclosed spaces aboard ships* (resolution A.1050(27)), as revised by resolution MSC.581(110), by showing the relative fatality rates incurred by the different ranks, particularly the senior ranks.
Strategic direction, if applicable:	Not applicable
Output:	Not applicable
Action to be taken:	Paragraph 8
Related document:	CCC 11/15

Introduction

1 The annexed report provides an analysis of fatalities by crew member rank in enclosed spaces on ships for the 25-year period from 2000 to 2024. It provides additional information to that provided in document CCC 11/15 (IBTA).

Enclosed space fatalities by rank for the period 2000 to 2024

2 At least 1,010 ship and shore workers were found to have lost their lives in the 25 years between 2000 and 2024* in enclosed spaces aboard vessels covered by SOLAS, of whom 700 were crew members and 310 were shore workers. Of the 700 crew members, 464 were found to have been identified by rank. This report analyses the number of fatalities in enclosed spaces from all causes by rank, the key trends and the lessons learned.

* Document CCC 11/15.

3 The analysis found that while the able and ordinary seamen grouping and the engine-room officer/rating grouping had the highest numbers of fatalities, the individual ranks with the highest number of losses were chief officers and bosuns, followed by masters and chief engineers.

4 Most of these fatalities occurred during solid bulk and liquid bulk cargo-related operations. The non-cargo-related fatalities involved mainly engine crew members during routine maintenance, inspection and hot work activities on board.

5 It is clear from any review of accident investigation and other reports that the chief officer and bosun ranks have the highest individual accident rates of all ranks from all the main causes of accidents on ships, and not only enclosed space accidents.

6 The findings highlight the need for:

.1 resolution A.1050(27) on *Revised recommendations for entering enclosed spaces aboard ships* to be implemented in full as intended;

.2 positive structural measures to be implemented in order to reduce the time pressures on senior personnel, and all crew members, arising from "utmost urgency" clauses in charterparties;

.3 specific safety training to improve safety awareness and knowledge of the main hazards and risks to health and safety on board ships, and best industry practices on how to manage those risks;

.4 while this type of safety training is required for all crew members, chief officers and bosuns, as well as masters and chief engineers, to receive training on their responsibilities as team leaders for their own safety and the safety of those they supervise; and

.5 given the relatively high fatality rate amongst cadets, urgently providing specific safety induction training for cadets so that they are not a risk to themselves or to anyone else on board.

Proposal

7 The Sub-Committee is invited to consider the distribution of fatalities by rank and the various contributory factors and recommendations as outlined, to consider this information when reviewing relevant IMO guidelines and to encourage other industry organizations to also consider them when reviewing their own guidelines, codes and standards, as appropriate.

Action requested of the Sub-Committee

8 The Sub-Committee is invited to consider the information provided and the proposal in paragraph 7 above, and to take action, as appropriate.

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ANNEX

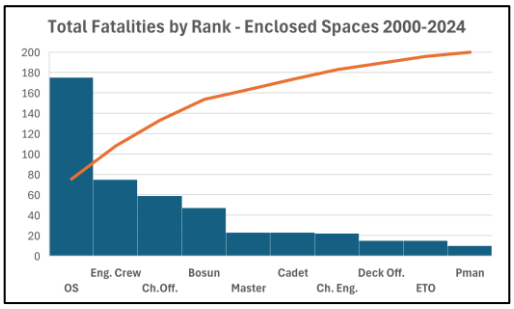
ENCLOSED SPACE FATALITIES BY RANK ABOARD SHIPS 2000 TO 2024

Kevin Cribbin Master Mariner, FCIS, G. IOSH - Technical Director, Vistrato Limited.

Background

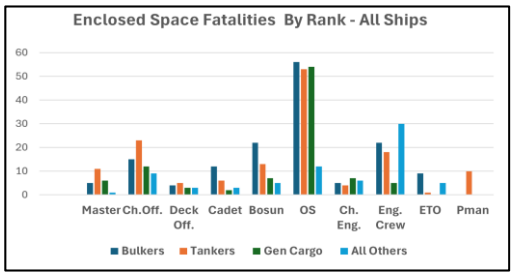
1 This document extends the information provided in the IBTA document CCC 11/15 so as to provide further information on the number of crew member fatalities in enclosed spaces by rank on all SOLAS ship types during the 25-year period from 2000 to 2024. This analysis is based on information derived from the IMO GISIS marine casualties database, flag and coastal State marine accident investigation reports, and P&I Club, MARS, MAIIF and other publicly available industry and reputable media sources.

Introduction



2 Vistrato has identified[1] at least 1,010 ship and shore workers fatalities between 2000 and 2024 in enclosed spaces on ships covered by SOLAS. Some 700 of those were crew members, of whom 464 were identified by rank in the various investigation and other reports of these accidents. For comparison purposes, it should be borne in mind that on average, every ship will carry at least five ordinary seamen[2] (OS) and five engine crew[3] members. Second and third officers are included as deck officers (DO). All other ranks are individual.

Summary



3 Of the 700 crew member fatalities in enclosed spaces between 2000-2024, only 464 could be identified by rank. The OS rank had the most losses with 175 fatalities, followed by engine crew (Engs) members with 75. Chief officers and bosuns on tankers and bulk carriers are the two individual ranks that had the most casualties, mainly cargo-related. These two ranks also have a high casualty rate on general cargo and all other ship types. Masters, chief engineers, cadets and electro-technical officers also have a relatively high casualty rate.

Enclosed space fatalities as identified by rank – 2000 to 2024.										
Master	**Chief officer**	**Deck officer**	**Cadet**	**Bosun**	**OS**	**Chief engineer**	**Eng. crew**	**[4]ETO**	**Pump man**	**Total**
23	59	15	23	47	175	22	75	15	10	464

1 Document CCC 11/15 (IBTA).

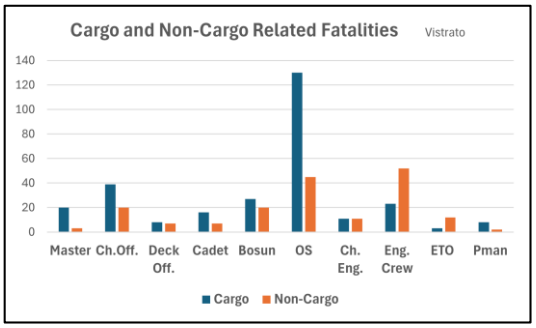
2 For the purposes of this review, the Ordinary Seaman rank includes Able Seamen and trainee ratings.

3 Engine Crew members include engineer officers, fitters and engine-room ratings.

4 ETO means electro-technical officer or electrician.

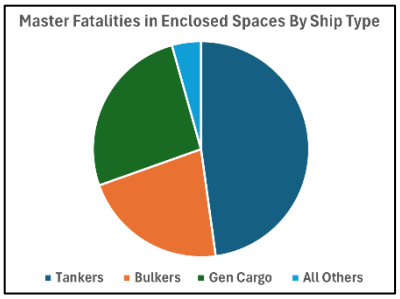
4 On the basis of this fatality rate, it can be extrapolated that of the 700 total fatalities in enclosed spaces between the period 2000 to 2024, the actual number of deaths by rank includes some 264 OS, 114 engine crew, 90 chief officers, 70 bosuns, 35 masters, 35 cadets and 33 chief engineers. There were also 22 deck officers and 22 ETOs, and 15 pumpmen. Chief officers and masters also have the highest casualties in rescue attempts. The casualty rate of chief officers and bosuns, the teams of OS that they lead, as well as masters as the overall managers, is an indication of the pressure they are under. The same applies to chief engineers and engine crew members. Accident report evidence indicates that chief officers and bosuns also have the highest individual casualty rates in the other main accident categories, i.e. falls from height, mooring and man overboard.

Cargo and non-cargo-related fatalities

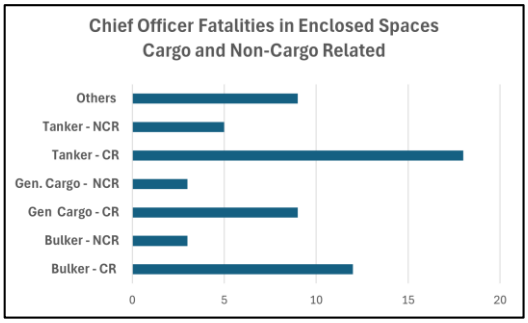


5 Cargo-related hazards on tankers, bulk carriers and general cargo ships were responsible for 564 (56%) of the 1,010 fatalities between the period 2000 to 2024 identified in document CCC 11/15. In total, 315 fatalities (31%) occurred on ships carrying solid bulk cargoes subject to the IMSBC and Grain Codes. The remaining 249 (25%) were liquid bulk related. Of the 464 crew identified by rank, 285 died in cargo-related and 179 in non-cargo-related accidents. Ordinary seamen (OS) had the most cargo-related and engine crew the most non-cargo fatalities. Most of the master, chief officer, cadet and bosun deaths were cargo-related.

Masters and chief officers



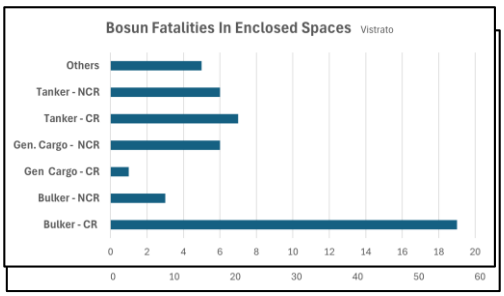
6 Of the 23 masters known to have died, 11 lost their lives on tankers, 5 on bulk carriers, 6 on general cargo ships and one on other ship types. 20 lost their lives in cargo-related operations, including 10 in rescues attempts. Of the 59 chief officers known to have died in enclosed spaces since 2000, 23 were on tankers, 15 on bulk carriers, 12 on general cargo and nine on other types. 11 chief officers died in rescues. Some 40 chief officers died in cargo and adjacent spaces mainly during cargo tank and hold cleaning, inspection and maintenance. A number of chief officers died while "dipping" a couple of steps down a tank access ladder to check the cleanliness of the tank. Anecdotally, this can happen when under pressure to check the last tank to be cleaned.



Deck officers

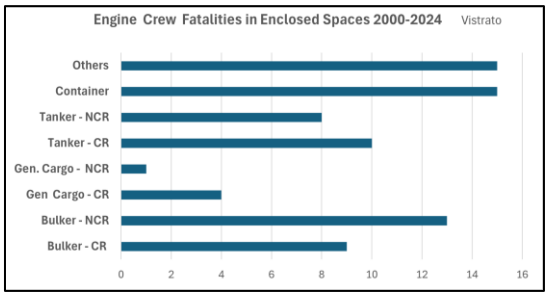
7 Of the 15 deck officers (second and third officers) found to have died in enclosed spaces on tankers, 4 were on bulk carriers, 3 on general cargo ships and three on other ship types; 8 during cargo-related operations. A third officer died in her cabin due to fumigant gas poisoning. She was the only female identified.

Cadets, bosuns and ordinary seamen



8 The sad fact that at least 23 cadets died in enclosed spaces should be a matter of real concern. Of those reported, 12 died on bulk carriers, 6 on tankers, 2 on general cargo and 3 on containerships. Some 16 cadets died in cargo operations. One cadet was poisoned by fumigant gas in his cabin, and one was crushed in an elevator shaft. Three were rescuers. At least 47 bosuns are known to have died in enclosed spaces, of which 27 were cargo and 20 were non-cargo-related. The cargo-related deaths occurred mainly during inspections, cargo sampling and hold and tank cleaning. Three were rescuers. At least 175 OS deaths were identified, of which 130 (75%) were cargo-related on bulk carriers (51), tankers (39) and general cargo ships (40). Thirteen were rescuers. Cargo-related fatalities occurred mainly during cargo handling, inspection, sampling and hold/tank cleaning. Twelve were rescuers.

Chief engineers, engineer officers and crew

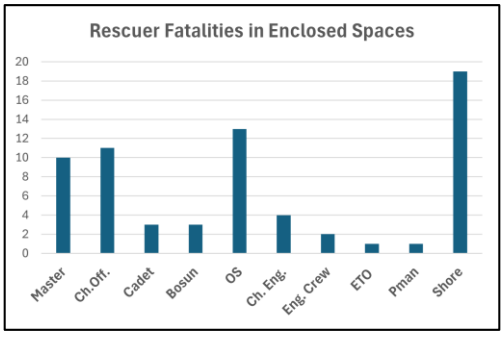


9 There were at least 22 known chief engineer fatalities, including 11 cargo-related (4 on bulk carriers, 4 on general cargo and 3 on tankers) mainly during inspections, maintenance, and hot work. Three were rescuers. There were at least 75 known engineer officer and crew fatalities, 23 during cargo-related maintenance or hot work. The other 52 occurred during non-cargo-related maintenance, including some 23 fatalities due accidental CO_2 releases. Two were rescuers.

Electro-technical officers and pumpmen

10 There were 15 known ETO fatalities. Of nine ETO fatalities on bulk carriers, three were cargo-related and four were crushed in elevator shafts. Another three ETOs died in elevator shafts on other ships – one each on a tanker, a container ship and a Ro-Ro. One was a rescuer. At least eight tanker pumpmen are known to have died during tank cleaning operations and two while recovering fallen objects from cargo tanks. One was a rescuer.

Rescuers who lost their lives



11 Of the 450 ship and shore workers that lost their lives in enclosed spaces that were oxygen depleted or contained toxic or fumigant gas, 67 (15%) were rescuers. Some 48 were crew members and 19 were shore workers. It is concerning that 10 of the 23 masters known to have died lost their lives in rescue attempts, as did 11 chief officers and three chief engineers. At least 19 shore workers died in rescue attempts in cargo spaces, apparently under the assumption that the casualty had tripped or fallen, almost always on the hold ladder. They typically would not have been told, and would have no way of knowing, that these spaces were oxygen-depleted and/or contained highly toxic gases undetectable by human senses.

Conclusions

12 Of the 700 crew members who died in enclosed spaces, this analysis of 464 whose rank was identified highlights the risks faced by all crew members. In particular, it finds that those with a team leadership role, i.e. chief officers, bosuns, masters and chief engineers, have the highest individual casualty rates, mainly during cargo operations. It can be assumed that time pressure to meet "utmost urgency" obligations in charterparties is a factor in many cargo-related fatalities. Many non-cargo-related fatalities are also due to the same pressures. The findings show a clear need for better communications, information exchange, planning and risk management between shippers, charterers, ship operators, masters and crews, as also identified in the review of resolution A.1050(27). As stated in the Gard P&I Club Crew Claims 2025 report,[5] pressure and stress are not only key factors in many shipboard accidents; they also badly impact the physical and mental health of seafarers. Better communications and planning would aid in reducing these pressures and improving both safety and health, as well as improving efficiencies and costs. A practical means of encouraging this approach would be to include a safety clause in charterparties outlining the specific safety responsibilities of the shipper, ship operator, master and load/discharge terminals. This type of clause is a statutory requirement between clients and contractors in similar shoreside contracts, e.g. in construction, in many countries. There is an obvious need to raise the standard of safety awareness by introducing more practical safety training that addresses the actual hazards faced by seafarers. This should include responsibilities for safety as well as the hazards that cause accidents every day at sea, including hazardous solid bulk and liquid bulk cargoes, enclosed spaces, mooring and snap-back hazards, work at heights, heavy weather, together with the other main hazards. There is a particular need for masters, chief officers, bosuns and chief engineers to receive this type of training so that they can protect their own safety and the safety of those they supervise. There is also a clear need for more focused safety training for cadets and other trainees so that they are not a risk to themselves or to anyone else on board.

13 Relevant work-related safety training is mandatory in construction and other high-hazard industries in many countries, and is often carried out in one day equivalent session. Given the vast number of reports written on the human element in maritime safety – many seeming to consider ships' crew as a homogeneous mass, it is time they were considered as humans in terms of their roles and the specific risks that they face, and not just as elements.

Disclaimer

Acknowledgements

Author: Kevin Cribbin Master Mariner, FICS, G.IOSH. Technical Director, Vistrato Limited.

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5 https://gard.no/about-gard/company-news/gard-crew-claims-report-2025-key-trends-in-seafarer-health-and-safety/