INTERNATIONAL MARITIME ORGANIZATION

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SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION
12th session
Agenda item 4

FSI 12/WP.2
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CASUALTY STATISTICS AND INVESTIGATIONS

Report of the Working Group

General

1 The working group on casualty analysis met from 15 to 17 March 2004 under the chairmanship of Mr. D. Rabe (United States).

2 The group was attended by representatives from the following Member Governments:

AUSTRALIA
BANGLADESH
BULGARIA
CANADA
CHINA
DENMARK
FRANCE
GERMANY
GREECE
IRAN (ISLAMIC REPUBLIC OF)
JAPAN
LIBERIA
MALTA
NETHERLANDS
NORWAY
POLAND
REPUBLIC OF KOREA
SWEDEN
UNITED KINGDOM
UNITED STATES

by the following Associate Member of IMO:

HONG KONG, CHINA

by an observer from the following intergovernmental organization:

EUROPEAN COMMISSION (EC)

and by observers from the following non-governmental organizations in consultative status:

INTERNATIONAL CONFEDERATION OF FREE TRADE UNIONS (ICFTU)
INTERNATIONAL FEDERATION OF SHIPMASTERS' ASSOCIATIONS (IFSMA)

3 The group was instructed by the Sub-Committee, taking into account comments and decisions made in plenary, to:

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.1 consider recommendations of the Correspondence Group based on its report (FSI 12/4), and confirm or otherwise the findings of the Correspondence Group based on the analysis of individual casualty investigation reports (FSI 12/4, annexes 1 and 2) for the Sub-Committee's approval and authorization of the release of the information on the IMO website;

.2 confirm or otherwise the text of the draft summary of lessons learned (FSI 12/4, annex 3) for the Sub-Committee's approval and authorization of the release of the information on the IMO website;

.3 collect any proposed amendments to the FSI circulars issued on very serious and serious casualties;

.4 review the format of the annexes to MSC/Circ.953-MEPC/Circ.372 on the basis of the outcome of FP 48 (FP 48/19, annex 7) and consideration of document FSI 12/4/2 (taking into account of the comment made in plenary relating to design problem) in order to prepare proposed amendments, for consideration by the Sub-Committee;

.5 review the method used by the working group for analysing casualty reports and making recommendations to other committees on the basis of the proposal contained in annex 4 to document FSI 12/4, and, in particular, consider the use of Formal Safety Assessment (FSA) methodology in the casualty analysis process, taking into account the instructions received from MSC 77 (MSC 77/26, paragraphs 18.6, 18.8.2 and 18.9) in order to report to MSC 78 on this issue, and to consider the possible identification of a trigger mechanism for the need to amend existing regulations;

.6 consider the request for casualty analysis information in relation to large passenger ship safety (MSC 77/26, paragraph 12.10),

.7 propose draft instructions for the Sub-Committee to instruct the Secretariat following the presentation of the prototype of the casualty database (FSI 12/4/1);

.8 conduct a preliminary review of the issue of the merit of the need for regulation of accommodation ladders for use other than for pilot embarkation and disembarkation (FSI 12/4, paragraph 7.1.6);

.9 identify how to obtain more casualty-related data from member States;

.10 advise on the re-establishment of the Correspondence Group on Casualty Analysis and, if so, prepare draft terms of reference for the group; and

.11 present a written report to plenary on Thursday, 18 March.

Summary of casualty analyses

4 The group reviewed the findings of the casualty analyses, as contained in annex 1 to document FSI 12/4, and noted that the quality of the reports of investigation submitted to the correspondence group was generally good.

5 In regard to the casualty information on the **Prestige** as contained in that annex, the group was informed that the casualty report on which the analysis was carried out by the

correspondence group was not the final report, but a provisional one by an interested State. Noting that since there were no investigation reports by the flag State and coastal State available yet, the information regarding such a catastrophic casualty on the IMO website might not appear to be balanced, the group proposed that information relating to that particular casualty should not be posted on the IMO website until the flag State and coastal State reports were also available. The remaining casualty analyses are set out in annex 1 for consideration by the Sub-Committee for release on the IMO website as agreed by MSC 76 (MSC 76/23, paragraph 9.7)

Lessons learned from casualties

6 The group considered the overview of lessons learned and draft text of lessons learned for presentation to seafarers (annexes 2 and 3 to document FSI 12/4) prepared by the correspondence group, and, after making several minor modifications, confirmed the findings of the correspondence group based on the analysis of individual casualty investigation reports (FSI 12/4, annex 1).

7 However, concerning the Overview of lessons learned (annex 2 to document FSI 12/4), the group agreed that it had only been developed to facilitate analysis by the Sub-Committee, and should not be released on the IMO website.

8 Regarding the Lessons learned for presentation to seafarers (annex 3 to document FSI 12/4) which could be released, the group felt that a few of them, although valuable, were not appropriate for seafarers as they involved issues such as hull failure and design faults. The group, therefore, decided that those particular lessons learned should not be posted on the website. In this regard, the group agreed also that when the Lessons learned for presentation to seafarers were released, it would be user-friendly to add a link for each lesson to relevant casualty information as contained in annex 1, so that an interested reader could find more detailed facts behind the lesson. In this context, a proposal was also agreed by the group that a link be provided in annex 1 to the casualty investigation report on the relevant member Government's website, to facilitate further detailed study. To promote the usage of such information, the group also agreed to recommend that lessons learned which cover both annex 2 and annex 3 to document FSI 12/4, could be utilized in the revision of IMO model courses, such as the one on Personal safety and social responsibility.

9 The Sub-Committee was then invited to approve the Overview of lessons learned and Lessons learned for presentation to seafarers, as set out in annexes 2 and 3 respectively, instruct the Secretariat to add relevant links in annex 3, for its release on the IMO website following the review carried out by the Secretariat in co-operation with the Chairmen of the relevant sub-committees, according to the agreed procedure (FSI 11/23, paragraph 4.19), and also advise the STW Sub-Committee on the proposal to use such information as mentioned in paragraph 8 accordingly.

FSI circulars on very serious and serious casualties

10 Regarding the FSI circulars, issued on very serious and serious casualties, namely FSI.3/Cir.4, FSI.4/Circ.3 and FSI.4/Circ.4, the group did not collect any proposed amendments. With regard to the concern that member Governments might not have had enough time to carry out proper verification on the information included therein, since those circulars had only been put on the IMODOCS website very recently, the group noted that, according to those circulars, the information contained in the electronic version of them would be updated, when additional information became available and was recorded in IMO's relevant databases. Therefore in order to avoid unnecessary delay, the Sub-Committee was invited to agree on release of those circulars

on the IMO website, member Governments to provide amendments on to those circulars to the Secretariat as appropriate.

Amendments to MSC/Circ.953-MEPC/Circ.372

11 For the fire casualty record, having reviewed annex 7 to document FP 48/19, the group agreed in general with the proposed amendments to annex 6 of MSC/Circ.953-MEPC/Circ.372 by FP 48. In this regard, the group also considered a suggestion in document FP 48/WP.5/Rev.1 that some general information contained in annex 6 of the circular could be transferred to annex 1 to the same circular and decided to revise that annex 1 accordingly.

12 Regarding the proposed life-saving appliance casualty record, as contained in document FSI 12/4/2, the group agreed that more detailed categories (choices) rather than general questions on the type of life-saving appliance involved, the type of personal life-saving appliance, etc., would facilitate statistics and analysis on the relevant casualty information. Consequently, with amendments made to that effect, including design aspects, the group incorporated such record as a new annex 10 to MSC/Circ.953-MEPC/Circ.372.

13 For user-friendliness, the group suggested that a new joint MSC/MEPC circular be prepared by the Secretariat on the basis of present circular, which would be superseded, incorporating the proposed amendments mentioned in paragraphs 11 and 12 above, as set out in annex 4.

14 In this connection, it was also suggested by the group that, in order to consult the DE Sub-Committee on the proposed life-saving appliance casualty record, before approval by the Committee, the Sub-Committee instructed the Secretariat to convey relevant extract of the report of the group to DE Sub-Committee for its comments on the proposed life-saving appliance casualty record, and submit the new joint MSC/MEPC circular, as suggested in previous paragraph, to MSC 80 and MEPC 53 for approval.

Use of Formal Safety Assessment (FSA) methodology in the casualty analysis process

15 Under this task, the group carefully reviewed the casualty analysis working group procedure proposed by the correspondence group, as contained in the annex 4 to document FSI 12/4, and made improvements to the diagram (paragraph 2.9 of that annex 4). It was found that the proposed procedure was a good step forward towards improvements of organizing casualty analysis. The procedure basically incorporated the proposal made by United Kingdom in document FSI 11/4/1 regarding use of Formal Safety Assessment (FSA) methodology in casualty analysis, with steps 1 and 2 of the FSA being specified for use in casualty analysis in a practical way. Therefore, the group believed that the proposed procedure formed a good basis for trial and further improvement. The Sub-Committee was invited to agree with the proposed casualty analysis procedure, as set out in annex 5, and report to the MSC 78 accordingly.

16 On the instruction to consider the possible identification of a trigger mechanism for the need to amend existing regulations, the group was of the opinion that the proposed process of evaluating safety issues (i.e. FSA steps 1 and 2), as contained in section 3 of annex 5, could provide a reasonable trigger mechanism.

Casualty analysis information in relation to large passenger ship safety

17 The group, in considering the request from MSC77 for casualty analysis information in relation to large passenger ship safety, recalled relevant discussion made at STW 34 (STW 34/WP.5) and identified that the information requested was mainly on the impact of any training or the levels of training on the casualty. Although, as indicated in the terms of reference, this information should be for large passenger ships only, and noting that there was no such definition of large passenger ship yet developed by the Organization, the group felt that it should not prevent from providing useful information for deliberation by relevant IMO bodies. Based on this understanding, the group made use of the casualty analyses carried out till this session and the existing IMO casualty database, and found some useful information relating to training issues for passenger ships, as set out in annex 6, for the Sub-Committee's consideration for possible submission to relevant IMO bodies.

IMO Global Integrated Shipping Information System (GISIS)

18 Following a successful presentation of the prototype of the title-mentioned database, the group was of the view that such prototype had achieved many of its objectives, such as web-accessibility, full coverage of the reporting format annexed to MSC/Circ.953-MECP/Circ.372, migration of data from existing IMO casualty database, etc. It was then realized that to come up with specific comments and recommendations, the members of the group would need considerable time of trial and operation on that database. In view of above, the group recommended that, instead of producing draft instructions to the Secretariat at this session, the Sub-Committee could request the Correspondence Group on Casualty Analysis (see paragraph 23) to carry out a study of GISIS in order to provide preliminary comments to the Secretariat by June this year, and in the meantime, the Sub-Committee could request the Secretariat to continue its work on that database and its plan to launch the initial version this year. For continuous improvements on the GISIS, it was also suggested that the Sub-Committee could ask the correspondence group to carry on its study on the database intersessionally and present a comprehensive list of suggestions for further improvement of the database at the next session.

Regulation of accommodation ladders

19 In considering the merit of the need for regulation of accommodation ladders for use other than for pilot embarkation and disembarkation (paragraph 7.1.6 of document FSI 12/4), noting that only data on one casualty relating to the appliance was available, the group agreed that more information was needed to develop any specific suggestion on this issue. Therefore, the group recommended that the Sub-Committee invite member Governments to submit information on casualties relating to accommodation ladders to the next session of this Sub-Committee.

20 In this regard, the group also noted that, apart from the inspection and survey aspect of the accommodation ladder, which would be addressed under agenda item 13 of DE 48, the aspect of design standards also needed to be reviewed. It was agreed that further information could be provided to the DE Sub-Committee after analysis of additional relevant casualty reports submitted to the Organization, as mentioned in paragraph.19.

Other recommendations made by the correspondence group

21 The group also discussed relevant recommendations made by the correspondence group regarding investigating the concept of high technology navigational aids adversely influencing the bridge team decision making (paragraph 7.1.4 of document FSI 12/4) and the global concerns with the use of vertical chute emergency escape systems (paragraph 7.1.5 of document FSI 12/4). Similarly to the situation with accommodation ladders as mentioned in paragraph 19, the group felt that more information was needed to proceed further. In parallel with paragraph 19, the group also recommended that the Sub-Committee invite member Governments to submit information on casualties relating to those two issues to the next session of this Sub-Committee.

Casualty-related data from member States

22 Having considered how to obtain more casualty-related data from member States, the group agreed to propose the following recommendations for consideration by the Sub-Committee:

.1 to consider enhancing transparency on Member States providing casualty-related data via web-based information, such as the new GISIS, for example, by noting on the IMO website when casualty information related to specific casualties is received by the IMO;

.2 to consider more direct assistance to be provided by the IMO or other Member States to those States who lack resources to carry out casualty investigations on a "one-to-one" basis;

.3 to consider amending SOLAS Regulation I/21 to have more strict and detailed requirements on carrying out casualty investigations and provision of results of such investigations; and

.4 to suggest emphasising the audit of implementation of casualty investigation requirements under relevant IMO instruments, when the Voluntary IMO Member States Audit Scheme is carried out.

Terms of reference of the correspondence group

23 The group, taking into account the work completed at this session, agreed to recommend that the Correspondence Group on Casualty Analysis be re-established, under the co-ordination of the United Kingdom*, to continue its work intersessionally with the following terms of reference:

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* Co-ordinator: Mr. S. Withington (UK)
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Southampton SO15 2DZ, United Kingdom
Tel: 44 (0)23 8039 5525
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.1 based on the information received from Members on investigations into casualties, to conduct an analysis of the relevant casualty reports referred to the group by the Secretariat;

.2 to identify safety issues that need further consideration;

.3 to forward the analysis of each individual casualty investigation report to the co-ordinator, using the applicable format, along with a synopsis of all reports analysed, for preparation of the co-ordinator's composite report that would be forwarded to the Secretariat for preparation of the correspondence group's report ;

.4 to carry out study on the GISIS database in order to provide preliminary comments to the Secretariat by June 2004;

.5 to continue its study on the database intersessionally and present a comprehensive list of suggestions for further improvement of the GISIS database; and

.6 to submit a report to FSI 13.

Action requested of the Sub-Committee

24 The Sub-Committee is invited to approve the report in general and in particular to:

.1 agree to the Summary of casualty analyses for release on the IMO website (paragraph 5 and annex 1);

.2 agree to the Overview of lessons learned (paragraphs 6 and 7, and annex 2);

.3 agree in principle to the Lessons learned for presentation to seafarers for release on the IMO website, and according to the agreed procedure (FSI 11/23, paragraph 4.19), instruct the Secretariat to review the summary of lessons learned in co-operation with the Chairmen of the relevant sub-committees, with a view to ensuring their accuracy before being released on the IMO website (paragraphs 6 and 9, and annex 3);

.4 endorse the group's view on utilization of the Overview of lessons learned and Lessons learned for presentation to seafarers in relevant IMO model courses and advice the STW Sub-Committee accordingly (paragraphs 8 and 9, and annexes 2 and 3);

.5 consider the proposal by the group on provision of links in annexes 1 and 3, to instruct the Secretariat to add relevant links in annex 3, and invite Member Governments to indicate the website address where the full investigation reports could be consulted, when submitting the investigation reports, so that the Secretariat could add such links in annex 1 (paragraph 8);

.6 agree to the release of FSI circulars on IMO website and invite Member Governments to provide the Secretariat with amendments to those circulars (paragraph 10);

.7 agree to the proposed amendments to MSC/Circ.953 – MEPC/Circ.372 on Reports on marine casualties and incidents and, instruct the Secretariat to prepare a new joint MSC/MEPC Circular, incorporating the proposed amendments, for submission to MSC 80 and MECP 53 for approval, and in addition, instruct the Secretariat to convey the relevant parts of the report of the group to the DE Sub-Committee for comments on the proposed life-saving appliance casualty record (paragraphs 11 to 14 and annex 4);

.8 note the outcome of the group's discussion on FSA methodology in the casualty analysis process, agree to the proposed casualty analysis procedure and report to the MSC 78 accordingly (paragraph 15 and annex 5);

.9 concur with the group on the trigger mechanism for the need to amend existing regulations (paragraph 16);

.10 consider the casualty analyses information relating to training issues for passenger ships collected by the group, and take action as appropriate (paragraph 17 and annex 6);

.11 note the group's view that the prototype of the GISIS database has achieved many of its objectives, endorse its opinion on more time needed to develop comments, and agree to the recommendations by the group, i.e. to request the Secretariat to continue its work on the database and its plan to launch the initial version this year, to request the correspondence group carry out a study on the GISIS database and send a list of preliminary comments to the Secretariat by June 2004, followed by another comprehensive list of suggestions to FSI 13 (paragraph 18);

.12 note the discussion in the group on the need for regulation of accommodation ladders, and invite Member Governments to submit relevant casualty information to FSI 13 (paragraph 19);

.13 note the group's view on the need to address the design standards of accommodation ladders, and take action as appropriate (paragraph 20);

.14 note the discussion in the group on adverse influence of high technology navigational aids, as well as the use of vertical chute emergency escape systems, and invite Member Governments to submit relevant casualty information to FSI 13 (paragraph 21);

.15 consider the recommendations by the group on how to obtain more casualty-related data from Member States, and take action as appropriate (paragraph 22); and

.16 re-establish the Correspondence Group on Casualty Analysis under the proposed terms of reference (paragraph 23).

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ANNEX 1
SUMMARY OF CASUALTY ANALYSES

The following analysis is aimed at identifying overall trends or issues of potential concern to the International Maritime Organization. It is based on casualty reports submitted to IMO. No corroborating data is available and the analysis should not be used for any other purpose.

The accuracy of the data received by analysts cannot be guaranteed. Where appropriate, reference is made to relevant existing rules and regulations and codes of practice, IMO resolutions and circulars, and other relevant documents.

Note that "Type of casualty" below is taken from the "Initial Event" list in MSC/Circ.953/MEPC/Circ.372, annex 1.

Type of Casualty **Ship's name** **Type of ship** **Flag Authority** **Tonnage** **Reporting State** **Analyst(s)** **Second ship (if any)**	**Date of casualty**	**Event**	**Causes**	**Issues raised** **Human factor**	**Action**
DAMAGES TO SHIP OR EQUIPMENT **ALLIGATOR VICTORY** **CONTAINER SHIP** **PANAMA** **42809** **CANADA** **MR.CREDE**	09/01/2001	Shortly after departure from port, the crew began the routine task of raising the starboard accommodation ladder to its stowed position in preparation for the ocean transit. The operation was nearly complete when an accommodation ladder pad eye, which was welded to the hull structure, broke in two. The steel snatch block that was shackled to the failed pad eye broke loose and violently struck a crew member in the face and forehead. The crew member died as a result of the injuries.	There are no SOLAS requirements for the construction, inspection, and maintenance of accommodation ladders unless they are used for pilot transfer purposes. It was difficult to obtain adequate access to inspect the critical components of the accommodation ladder. The vessel's maintenance procedures for the accommodation ladder were inadequate.	Only accommodation ladders that are used for pilot transfer are subject to SOLAS construction and inspection requirements. The ISM Code requires procedures for the maintenance and inspection of safety sensitive equipment and accommodation ladders fall into this category.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
GROUNDING/STRANDING **AROSA** **FISHING VESSEL (SIDE-T)** **UNITED KINGDOM** **248** **UNITED KINGDOM** **MR.FUJIE**	03/10/2000	The fishing vessel AROSA had stopped fishing at about 18:46 (UTC) on 2 October 2000 and had begun a passage towards the nearest point of land on the Irish coast. The weather forecast for the area in which she was fishing, was for winds to increase up to a possible storm force 10. The skipper apparently decided to head for shelter in Galway Bay. AROSA did not make a direct course to the entrance of Galway Bay but was offset to the north, which put the strong winds and rough seas further abaft the beam. At about 04:00 (UTC) on 3 October 2000, AROSA ran aground on Doonguddle rock, which is off the west coast of Ireland and about 10 miles north of the north entrance to Galway Bay. The vessel was lost, and all but one deckhand of the 13 crew members lost their lives. As the two people with knowledge of the navigation both lost their lives, it has not been possible to determine the direct causes of the accident.	It was not possible to determine for sure why the vessel ran aground since the navigators on board lost their lives in the accident.	There was neither watch alarm nor lookout on the bridge to guard against the watchkeeper falling asleep. Liferafts were launched after the vessel grounded but crew members were reluctant to board them because of the hazard of disembarking due to the vessel's list. The difficulty of disembarkation of a vessel when listing and grounded on rocks. The sole survivor chose not to don a lifejacket for fear of it choking him and restricting his movement so that he would be thrown against the rocks.	Report noted.
COLLISION **ASH** **GENERAL CARGO SHIP** **SAINT VINCENT & THE GRENADINES** **1009** **UNITED KINGDOM** **MR.SAMMY (YOUNGSUN) PARK** **DUTCH AQUAMARINE** **CHEMICAL TANKER** **NETHERLANDS** **4700**	09/10/2001	The overtaking vessel, DUTCH AQUAMARINE, collided with the starboard quarter of ASH, with a speed about 6 knots faster than that of ASH in the south-west traffic lane of Dover Strait TSS to the south-east of Hastings, which resulted in the foundering of ASH and the death of her Master. DUTCH AQUAMARINE suffered minor damage to her fore part. The visibility was good.	- OOW of the overtaking vessel was not keeping a proper lookout. - The watchkeeper of the stand-on vessel was distracted from lookout duties by a mobile telephone call. - Dedicated lookout was not posted. - Two vessels were on coincident tracks and travelling at different speeds. 1. The large majority of vessels transiting the Dover Strait in the SW traffic lane choose tracks which run parallel and close to the northern edge of the lane. This causes bunching of traffic in this area. 2. Navigators appear to prefer to return the vessel to the original planned track rather than parallel it until the next way point as was common practice before the advent of GPS. 3. Variations in speed between the stand-on vessel and the overtaking vessel. 4. Close passing.	- The fundamental basis for anti-collision manoeuvres is a good lookout. - In heavy traffic situations like those that exist in the Dover Strait TSS, the posting of a dedicated lookout is a sensible and seamanlike precaution. - Many navigators might not be fully adept in the use of GPS and track control systems, and this causes them to return to the programmed track after anti-collision manoeuvres. This, in turn, tends to maintain the bunching of traffic on the popular pre-programmed tracks. - Dangerously close overtaking has become commonplace in the SW lane of the Dover Strait TSS and dangerous situations arise where vessels of markedly different speeds are travelling on coincident tracks.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **AURES** **GENERAL CARGO SHIP** **ALGERIA** **4932** **SPAIN** **MR.DE LIMA CORREIA** **LIMA** **REFRIGERATED CARGO SHIP** **NETHERLANDS ANTILLES** **2989**	10/08/2000	At 07:47 (local time) on 10 August 2000, at the entrance of port Ribeira, position 42º32'.4N, 008º57'.9W, the general cargo ship AURES (4kn) prepared to enter the port, collided with the refrigerated cargo ship LIMA (2kn) which was leaving the port with the Pilot on board. Ship AURES was at anchorage outside the port when the Captain was instructed by the Pilot to lift the anchor and to sail near the entrance of the port where he had embarked. The accident happened because the Captain of the ship AURES thought that ship LIMA was the tug with the Pilot on board. He manoeuvred his ship towards LIMA to facilitate Pilot embarkation. Both ships tried to avoid the collision but it was too late. Consequences: AURES, bow structure deformation and bulbous fracture of about 1m, remains fit to proceed; LIMA, hold No.4 side shell damage, hole rounded diameter about 2m at waterline level, rendered unfit to proceed.	Restricted visibility (150m). Poor communications with the Pilot.	Importance of a good communication between captains and pilots. Every port should have pilotage boarding positions well identified and exclusively for pilotage operations. Captains unfamiliar with the port should avoid sailing from pilotage boarding position without the pilot on board. Unsafe act and decision. - Capacity to distinguish between the echoes of small and big vessels - lack of perception, slip - skill-based. - Poor communication: mistake - knowledge-based routine. - Sailing without pilot in an unfamiliar port: mistake - knowledge-based routine.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **BALTIC CARRIER** **CHEMICAL/OIL TANKER** **MARSHALL ISLANDS** **22235** **MARSHALL ISLANDS** **MR.STUART WITHINGTON** **MR. ANAND** **TERN** **BULK CARRIER** **CYPRUS** **20362**	29/03/2001	ANALYSIS BASED ON REPORT FROM MARSHALL ISLANDS (FSI 12): 1. The two ships collided in the vicinity of 54°43'.1N, 012°35'E while on passage through the 17m DW route in the Baltic Sea. 2. The bow of the bulk carrier impacted with the starboard side of the oil tanker at an angle of about 50°. 3. The oil tanker was extensively damaged between frames 40 and 68 and much of the 2,732 tonnes of OM 100 fuel oil contained in No. 6 starboard tank was lost into the sea. 4. Damage to the bulk carrier included her bulwark, stem and bow plating. ANALYSIS BASED ON REPORT FROM DENMARK (FSI 11): - The two ships collided in the vicinity of the 17 m DW route in the Baltic Sea, at 54º43'.2N, 012º35'E. The collision angle was 50º when the bulk carrier ran into the oil tanker in way of its starboard No. 6 double hull tank. - The oil tanker was holed through the No. 6 double hull tank. 2700 tonnes of fuel oil escaped into the sea. The pollution of the coastline was the most severe which had ever happened in Denmark. - The bulk carrier was heavily damaged in way of the forward structure to a degree that impaired its seaworthiness. The forepeak ballast tank was opened to sea. The bulkhead between the forepeak and the cargo hold was also affected.	ANALYSIS BASED ON REPORT FROM MARSHALL ISLANDS (FSI 12): 1. A failure in the electrical control system of its steering caused the oil tanker to make an unintended turn to port into the path of the oncoming bulk carrier. 2. Both vessels were navigating in a deep water channel, which affords a passing distance of about 0.5 miles, when both had sufficient under keel clearance to use an alternative wider channel. 3. There was about a half minute delay from when the helmsman reported that the vessel was not responding to the helm until the steering failure alarm light illuminated and the Master ordered a change to an alternative control system. 4. The Master had no way of determining the nature of the steering failure, be it electrical or mechanical, when first reported by the helmsman. 5. The unexpected alteration of course by the oil tanker was not immediately observed by the OOW of the bulk carrier, who was working in the chartroom. 6. Neither vessel altered engine speed or direction in an attempt to avoid the collision. ANALYSIS BASED ON REPORT FROM DENMARK (FSI 11): - The primary cause of the collision was an unintended port turn by the oil tanker which was caused by an unknown technical error in the steering system. - Cause of the failure of the steering system could not be established. There is only a very remote possibility that failure of the steering system was caused by Magnetic Disturbance or lack of Electromagnetic Compatibility (EMC)*. - Both vessels chose to navigate in the 1 mile wide DW route although their drafts permitted them to use the much wider traffic separation scheme. Use of the DW route restricted the safe passing distance between the two vessels. - The second officer of the bulk carrier went into the chart room just before both vessels were about to pass at a distance of 0.5 mile. This reduced the response time available when collision risk developed suddenly. * Comments on the analysis from the Reporting State: "According to the report of the Division for Investigation of Maritime Accidents (DIMA) the opinion is as follows. - DIMA is of the opinion that the steering problems have not been caused by a magnetic field from the	ANALYSIS BASED ON REPORT FROM MARSHALL ISLANDS (FSI 12): 1. There is no regulation preventing vessels, which can safely use alternative routes from using DW routes, which are intended for deep drafted vessels. 2. When assessing a safe distance at which to pass another vessel, the probability and potential consequences of a mechanical or steering failure must always be considered. 3. Bridge watchkeepers need to be alert and closely monitor the actions of other vessels when in close proximity. 4. The use of main engines must always be considered when taking avoiding action. ANALYSIS BASED ON REPORT FROM DENMARK (FSI 11): - Although it is not forbidden to use the DW route, it is advisable for vessels drawing a relatively shallow draft to use the recommended direction of traffic flow in order to allow greater passing distance between vessels. - New SOLAS Ch. V requires all electronic equipment on the bridge of ships constructed on or after 1 July 2002, to be tested for EMC. ANALYSIS BASED ON REPORT FROM MARSHALL ISLANDS (FSI 12): There do not appear to be any significant human factor related issues that have directly contributed to the accident. ANALYSIS BASED ON REPORT FROM DENMARK (FSI 11): - OOW should remain at heightened alert when passing another vessel at close range and should be vigilant for, inter alia, equipment failure and unexpected response from own and/or the other vessel.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
			power cables. - The opinion of DIMA is that it is possible that the steering problems could have been caused because equipment on board were EMC vulnerable. Another possibility could be weakness in the software of the steering stand. - DIMA is at the moment working to find out if it is possible to make further examinations on the steering stand equipment."		
FIRE **BALTIC EIDER** **RORO CARGO** **UNITED KINGDOM (ISLE OF MAN)** **20865** **UNITED KINGDOM (ISLE OF MAN)** **MR.RABE**	05/08/2001	While underway at sea an unlocked plug on the body of a main engine fuel pump completely unscrewed allowing the escape of fuel under pressure. The fuel released in an engine area known as the hot box, contacted high temperature surfaces, vaporized and ignited. Engineering personnel made two unsuccessful attempts to extinguish the fire using hand held extinguishers and within about ten minutes of the detecting of fire, ventilation was secured and the engine room's CO2 system was activated and successfully extinguished the fire. After the fire was extinguished the vessel was able to safely anchor. There were no injuries resulting from the casualty. However, the main engineroom, main propulsion engines, associated cabling and switchboard were extensively damaged.	The loosening of the plug and ultimate release of fuel from the body of the fuel pump is directly attributed to the absence of a locking device capable of preventing loosening induced by vibration.	Vibration induced loosening of fasteners and the failures of components they secure on main and auxiliary diesel engines are often identified as the cause for uncontrolled fuel releases within machinery spaces. The prevention of such loosening, and the isolation and insulation of heated surfaces capable of causing fuel to ignite remains an important design consideration to minimize diesel engine fires onboard ships. The absence of a locking mechanism on the fuel pump plugs removed an effective defense against this casualty. Evacuation of the engineroom was accomplished effectively.	Report noted.

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OTHER (FALL OVERBOARD) **BEN VARREY** **GENERAL CARGO SHIP** **UNITED KINGDOM (ISLE OF MAN)** **997** **UNITED KINGDOM (ISLE OF MAN)** **MR.FOLEY**	07/09/2001	BEN VARREY was alongside Kilroot Jetty in Belfast Lough when the incident occurred on 7 September 2001. The ship had just completed loading a cargo of salt and was preparing to depart. Once loaded, the ship was lying with the top of its bulwarks some 2 metres below the jetty deck. The weather was poor and deteriorating with the Master eager to leave as soon as possible as he was concerned that the ship's movement alongside the jetty was likely to result in damage. The crew had not rigged a gangway or any other means of safe access between the jetty and the ship. The Mate had gone forward on the main deck to sign the cargo receipt held by a shore representative standing on the jetty. In the process of exchanging the receipt book, with the Mate standing on the bulwark, he slipped and fell between the ship and the jetty fenders. His pelvis was crushed and he sustained serious internal injuries when the swell caused the ship to close on the fenders. Two crew members, who were working on deck, saw the Mate trapped between the ship and the fenders and assisted him back on board. The Mate lost consciousness and died a short time later. Two fast catamaran ferries were passing the Jetty at around the time of the incident but their wash was found not to have contributed to the motion of BEN VARREY at the time the Mate fell.	- There was no safe means of access between the ship and the jetty. - The relative levels of the jetty and the ship's bulwarks meant that the Mate had to stand on the bulwark and reach up to pass the cargo receipt book. - The ship was moving substantially in the prevailing weather conditions.	There is a need to ensure a safe method of access between ship and shore when people need to move from one place to the other. Alternatively, safe method of exchanging documentation in all foreseeable conditions should be contrived when there is no need for people to move between ship and shore. The urgent need to leave the berth with consequent haste on the part of the Mate may have led to him taking an unacceptable risk when passing the cargo receipt book.	Report noted.

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CAPSIZING **BURAZ** **FISHING VESSEL** **SPAIN** **111** **SPAIN** **MR.DE LIMA CORREIA**	24/11/2000	At 10:15 (local time) on 24 November 2000, position 42º19'.8N, 009º01'.5W, the fishing vessel (stern trawler) BURAZ, of 24m in length, was trawling S.W. of Ons island, in heavy weather, following seas, when the trawl was fastened on a seabed obstruction. The skipper used the engine power to free the fastener, without success. During this operation a large amount of water flooded the freeboard deck (working deck) through the superstructure aft doors which were open. The skipper changed the course; the vessel was hit by 2 or 3 waves, capsized and sank. The skipper did not release the winch brakes or run the trawl warps off. The trawler capsized due to a combinations of factors, such as: water on freeboard deck and free surfaces of liquids; increase of loads in the warps caused by the increase of engine power; asymmetric and transverse loads on trawl cables; and the impact of waves. Consequences: two fatalities, two persons missing, one person serious injured, total loss of the vessel and minor pollution.	Heavy sea and wind. Trawl coming fast on a seabed obstruction. Superstructure aft doors open in heavy weather and during fishing operations.	The skippers of stern trawler fishing boats should be aware of the procedures to free the trawl from a seabed obstruction and related basic principles of stability considering bad weather conditions and following and quartering seas. The importance of the vessel superstructure weathertightness. Considering vessels characteristics, establishment of sea state threshold beyond which fishing work should be avoided or extra-caution should be considered. - Increase of engine power to free the fastener in heavy weather: mistake, lack of knowledge in emergency ship operations, failure to respond appropriately. - Superstructure aft doors open in heavy weather and during fishing operations: violation, knowledge based routine.	Report noted.
OTHER (WORK-RELATED ACCIDENT) **CEC CRUSADER** **GENERAL** **CARGO/CONTAINER SHIP** **BAHAMAS** **6714** **UNITED KINGDOM** **MR.FOLEY**	22/11/2001	At the time of the incident, CEC CRUSADER was at anchor in the Thames River estuary. The deck crew were in the process of removing and stowing tween deck hatch covers, using the ship's crane, when the Chief Officer became trapped between a suspended hatch cover and the forward bulkhead of the ship's accommodation. His pelvis was crushed by the swinging hatch cover and he sustained serious internal injuries. He died before he could be evacuated by helicopter.	- The Chief Officer's decision to place himself between the hatch cover and the accommodation bulkhead. - The accepted past practice of conducting the hatch cover operation while the ship was at sea or at anchor and subject to sea induced motion. - Lack of reasonable consideration of the dangers associated with the hatch cover operation. - The lack of instructions/guidance from the company regarding where, and under what conditions, the hatch cover operation should be conducted.	Operations involving the suspension of heavy weights from a single point are inherently dangerous. These operations may be considered to be unsafe when they are conducted on ships subject to motion induced by the sea and the movement of the suspended weight cannot be adequately constrained. The crew had accepted that moving hatch covers at sea as a normal task and as a result were complacent about the dangers associated with the operation. - The Chief Officer may have been misled by the ease with which the hatch covers could be manoeuvred (rotated) by hand when suspended and thus did not realise the large force exerted by the hatch cover when it was swinging (moving laterally).	Report noted.

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COLLISION **CIUDAD DE CEUTA** **RORO CARGO/FERRY** **SPAIN** **2752** **SPAIN** **MR.DE LIMA CORREIA** **CIUDAD DE TANGER** **RORO CARGO/FERRY** **SPAIN** **9481**	16/07/2000	At 07:47 (local time) on 16 July 2000, near Algeciras bay, S.E. of Punta del Carnero, position 36º03'.7N, 005º23'.9W, the ro-ro passenger ship CIUDAD DE TANGER, sailing (15.6kn) from Tangier to Algeciras, with 26 passengers and 23 trucks on board collided with ro-ro passenger ship CIUDAD DE CEUTA (14.9kn) which had left Algeciras, with 290 passengers, 86 vehicles and 12 trailers on board. When they were at 3 miles distance, both vessels detected each other by radar. CIUDAD DE TANGER evaluated that it would pass clear and maintained almost the same course. CIUDAD DE CEUTA continued manoeuvring slowly to starboard to enter the traffic separation scheme of the Strait of Gibraltar. Both vessels did not follow each other's courses. They then entered into a fog bank and the casualty happened when the bow of CIUDAD DE TANGER who did not carry out an effective manoeuvring to port, collided with the port side of CIUDAD DE CEUTA. Consequences: CIUDAD DE CEUTA : 5 fatalities, 18 persons injured, deformations and breach of side shell plating, decks and flooding of ballast tanks. Vessel rendered unfit to proceed. CIUDAD DE TANGER : bow structure deformation, damages to visor, embarking ramp and bulbous bow. Vessel rendered unfit to proceed.	Fog banks at casualty location. Both vessels did not take effective action in time to avoid collision. Lack of proper lookout on both vessels. Absence of communications between vessels.	Possible establishment of a traffic separation scheme to give access to Algeciras bay. Importance of good communication between vessels. The importance to give effect to the rules of COLREG, 1972, particularly: rule 5 - Look-out; rule 6 - Safe speed; and rule 7 - Risk of collision. - Action in time to avoid collision considering the state of visibility: violation - mistake - knowledge-based routine. - Lack of proper lookout: violation - mistake - knowledge-based routine. - Absence of communication: violation - mistake - knowledge-based routine.	Report noted.

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COLLISION **DIAMANT** **FERRY, TWIN-HULL** **LUXEMBOURG** **4305** **UNITED KINGDOM** **MR.SAMMY (YOUNGSUN) PARK** **NORTHERN MERCHANT** **FERRY** **UNITED KINGDOM** **22152**	06/01/2002	While DIAMANT was bound for Dover with 148 passengers at 29 knots, NORTHERN MERCHANT departed Dover with 102 passengers at 21 knots. Both vessels approached each other with a Closest Point of Approach (CPA) of 3 cables in the Dover Strait in poor visibility. As the distance between the vessels decreased to 6 to 7 cables, NORTHERN MERCHANT altered course to starboard by 7° to 10° and then applied 20° of helm. At the same time, DIAMANT altered course to port. DIAMANT collided with the port side of NORTHERN MERCHANT. There were no injuries or death on either vessel. DIAMANT suffered substantial prow and starboard side wave piercer damage. NORTHERN MERCHANT suffered slight damage to her port side shell plating.	Potentially unsafe speed. Complacency in acceptance of small CPAs with other vessels. A failure to make continued use of the ARPA's course and speed display. A decision to alter course by small angle helm.	- The non-existence of a perceived "unwritten rule" that high-speed crafts will keep clear of all other craft because of their manoeuvrability. - A failure to recognise what constitutes a close quarters situation and safe speed in coastal waters. - Under certain conditions it is possible that small displayed ARPA CPAs could be zero because of side robe effect of radar beam.	Report noted.
FIRE AND EXPLOSION **EMILIA THERESA** **CHEMICAL TANKER** **UNITED KINGDOM (ISLE OF MAN)** **3356** **UNITED KINGDOM (ISLE OF MAN)** **MR.RABE**	17/01/2001	Vessel had completed loading a cargo of benzene into 12 cargo tanks. Near completion of loading the vessel was boarded by a cargo surveyor (CS). The pumpman observed the CS taking samples from the aftermost tanks and working forward. Approximately 25 minutes after the last tank was loaded an explosion occurred and fire developed near the forward part of the cargo area. A general alarm was sounded, the foam extinguishing system activated and the fire was extinguished in several minutes by the Master and another crew member using deck monitors. The No. 1 port cargo tank lid was blown off and other superficial damage was noted on nearby structures and pipework. The cargo surveyor was injured, provided first aid, and removed by an ambulance.	A static charge had developed in the cargo tank prior to the explosion and had not dissipated in the twenty minutes which elapsed since topping off. The CS used a metallic can attached to a man made fiber rope to obtain samples which facilitated a discharge of static electricity within the tank and resultant explosion. The CS was unknowledgeable as to risks associated with the equipment he was using and had not followed shipboard or other established procedures. Vessel crew members did not confer with the CS as to his methods and equipment used to sample tanks.	There are no assurances that shore based service providers like cargo surveyors may understand the risks associated with their activities, nor may their operation and safety procedures be adequate for a particular vessel or cargo. A brief inquiry by a competent vessel deck officer into the surveyor's methods and equipment used during sampling may have revealed inadequacies and prompted the use of safer methods and equipment. The general workload and responsibilities of the Chief Mate while completing the loading process may have contributed to his inability to note the surveyor's methods and equipment. Had he done so, the casualty could have been prevented. The CS failed to recognize risks in the methods and equipment he chose to use.	Report noted.

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COLLISION **GLOBAL MARINER** **DRY CARGO SHIP** **UNITED KINGDOM** **12778** **UNITED KINGDOM** **MR.SAMMY (YOUNGSUN) PARK** **ATLANTIC CRUSADER** **GENERAL CARGO SHIP** **CYPRUS** **7366**	02/08/2000	GLOBAL MARINER un-berthed and turned around to head downstream under pilotage at Matanzas, Orinoco River, Venezuela. Two other vessels were anchored in the river, both heading upstream. One of the anchored vessels ATLANTIC CRUSADER, a 7,366gt general cargo vessel, was showing a starboard aspect at approximately 4 cables on the port bow from GLOBAL MARINER. She was perceived to be underway and proceeding on a course across the track of GLOBAL MARINER. The pilot ordered hard to starboard. However, the anchored vessel's bow impacted with the port side of GLOBAL MARINER, which caused her to flood and founder, finally grounding. There were no injuries and all on board were safely evacuated.	- The bridge team believed that the anchored vessels were securely anchored, heading upstream. - The strong current caused the anchored vessel to yaw and possibly drag her anchor and significantly reduced the time available in which to take effective avoiding action.	- Ensure that pilots are fully informed by the port authority of the exact positions of vessels anchored in rivers, and of any problems relating to their ability to maintain position. - Ensure that a sufficiently wide navigable channel remains clear at all times by reviewing arrangements for anchored vessels in rivers. - Ensure the reliability of buoyage in rivers. In view of the immediacy of the risk of collision, both the Master and the Pilot were probably experiencing increased levels of stress, which would have potentially affected their situation appraisal and decision-making ability.	Report noted.

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OTHER (WORK-RELATED ACCIDENT) **HAVILA CHAMPION** **TUG/SUPPLY SHIP** **BAHAMAS** **1654** **BAHAMAS** **MR.FOLEY**	06/11/2001	At the time of the incident, HAVILA CHAMPION was engaged in towing an aircraft carrier from the Black Sea to the Aegean Sea. A second vessel, SOLANO, had been contracted to complete the tow to China. While transferring the tow to SOLANO on 6 November 2001, one of HAVILA CHAMPION's deck crew was killed. Transferring the tow involved using HAVILA CHAMPION's port tugger winch to move SOLANO's towing pennant into a position on HAVILA CHAMPION's stern where the pennant could be fastened to the towing bridle. The tugger wire was fastened to SOLANO's towing pennant and HAVILA CHAMPION's crew were in the process of slacking the wire to lead it around HAVILA CHAMPION's port towing pin when the towing pennant was dropped from SOLANO's stern. The tugger wire came under sudden tension due to the weight of the towing pennant causing it to sweep rapidly across HAVILA CHAMPION's after deck. The deceased crew member, who was standing in the bight of the tugger wire, was thrown 4-5 m in the air by the wire and then landed heavily on the deck. He sustained serious internal and external injuries and died before he could be evacuated by helicopter.	- The tugger wire was fastened to SOLANO's towing pennant prematurely i.e. before it had been led around the towing pin. - SOLANO's crew released the towing pennant prematurely in contravention to instructions from their Master and HAVILA CHAMPION's Master. - HAVILA CHAMPION's crew were working inside the bight of the tugger wire.	The need for careful planning, good communication between vessels, and careful execution when carrying out the inherently risky operation of transferring a tow. Failure of communication between the Master and crew of SOLANO.	Report noted.

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FIRE AND EXPLOSION **HENG SAN** **OIL TANKER** **SINGAPORE** **122270** **SINGAPORE** **MR.PERKINS**	12/06/2001	During tank cleaning operations while at sea, the crew was ventilating a tank using two steam-driven fans connected to duct hoses leading to the bottom of the tank. A third fan which was driven by compressed air was in place and rigged with the ducts but was not being used. In the early morning after several hours of ventilating, flames were seen shooting out of the tank followed by a series of explosions. The fire was extinguished by the crew in approximately 3 hours; however the vessel suffered serious damage. That evening, the crew realized the vessel was breaking in two and abandoned ship using the two lifeboats. Two crew members were inadvertently left onboard. In response to the distress, two vessels picked up the crew from the lifeboats. Two crew members lost their lives while boarding the ladder during recovery operation in rough sea condition. Several ships searched the area but the four missing seamen were not found.	The crew had completed washing another tank without incident and had used the inert gas system as prescribed in procedures. During this tanking cleaning operation, the IG system was not used and it could not be determined why because the officer in charge was missing. The source of ignition could not be determined. The crew did not take time to prepare for potentially having to abandon ship. The lifeboats were not lowered to the embarkation deck and to verify all was in proper running order. At the time of abandoning ship, a crew member was left on the embarkation ladder because the lifeboat engine was inoperative and they were unable to row back alongside.	In the report, there was nothing to indicate the safety procedures or fitted equipment was inadequate or that the officer in charge was not aware of or did not normally follow them. However, the circumstances leading up to the explosion showed that they were not properly applied or used in this instance indicating that some procedural checks assigned to different crew members could be employed to ensure certain key steps in safety procedures are followed. The need to use lifeboats is never planned and this accident confirms the requirement to continually verify that they are in proper working order. In any operation, the crew must continually assess the risk of an accident. As in the case of the explosion, procedural checks would reduce the probability of the development of a hazardous situation. With respect to the lifeboat, projecting potential consequences of a hazardous situation would have concluded with the need to potentially abandon the ship and to be prepared especially given the fact that such preparations would not negatively have impacted upon the safe operation of the ship.	Report noted.
OTHER **JOHANN SCHULTE** **GAS CARRIER LPG** **UNITED KINGDOM (ISLE OF MAN)** **15180** **UNITED KINGDOM (ISLE OF MAN)** **MR.CREDE**	02/03/2000	The Chief Officer and five crew members were checking the anchor securing arrangement during heavy weather. The ship began pitching and two waves swept over the bow. One seaman was able to obtain cover from the seas. The Chief Officer and the remaining four crew members, who were facing aft at the time, were unaware of the approaching seas. The impact of the waves tossed them to various locations on the forward decks. The Chief Officer and one seaman died as a result of their injuries. The remaining injured seamen were ultimately air lifted to a hospital.	The failure of personnel on deck to wear harnesses with lifelines during rough weather. Chief Officer acted on his own without notifying the Master or Officer of the Watch of the task being performed on deck. Chief Officer underestimated weather conditions.	Several standing orders and written procedures were not followed. More care should be taken in recording Deck Log Book entries, especially during adverse weather. The Emergency Response Plan should contain contingency plans and drills for dealing with emergency situations during heavy weather. The Chief Officer failed to advise Officer of the Watch of activities being performed on deck during heavy weather. Errors in judgement and the failure to pass information to the Master by the Chief Officer.	Report noted.

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OTHER (FALL OVERBOARD) **KONINGIN BEATRIX** **FERRY** **UNITED KINGDOM** **31189** **UNITED KINGDOM** **MR.LEE**	29/10/2000	On 29/10/2000, the passenger ro-ro ferry departed Rosslare for Fishguard with 1,092 passengers and 105 crew on board. The weather was rough with south-westerly wind of force 7 to 8. At 11:45, the bridge was informed that three passengers had seen a man in the water. The OOW initiated Man Overboard procedures, turned the ship back and, with another nearby vessel, started the search and rescue operation. The Master considered the weather too rough to safely lower a rescue vessel. The man, who was later confirmed to be a passenger on the vessel, was sighted several times, and between 12:30 and 12:38 was reportedly very close to the starboard side of the vessel. At 12:38 he passed around the vessel's bow and was then seen floating with his face down. At 13:00 he was picked up by an Irish Coastguard helicopter and taken to hospital. He was declared dead at 16:05.	- As there were no witnesses, it is not known if the victim fell overboard accidentally or intentionally. - The Master ruled out the lowering of a rescue boat because of the adverse weather conditions. This was considered justified by the investigation authority. - Once the use of the ship's rescue boat was ruled out, there was no clear plan made for the rescue attempt. Neither did the Company procedures provide details regarding action to be taken to recover a man overboard under such circumstance. - The port bridge wing lifebuoy released by the OOW was the only lifebuoy thrown overboard during the incident. - The bridge team was aware that rocket line-throwing apparatus was stowed on the bridge. These units were not considered for use during the incident.	- Rough weather may preclude the use of rescue boat. Other means to recover a person overboard in adverse weather conditions should be explored and details provided in the company standing orders and operational procedures manual. - Consideration should be given to the risk of allowing passengers access to open decks in adverse weather conditions that preclude the use of the ship's rescue boat. The failed attempt with the lifebuoy and line suggests that the crew considered the use of a lifebuoy more of a rescue means, rather than a survival means that could buy more time for the rescue operation.	Report noted.
COLLISION **KUNDA** **RORO CARGO** **ESTONIA** **11909** **DENMARK** **MR.STUART WITHINGTON** **KLAZINA VERA** **FISHING VESSEL** **DENMARK** **100**	06/12/2001	1. The fishing vessel and the ro-ro vessel collided in the vicinity of 54°55N, 010°55.0E in Route H of the Langelandsbaelt, in the Baltic Sea. 2. At the collision the stem of the ro-ro vessel hit the fishing vessel starboard side aft. 3. The fishing vessel sank shortly after the collision with one of three persons still onboard. 4. The skipper and one crew were recovered from the water by a pilot boat. 5. Divers later recovered the dead body of the missing fisherman from the fishing vessel's wheelhouse. 6. The hull of the fishing vessel was subsequently raised; she was badly damaged on her starboard side. 7. The ro-ro cargo vessel sustained a 10cm hole on the starboard side of the stem.	1. The fishing vessel was proceeding on the 'wrong-side' of the route against the general direction of traffic. 2. After detecting the ro-ro vessel, the fishing vessel watchkeeper assessed the two vessels were on reciprocal courses and about 3 minutes before the collision the fishing vessel altered course between 5° and 10° to port to make clear his intentions. 3. The fisherman on watch in the wheelhouse did not hold the appropriate certification or training. 4. At about the same time the ro-ro vessel altered course 15° to starboard, assuming that the fishing vessel would be following the charted route.	1. Proceeding down the 'wrong-side'of a fairway, channel or traffic separation scheme can lead to confusion regarding a vessel's intentions. 2. An alteration to port in either a head on or crossing situation is inappropriate. 3. Where possible, action taken to avoid a collision should happen before vessels get into close quarters. 4. The ro-ro bridge was not manned in accordance with the requirements of the STCW Convention with regard to the provision of an additional lookout during the hours of darkness. 5. Although the liferaft hydrostatic releases functioned correctly, the liferafts did not float to the surface because they were trapped under the capsized vessel. The actions of the un-certificated and untrained watchkeeper, which were contrary to the collision regulations, had a significant bearing on events.	Report noted.

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FIRE **LA SURPRISE** **RORO CARGO** **SPAIN** **15224** **SPAIN** **MR.DE LIMA CORREIA**	15/10/2000	At 06:15 (local time) on 15 October 2000, the ro-ro cargo ship LA SURPRISE was sailing in the Bay of Biscay, North of Punta de la Estaca de Bares, position 44º30'N, 007º39'W, when a fire broke out in the ship's engine room. The ship was left without power. Because of the fracture of a small pipe in the manifold's pressure gauge, fuel oil leaked and sprayed onto a hot surface causing fire in the starboard engine. Fuel oil pressure inside the manifold, which supplies high-pressure injection pumps, was 7 bars. The automatic smoke detector alarmed the crew who was able to extinguish the fire by sealing off the engine room and activating the fixed CO2 system. Consequences: extensive damage of equipment and electric installation; ship rendered unfit to proceed.	Hot surfaces surroundings. Poor maintenance or faulty installation of the small fuel pipe.	Positive action of the crew : fire-fighting operations (organization, command, techniques and control). Importance of proper maintenance and installation of fuel oil system - equipment, pipes, valves, fittings and connections. Regular inspections for detection of leakage or accumulation of fuel oil and evaluation of vibrations. Detachable pipes connections in fuel oil pressure pipes should be protected and at safe distance from heated surfaces and electrical equipment. Unsafe act and decision - Poor maintenance or faulty installation of the small fuel pipe - Inadequate management of physical resources.	Report noted.
HULL FAILURE **LEADER L** **BULK CARRIER** **PANAMA** **38975** **PANAMA** **MR.MOGENSEN**	23/03/2000	During a voyage from Alexandria, Egypt, to New York, United States, loaded with 57,000 tons salt, the vessel encountered rough weather in the Atlantic Ocean. At approximately 14:00 (local) on 23 March problems arose with the steel plates 15 meters long on the starboard side of the No. 4 hold below the waterline. Water entered the No. 4 hold and the hatch cover came off. Sections of the steel plates came off. The bow of the ship went down more and more. At 19:49 the ship sank in position 35º53'N, 058º12'W. The crew was thrown in the water. Some of them made it to the liferafts. Some were rescued from the sea by helicopter. Of the crew of 31 only 13 survived.	Substantial corrosion in various frames, including side shell frames of holds with the consequence of detached welds between side shell plates and frames. Insufficient survey carried out by the classification society. Possible asymmetrical loading of the vessel may have caused unusual influences of forces at the hull of the vessel.	Free fall lifeboats, capable of safe launching in all weather, should be fitted and the crew trained in their use. Survival suits should be provided for all crew members for vessels without free fall lifeboats. Quality control by IACS of classification society surveys should be carried out on a random basis for vessels in high risk categories. Flag States should ensure current "hot topics" for vessels in high risk categories are provided to their surveyors and that these areas are inspected and commented upon. The Captain misjudged the situation and did not abandon the ship in time. The rapid foundering thus prevented the proper manning and use of the lifeboats.	Report noted.

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COLLISION **MAR ROCIO** **CHEMICAL TANKER** **SPAIN** **4931** **SPAIN** **MR.DE LIMA CORREIA** **SKS TRINITY** **ORE/BULK/OIL CARRIER** **NORWAY** **63515**	16/08/2000	At 00:09 (local time) on 16 August 2000, the chemical tanker MAR ROCIO (12kn) sailing, in ballast condition, north of Algeciras Bay collided with the OBO ship SKS TRINITY (14kn), in loaded condition, as she was approaching the Gibraltar channel TSS from the Mediterranean sea. MAR ROCIO's OOW saw SKS TRINITY by bow, decided to reduce speed, keep out of her way and pass astern. After manoeuvring, the OOW increased speed because he saw another vessel on the same course (which in reality was the same vessel SKS TRINITY) and he wanted to pass ahead of her. SKS TRINITY advised MAR ROCIO by VHS that she was in risk of collision and should alter her course in accordance with COLREG. Tarifa RCC warned both vessels of their close proximity (0.6 miles). The manoeuvre of MAR ROCIO to starboard at the last moment did not permit to avoid the accident which occurred in position 36º01'N, 005º20'W, 5 miles S.E. of Punta del Carnero. Consequences: MAR ROCIO : large deformations and fractures of the bow structure and bulbous bow; SKS TRINITY : extensive deformations (4m) at port side (stringer and sheerstrake plates, 1st strake and internal structure) and side shell hole of about 4x3m at waterline level with flooding of No.2 water ballast tank. Both vessels rendered unfit to proceed.	OOW of MAR ROCIO did not identify the second vessel as being SKS TRINITY. Both vessels did not use the IMO Standard Marine Navigational Vocabulary to communicate. Both vessels did not take action in time to avoid collision.	Use of the IMO Standard Marine Navigational Vocabulary to communicate between vessels. The importance to give effect to the rules of COLREG, 1972, particularly: rule 5 - Look-out; rule 7 - Risk of collision; rule 15 - Crossing situation; rule 16 - Action by give-way vessel; and rule 17 - Action by stand-on vessel. - OOW of MAR ROCIO : failure to maintain proper lookout, slip - attention failure. - OOW of MAR ROCIO : incorrect evaluation of risk of collision, slip - attention failure. - OOW of MAR ROCIO : "failure on the duty of keeping out of the way and early actions to keep well clear", violation - knowledge-based routine. - Both ships did not take action to avoid the collision : mistake - error in judgement - knowledge-based routine.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **MILENIUM** **PASSENGER SHIP/CATAMARAN** **SPAIN** **6360** **SPAIN** **MR.DE LIMA CORREIA** **AURIGA E** **YACHT** **UNITED KINGDOM (BERMUDA)** **247**	07/09/2000	At 21:18 (local time) on 7 September 2000, near the coast of Mallorca, position 39º32'N, 002º20'.8E, the yacht AURIGA E sailing from Formentera to the Port of Andraitx, collided with the ro-ro/passenger ship (high speed craft) MILENIUM which was sailing from Palma de Mallorca to Barcelona. MILENIUM course was 310º (38kn). The Officer of the watch saw the stern light of AURIGA E (20-22kn) and evaluated, using the radar, that it would pass by the starboard side some 0,4 miles away. There is no information of distance between the two ships when the vessels were almost alongside. The accident happened when AURIGA E changed course to starboard colliding at an angle of impact of about 90º with MILENIUM, at about 1/3 of its length from the stern. Consequences: AURIGA E : 8 persons injured, bow body detached and significant flooding, rendered unfit to proceed. MILENIUM : side shell damage with a large hole above the waterline, rendered unfit to proceed.	MILENIUM was overtaking AURIGA E. High speed and proximity of both vessels. Failure to maintain proper lookout, absence of communications and incorrect judgement of the courses. Insufficient action to avoid collision.	The importance to give effect to the rules of COLREG, 1972, particularly: rule 5 - Look-out; rule 7 - Risk of collision; and rule 13 - Overtaking. Unsafe act and decision. - MILENIUM : failure on the "duty of keeping clear of the overtaking vessel until she's finally past and clear", mistake - knowledge-based routine. - AURIGA E : incorrect judgement of MILENIUM's course, slip - skill-based. - Both vessels : incorrect evaluation of the risk of collision, slip - attention failure. - Both vessels : absence of communication, mistake - knowledge-based routine. - No action to avoid the collision, mistake - knowledge-based routine.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **MILENIUM** **RORO CARGO/FERRY** **SPAIN** **6360** **SPAIN** **MR.DE LIMA CORREIA** **TRIMAR** **PASSENGER SHIP** **SPAIN** **159**	05/04/2001	At 11:06 (local time) on 5 April 2001, when the ro-ro/passenger ship (high speed craft) MILENIUM was turning during berthing operations in the port of Barcelona at Drassanes dock, there was a technical failure in the steering gear. Consequently, MILENIUM continued moving ahead and collided with a small passenger vessel TRIMAR moored at its usual quay. Immediately after the casualty the Captain of MILENIUM recovered the vessel manoeuvring control. The cause of the casualty was the blocking of the valves which controlled the port water jets. Before the accident, 3 alarms were registered : stabilisers not up, failure of valves which control the speed and the movement astern, and control transfer. However, they were not accepted and the problem with the steering system was ignored. Neither the emergency stop nor the anchor was used. Consequences: TRIMAR : 3 persons slightly injured, extensive damages, rendered unfit to proceed; MILENIUM : no damages, remains fit to proceed.	Alarms not accepted. Emergency stop not activated. Anchor not used.	Test engines for satisfactory operation ahead and astern before berthing operations. Test steering gear primary and secondary systems before berthing operations. Unsafe act and decision - Alarms not accepted : Slip - incorrect operation of controls. - Emergency stopping not activated : mistake - failure to respond appropriately. - Anchoring not used : mistake - failure to respond appropriately.	Report noted.
OTHER (FALL OVERBOARD) **MISS GATINEAU** **PASSENGER SHIP** **CANADA** **52** **CANADA** **MR.LEE**	12/05/2000	On the night of 12/05/2000, the passenger vessel was conducting a cruise on the Ottawa River with 132 passengers on board. At 23:20 a passenger was seen to have fallen overboard. The vessel was held in position. Despite a search conducted by the crew in the vessel's lifeboat, and by water rescue units from two local fire departments, the victim could not be found. His body was recovered two weeks later.	- The victim fell overboard while attempting to perform a gymnastic manoeuvre on the forward railing of the vessel. His ability to stay afloat or swim to shore would have been affected by hypothermia due to the low water temperature. - The vessel was not suitably equipped to conduct effective SAR operation in the dark, nor was it equipped with a motorized lifeboat. - No specific lookout was assigned to keep track of the victim in the water resulting in the crew losing sight of him. - The SAR teams did not proceed immediately downstream to search the victim due to a lack of understanding of the effect of river current on a person in the water.	- Smaller passenger vessels operating in sheltered waters should be suitably equipped to quickly locate and recover persons who fall overboard. - Person overboard procedures should be established and practiced along with other emergency drills. The procedures should provide for a specifically assigned lookout to keep track of the victim. - Understanding of the prevailing environmental conditions is essential in planning and executing a successful SAR operation. The incident happened at a location near the boundary between two municipalities, each having their own rescue resources. The investigation suggests that the lack of direct communication and joint exercise between the rescue resources had inhibited the conduct of a coordinated SAR operation.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FIRE **NARIVA** **CHEMICAL TANKER** **BAHAMAS** **20573** **BAHAMAS** **MR.RABE**	14/08/2001	While the vessel was underway, vessel engineers drained a deck hydraulic line to an engine room storage tank by way of a reservoir/expansion tank. During this evolution the vessel was on a ballast passage and trimmed three meters down by the stern. As the larger deck line was draining, the vent to the expansion tank filled and overflowed just above the main engine turbocharger. The falling oil contacted hot surfaces, vaporized and ignited. About 40 minutes passed until CO2 was released which successfully extinguished the fire. The ship's engineers were able to restore electrical power but not propulsion and the vessel required a tow. The engine room was extensively damaged from heat and smoke. The vessel's Chief Engineer sustained burns to his hands and face while attempting to enter the engine room during response efforts.	The hydraulic oil piping system was inadequately designed in that its reservoir/expansion tank venting arrangements failed to be suitable for all levels of trim. In the condition of trim at the time of the casualty, the tank's vent was lower than sections of the piping being drained.	Vessel operators and shipboard employees may be incorrect to assume that an installed system is adequate for all aspects of operation. Shipboard engineering systems, their design and installation although approved to various standards and regulations may be in certain instances found inadequate and lead to unintended and unfavorable circumstances. The investigation revealed that the engine room escape terminated near an area that shares access to engine room doors. This emergency escape route would have been restricted if those doors had been left open and permitted the passage of smoke and flame. Although the drain back process of overflowing and emptying the reservoir/expansion tank to the storage tank appeared innocuous, the individual overseeing the process should have recognized the potential risk for problems occurring in the engine room. Defenses could have been established by assigning an individual to continually observe the levels in both the tanks. This person could have also been instructed on what actions to take should problems, like an overflow condition develop. Shipboard personnel were not all accounted for at muster after the sound of the fire alarm. As a result, the release of CO2 was delayed, likely permitting the fire to further develop and cause additional damage.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
EXPLOSION **NEGO KIM** **BULK CARRIER** **HONG KONG, CHINA** **15832** **HONG KONG, CHINA/AUSTRALIA** **MR.PERKINS**	18/11/2001	ANALYSIS BASED ON REPORT FROM HONG KONG, CHINA (FSI 12): While at anchor awaiting instruction to enter port, the crew was engaged in cleaning and painting the No.1 Port, topside ballast tank as part of an ongoing maintenance program. The tank had been opened some days previous to the accident so the crew could clean the tank and prepare the surfaces for painting. On the day of the accident, the Mate tested the tank for oxygen levels a few times and found them to be 21%. There was no gas detector onboard. The tank was ventilated using a fan blowing air through a manhole and a compressed air line situated in the tank. A cargo light was used to illuminate the work area. The epoxy paint with thinners was applied using a spray gun with the reservoir situated exterior on the open deck. The paint contained more than 30% thinners. After approximately 2 hours of painting, there was an explosion which blew the tank apart. Five crew members died and three were missing. ANALYSIS BASED ON REPORT FROM AUSTRALIA (FSI 12): same as Honk Kong, China.	ANALYSIS BASED ON REPORT FROM HONG KONG, CHINA (FSI 12): Spray painting using a mixture of epoxy paint and thinners created vapour concentrations within the explosive range of the mixture's compounds. The ventilation of the tank was inadequate and electrical equipment used was not intrinsically safe / explosion proof. The ignition source could not be determined but was probably the cargo light. There was a lack of proper documentation/guidance pertaining to painting in enclosed spaces using epoxy paints and a lack of explosive proof equipment and protective clothing onboard. ANALYSIS BASED ON REPORT FROM AUSTRALIA (FSI 12): same as Honk Kong, China.	ANALYSIS BASED ON REPORT FROM HONG KONG, CHINA (FSI 12): In the previous tank painting operation, similar measures had been taken to ensure that there was oxygen and ventilation. It was only as a matter of chance that there was no explosion. The safety management system did not set out procedures for painting in enclosed spaces. The checklists required testing for oxygen and hydrocarbons and set out guidance for how the sampling should be taken. The crew did not recognize the hazards associated with spray painting in enclosed spaces. The Material Safety Data Sheets were not on-board. The MSDS provides flash points, explosive limits and ignition points for the paint base, hardener and thinner. Following the accident, the ship management company suspended tank painting operations until it developed revised procedures. Also, the Hong Kong Marine Department sent a shipping notice to ship owners, managers, operators and crew summarizing this accident and describing the hazards associated with painting in enclosed spaces. ANALYSIS BASED ON REPORT FROM AUSTRALIA (FSI 12): Measures were taken to ensure that there was oxygen and ventilation; however, the crew did realize the full extent of the risks associated with painting in enclosed spaces and had neither the guidance nor the proper equipment to reduce the risk. An ISM audit was carried out following the accident and it was found that the procedures were complied with and there were no non-conformities. It was determined that "approved equipment" was not required because the ship was neither a tanker nor would it be carrying dangerous cargos. There was correspondence between the ship and the management company on how to apply the paint but not on the safety aspects. The ship did not have the Material Safety Data Sheets on-board.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FAILURE OF WATERTIGHT DOORS/PORTS/ETC **ORIANA** **PASSENGER SHIP** **UNITED KINGDOM** **69153** **UNITED KINGDOM** **MR.CREDE**	28/09/2000	The vessel was struck amidship on port side by a large wave while on a passage from New York to Southampton. Three cabin windows on Deck No. 5 and three cabin windows on Deck No. 6 were breached. The windows on Deck No. 5 were fitted with storm covers which also failed. Seven cabin occupants were injured and extensive damage occurred to the cabins.	The cumulative effects of various defects weakened the windows. The overlap of the glass panes and glazing strips did not meet the required design specification. The classification society surveyor did not detect latent defects in the windows during manufacture. Distortion of the window frames by welding during installation may have caused them to become oversized. The effects of storm force winds and high seas on the vessel. The wave that impacted the ship, which may have been greater than 10 meters in height, could have resulted in forces in excess of window design strength. If windows had been manufactured and installed as designed, they would have been more likely to withstand the forces from the wave. Storm cover arrangements were inadequate and there was little information regarding the use or strength of the storm covers.	The windows passed the installation hose test despite the defects. A hogging condition of the vessel did not result in significant distortion of the window frame. The speed of the vessel was appropriate for the seas and the course being taken. The Officer navigating the ship may have underestimated the sea conditions due to the size of the ship, height of the navigation bridge, and the use of stabilizers. The classification society surveyor failed to detect the defects in the windows during their manufacture.	Report noted.
OTHER/UNKNOWN **P&OSL AQUITAINE** **FERRY** **UNITED KINGDOM** **28833** **UNITED KINGDOM** **MR.RABE**	09/10/2002	While conducting an evacuation drill of a ro-ro passenger ferry alongside the dock using a vertical chute evacuation system, a volunteer evacuee became stuck in the chute and died.	- Ergonomic unsuitability of lifejackets for the evacuation chute equipment. - Lack of screening for suitability of evacuation drill participants. - Poor communication to evacuee participants regarding the expected physiological and psychological demands of the drill. - Poor communications regarding emergency escape methods or procedures. - No specific training program for personnel tasked with clearing the evacuation chute (Sweepers). - No specific equipment in place to aid in clearing the chute of obstructions. - No threat perceived by the manufacturer or management regarding a chute blockage.	- The need to fully screen drill participants for suitability with regard to safely conducting a particular procedure. - The value of conducting Risk Assessments for emergency drill evolutions. - The importance of developing effective control measures from a risk assessment, and of fully implementing appropriate controls. - The importance of fully evaluating a marine safety product considering all possible hazards. - The importance of establishing a training scheme that provides realistic training for all personnel. - Ergonomic issues : Fully evaluate equipment suitability for all realistic physiological and psychological conditions. - Management issues : While conducting a formal Risk Assessment for this drill procedure was exemplary, the failure to implement control measures negated the value of the Risk Assessment. Drill participants should be screened for suitability for the tasks involved. All potential hazards must be evaluated and adequate defenses established. - Regulator issues : There is a need to critically examine the hazards of "realistic" drills versus "controlled" drills to develop safe standards for all drills.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
EXPLOSION **P. HARMONY** **OIL TANKER** **PANAMA** **5540** **KOREA, REPUBLIC OF** **MR.PERKINS**	15/01/2001	After discharging gasoline in one port, the tanker was making an 11-hour transit to the next port where the next cargo was to be loaded. Following the instructions of the charter, the crew started tank cleaning operations by fitting a water-driven fan to ventilate the tank with ducting extending to the lower portion of the tank. Due to the freezing weather, the water in the pipes was freezing making the operation of the fans difficult and necessitated starting the operation from the after tanks. After completing the ventilation of the tank just forward of the slop tanks and considering it to be gas free, two crew members entered the tank to remove residual oil. There was an explosion which tore away bulkheads to adjoining tanks. One such tank contained A-1 Jet Fuel and Kerosene slops which ignited. The hull was breached in way of the tanks and the engine room and the ship flooded rapidly, developed a starboard list and sank. The crew escaped by jumping into the sea and seven were recovered by passing ships. Of a crew of 16, 7 survived, 3 bodies were recovered and 6 were missing.	The source of ignition was not identified; however, it was indicated that it was highly probable either due to a discharge of static electricity from winter clothing or from the ventilation ducting; or to an ordinary metal paint can that was used to carry tools into the tanks coming in contact with metal and causing a spark. Whereas it is normal procedures not to enter tanks until gas concentration are below danger levels, it could not be determined if the officer in charge of the operation followed these procedures properly. The crew was under pressure to complete the tank cleaning operation due to the short duration of the transit to the next port in that given the equipment available and the weather conditions, there was insufficient time to ventilate and clean all the tanks as was requested. Given the type of cargo to be loaded in the next port, the report disputes the need to clean tanks in this case.	The investigation report indicates the need for stricter standards including the fitting of inert gas systems; cleaning tanks only when necessary; using fitted piping for loading and discharging as a means to blow air into tanks; and situating slop tanks close to the bow. There is a need to ensure having sufficient time to conduct tank cleaning operations to minimize the possibility of missing steps in or not paying adequate attention to the operation. All the crew had taken training in tanker operations; however, there is a need to continually reinforce this training on-board and to ensure the lessons are properly applied.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FAILURE OF WATERTIGHT DOORS/PORTS/ETC **QUEEN ELIZABETH 2** **PASSENGER SHIP** **UNITED KINGDOM** **70327** **UNITED KINGDOM** **MR.CREDE**	21/05/2002	On 21 May 2002 at about 02:00, while on a trans-Atlantic passage from Southampton to New York, a large sea water leak was discovered in the aft engine room. The source was found to be a perforation, outboard of the skin valve, in a 250 mm diameter salt water inlet pipe for the evaporator. Several attempts were made before the leakage was finally stopped. The emergency bilge injection valve was used on numerous occasions to pump large quantities sea water overboard in order to prevent flooding of the engine room. It took until 21:00 to stop the leakage using an inflated bladder from spare parts from the watertight door hydraulic system. However, the bladder failed at 09:15 the following day and it took approximately an hour to insert a larger bladder. The ship continued on the voyage once the leakage was stopped.	The pipe/flange construction of the affected piping made detection of the severe corrosion difficult when using ultrasonic methods. The length and diameter of the affected piping did not facilitate internal cleaning and visual examination.	It is very difficult to detect corrosion in piping systems of this size using ultrasonic testing. It was necessary to discharge bilge water in accordance with Regulation 11(a) in Annex I of MARPOL in order to control the flooding. The ingenuity demonstrated by part of the crew for using inflated watertight door hydraulic system bladders to stop the leakage.	Report noted.
FIRE AND EXPLOSION **REAL PROGRESS** **OIL TANKER** **LIBERIA** **4475** **LIBERIA** **MR.PERKINS**	02/06/2001	The vessel was alongside undergoing repairs following a period of time that it had been laid up. During the process of replacing an expansion joint in one of the tanks, it was realized there was a quantity of Premium Motor Spirit in the tank. An electrical submersible pump was to be used to pump the oily water mixture. The pump was lowered in the tanks and soon after it was started, an explosion occurred severely rupturing the cargo tanks. As a result of the explosion, 6 shore workers and one of the ship's officers died. As well, one shore worker and another of the ship's officers were admitted to hospital.	There was an explosive meter on board and tanks had been tested some time before; however, there is nothing to indicate that the atmosphere in the tank had been tested on the day of the explosion. The ship's eduction pump was not used and the electrical submersible pump that was used was faulty or not intrinsically safe to be used in such conditions. The Master's experience was, for the most part, on general cargo and container vessels and not on tankers.	When working with oily water mixtures in tanks, ship's crew members should not assume that the tank is gas free and should only use equipment designed for such purposes.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FIRE **ROSEBANK** **GENERAL CARGO SHIP** **UNITED KINGDOM** **1213** **UNITED KINGDOM** **MR.LEE**	14/12/2001	On 14/12/2001 a fire broke out in the provision room of the general cargo vessel, which had just left Dundee for the Channel Islands of Guernsey and Jersey with a crew of five. There was only one SCBA set on board, which was worn by one crewmember to fight the fire. The 45 kg CO2 extinguisher in the engine room was used to extinguish the fire. The fire was knocked down but it re-ignited as soon as the CO2 ran out. Fire hose was used to apply boundary cooling, however the fire fighting team failed to monitor all sides of the provision room. The re-ignited fire spread into the accommodation and the crew was unable to contain it. The coastguard was informed and a helicopter was dispatched to rescue. With the fire out of control the Master was forced to abandon the ship and all crew were airlifted off. The fire was subsequently put out by a navy ship and a fire-fighting tug. The accommodation block including the bridge was destroyed by the fire.	- The exact origin of the fire could not be identified, but it was believed that electrical failure within the motor compartment of one of the fridges or freezers in the provision room had caused the fire. - Inability to seal the space had caused the re-ignition of the fire after it was knocked down by the 45 kg CO2 extinguisher. - The spread of the fire into the accommodation could not be controlled as the fire party failed to follow boundary cooling techniques and monitor all sides of the space containing the seat of the fire. - Communication between the bridge and the fire party was inhibited due to the crew's failure to use the three available hand-held VHF sets. - The availability of only one SCBA set inhibited the capability of the fire party. - The senior officers failed to take control of the fire party, to assess the situation and to consider using different medium to fight the fire.	- CO2 can knock down a fire quickly, however its cooling effect is limited. To prevent re-ignition the space containing the seat of fire should be effectively sealed. - When applying boundary cooling to contain a fire, all sides of the space should be monitored. - Smoke helmet is not as effective as SCBA set in fire fighting, especially on vessels with only a small number of crew. - Fire party should be led by a more senior officer, who should use his experience and knowledge to assess the situation and consider the most appropriate means to fight the fire. - A small size crew sufficient to cope with normal shipboard duties may not be sufficient to handle emergencies. - The ability to communicate effectively between crewmembers of different nationalities during emergencies is an important factor that should not be overlooked.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **RUTH BORCHARD** **GENERAL CARGO SHIP** **BAHAMAS** **4015** **SPAIN** **MR.DE LIMA CORREIA** **ESTE** **GENERAL CARGO SHIP** **PORTUGAL** **1763**	09/08/2000	At 22:49 (local time) on 9 September 2000, in Finisterre TSS, the general cargo RUTH BORCHARD sailing from Amberes to Piraeus collided with the general cargo ESTE which was sailing from Passages to Malaga. Both ships were sailing South, RUTH BORCHARD's (15.2kn) course was 180º, ESTE's (10.5kn) course was 183º. RUTH BORCHARD's bow collided with ESTE's quarter, position 43º09'N, 009º55'.6W. The Captain of RUTH BORCHARD evaluated that the ship would pass by the starboard side one cable (185m) away and he said that ESTE had suddenly manoeuvred to starboard. According to Finisterre RCC the vessels were alone in the accident area and the traffic lane is 3 miles wide. Consequences: RUTH BORCHARD : bow and bulbous deformations; remained fit to proceed. ESTE: extensive deformations at starboard quarter structure (side shell, deck and structural elements); rendered unfit to proceed.	RUTH BORCHARD was overtaking ESTE. Short distance given by the overtaking vessel to keep out of the overtaken vessel. RUTH BORCHARD : incorrect judgement of the course of ESTE. Both vessels : failure to maintain proper lookout, absence of communications. Both vessels : no action to avoid collision.	The importance to give effect to the rules of COLREG, 1972, particularly: rule 5 - Look-out; rule 7 - Risk of collision; and rule 13 - Overtaking. Unsafe act and decision. - Failure on the "duty of keeping clear of the overtaking vessel until she is finally past and clear": mistake - knowledge-based routine. - Incorrect evaluation of risk of collision, narrow distance: slip - attention failure. - Both ships : absence of communication and proper lookout - mistake - knowledge-based routine. - Both ships : no action to avoid the collision - mistake - knowledge-based routine.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FIRE **SPIRIT OF TASMANIA** **FERRY** **AUSTRALIA** **31356** **AUSTRALIA** **MR.LEE**	24/02/2001	On 23/02/2001, a fire broke out in the photography shop of the passenger ro-ro ship while she was proceeding from Melbourne to Devonport with 967 passengers on board. The Master initiated the muster signal and sent fire-fighting team to tackle the fire. The team tried initially to extinguish the fire using hand held fire extinguishers but the fire kept re-igniting. A fire hose was used in the second attempt and the fire was extinguished in five minutes. All passengers were mustered at their designated muster areas in about 30 minutes after the muster signal was initiated. The mustering was generally effective except that a few passengers remained asleep in their cabins, as they were not awoken by the alarm. Also there were some passengers moving back against the flow of other passengers evacuating from the accommodation. The passengers were released after the smoke in the accommodation was cleared and the ship resumed her voyage. Apart from the fire damages inside the photography shop there was no other casualty in the incident.	- The fire was caused by a short circuit in an electric extension lead supplying power to a fridge inside the store area of the photography shop. - The short circuit was caused by breakdown of insulation as heavy load of boxes of photograph envelopes had been stowed on top of the extension lead for several months. - Neither the short circuit protection nor the earth leakage detection in the ship's electrical system was able to detect or limit the damage caused by the short-circuiting. - As the photography shop was a licensed business area on the ship, access by ship's staff was limited and the extension lead had not been inspected at any time prior to the fire. - The danger of stowing boxes on top of the extension lead had not been identified by any crew inspection and the photography shop staff had not received any training in recognizing such danger.	- Licensed business areas on a passenger ship should be subject to the same safety management policy, procedures and inspections as any other parts of the ship. - Staff of licensed businesses on a ship should receive the same safety training as received by other regular crew members. - Appropriate fire detectors should be installed in areas that have potential fire risk and can be separated from other areas protected by fire detection system. - It is important to ensure that alarm and public address systems in different areas of a ship are audible. - A final head count should be included in the evacuation plan of a ship to ensure that all passengers are accounted for. The Master's decision to initiate muster signal at an early stage of the fire is considered appropriate, as mobilization of a large number of passengers will take time. Clear instructions and proper guidance to passengers are important to avoid confusion and panic under an emergency situation.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FIRE **SSG EDWARD A. CARTER, JR.** **CONTAINER SHIP** **UNITED STATES** **42719** **UNITED STATES** **MR.PERKINS**	14/07/2001	The vessel was alongside with 1,212 containers on-board containing military explosives. In the engine room, the engineering officers were carrying out various tasks in preparation of proceeding to sea. One of the engineers was transferring heavy fuel oil from the starboard and port overflow tanks to the settling tank. He was not monitoring the operation and the tank and vents filled which in turn, resulted in the fuel oil becoming mixed with diesel fuel in another tank. The oily mixture continued up the vent piping to a vent collection chamber where a flange was not connected and spilled on the deck and down into engine room spaces below. The oily mixture ignited, the fire developed rapidly and the engine room spaces filled with smoke. The crew fought the fire but were hindered by the smoke. They were soon joined by shore fire fighting personnel. They tried to activate the CO2 system twice and thought that it had discharged. After several hours of effort, the fire was brought under control and extinguished. The ignition source could not be determined but was probably as a result of some of the oily mixture coming in contact with an incinerator. An engineer was overcome with smoke inhalation and died and an ER crew member drowned when he jumped overboard from an open side door to escape the fire. There was extensive damage to the vessel.	The engineer did not properly monitor the fuel transfer operation. The tank level monitoring systems were fitted with alarms which had been over-ridden by placing a pencil in a toggle switch used to acknowledge alarms. This had been common practice for some months as sensors needed to be replaced. The problem was known but not rectified. The venting system was in the process of being cleared of blockages and several flanges had been disconnected at a collection chamber where several vents come together. Fire and watertight doors were open which allowed the smoke to enter various spaces including the Fire Control Room and CO2 room hampering the response and an attempt to release the CO2 manually.	With the venting system being open to clear blockages, procedures with physical lock-outs were needed to ensure there is no transferring of fuel. If automatic alarm systems are not functioning, a safeguard that was required is not being maintained. Appropriate actions by the company or officer responsible have to be taken to either repair the system or introduce procedures to ensure the safeguard is maintained. The vessel's fire response plan was not followed. The less than adequate command and control of the response resulted in delays and uncoordinated actions such as the failure to establish fire boundaries and communications and to activate the CO2 system. A lack of training and awareness of the operation of certain fitted fire fighting systems underlines the need to be able to demonstrate their ability to function through drills and exercises. Awareness of possible means to evacuate an engine room may have allowed the crew member who drowned to consider other safer alternatives.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
FIRE **STENA EXPLORER** **FERRY, TWIN-HULL** **UNITED KINGDOM** **19638** **UNITED KINGDOM** **MR.RABE**	20/09/2001	Shortly before tying up, while the ferry was approaching its linkspan, a compression fitting failed on an aft generator located in the catamaran's port pontoon. The failure allowed the release of pressurized gas oil which contacted a hot spot, flashed into vapor and ignited. Soon after the fire alarm sounded, the vessel's Hi-fog fire-fighting system was activated and the generator was kept running until the vessel was lined up with the linkspan. The fire damaged the vessel's closed circuit television system typically used for docking procedures before the vessel was secured in the linkspan. Despite this damage, the Master was able to continue docking the vessel through radio communications with aft lookouts. The fire resulted in no injuries and very limited damage.	The casualty was caused by the loosening and release of tubing on the low pressure side of the fuel supply/return piping on one bank of engine cylinders. A small piece of tubing bent in the shape of a pigtail was used to connect two sections. The tube is secured and sealed by the use of compression nut, which compresses a spring ferrule and a rubber element that forms the seal against the pipe and the bore of the internally threaded socket on the fuel block. Investigators determined that the piping was not pushed as far as possible into the fuel block before the nut was tightened.	The elimination of compression fittings from fuel systems would significantly reduce the risk of fire from leakage. The Hi-fog system used to fight the fire proved highly effective and reduced resultant damage. The Master's decision to not shut down the engine when the fire initiated was appropriate. It allowed the vessel to properly tie up and the passengers to disembark. The engine manufacturer may have inadequately assessed the design and placement of the pigtail connections. Inspections of the connections are difficult and maintenance, such as replacing the ferrule or rubber element, is impossible without significant disassembly of other components.	Report noted.
FIRE **THEBAUD SEA** **SUPPLY SHIP** **CANADA** **2594** **CANADA** **MR.RABE**	03/02/2001	While underway at sea at 04:00 shortly after an engineer made a round through the machinery spaces, a fire developed in the vessel's starboard engineroom that contained 3 of the vessel's 6 main diesel generators. The engineer notified the bridge and a general alarm was sounded. Shortly afterwards the vessel's Chief Engineer (C/E) started the remaining port generators and transferred the load from the starboard generators. The starboard engineroom fuel trip was activated causing the vessel to black out entirely. The C/E started the emergency generator and at 04:18 CO2 was released to the stbd. machinery space. Between 05:00 and 06:21when the fire was declared out, three entries were made in which hand held and fixed extinguishing systems were used. The resultant damage was extensive affecting electrical cabling and various components located near the forward end of no. 4 diesel generator.	A 90 degree fitting partially separated from the end cover of the secondary fuel oil filter. Fuel sprayed, contacted, vaporized and ignited on nearby hot surfaces of the exhaust manifold. The male threads of the fittings were straight while the female threads of the socket were tapered, which resulted in reduced thread contact and joint strength. Engine vibration loosened the fitting.	Vibration induced loosening of fasteners and the failures of the components they secure on main and auxiliary diesel engines are often identified as the cause for uncontrolled fuel releases within machinery spaces. The use of non-mating threads at a pressurized joint should be avoided. Post casualty inspections revealed that the engineroom dampers required electrical power to close. Once the fire damaged the wiring, the dampers could not be closed. The effectiveness of the crew's response reduced resultant damage. The frequency of the crew's emergency practices and drills enhanced their ability to effectively respond to the casualty, thereby minimizing damages and preventing injuries.	Report noted.

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Analyst(s) Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **THELISIS** **RORO CARGO** **GREECE** **8904** **UNITED KINGDOM** **MR.SAMMY (YOUNGSUN) PARK** **OUR SARAH JAYNE** **FISHING VESSEL (TRAWLER)** **UNITED KINGDOM** **21**	20/06/2001	The starboard quarter of the ro-ro cargo vessel THELISIS under pilotage collided with the port side of the trawler OUR SARAH JAYNE engaged in fishing in the Thames Estuary at night. The visibility was very good. The trawler flooded then foundered. The ro-ro cargo vessel sustained slight damage to her hull plating. No injuries resulted from this incident.	In accordance with the Collision Regulations : - The Pilot on board the ro-ro cargo vessel failed to take avoiding action in sufficient time. - The Skipper on board the trawler failed to keep a proper lookout.	- The Pilot relying on VHF radio for collision avoidance. - The complacency and expectation of the Pilot that the trawler's Skipper would alter course if he requested him to do so. - The Master of the ro-ro cargo vessel failing to override the pilot's instructions. - The Skipper of the trawler's decision to sail single-handedly, thereby denying himself the ability to keep a safe navigational watch.	Report noted.
OTHER (WORK-RELATED ACCIDENT) **WESTERN MUSE** **BULK CARRIER** **PANAMA** **28097** **AUSTRALIA** **MR.CREDE**	19/06/2002	The Bosun was in charge of changing the cargo wire on No. 2 crane. He had a deck cadet, three able seamen, and two ordinary seamen assigned to assist. The renewals started at 10:00 and were completed by 17:45. There was a lunch break of approximately 45 minutes. The Bosun was working on a platform above the top of the crane. Once the wire was renewed, he disconnected his safety belt from the platform railing and had the Cadet operate the crane to ensure the wire was running freely. His unclipped safety belt became entangled with the moving luffing wire and it pulled him into the crane. The Bosun's left leg and hip were drawn in between the sheaves and the luffing wire. His leg was nearly severed and he was heamorrhaging. Even though the crew was able to quickly free him, he died from massive traumatic injuries to the leg and pelvis shortly thereafter.	The possibility that the Bosun experienced a concentration lapse after completing a physically and mentally demanding task. The Bosun not noticing that his unclipped safety belt was going to become entangled with the moving luffing wire due to his intense focus on the operation of the renewed cargo wire. The insufficiency of ISM Code safety procedures aboard the vessel. The lack of warnings to personnel working aloft regarding the dangers of loose clothing becoming entangled with moving parts. Poor lighting near the completion of the job due to the onset of darkness.	The Bosun was qualified to renew the crane cable and he successfully performed the repairs. His death was caused by a mental lapse during testing of the repairs rather than from improperly performed repairs. The possibility of suffering a concentration lapse after completing a physically and mentally demanding task. Failure to watch the movement of the luffing wire due to intense concentration on the cargo wire.	Report noted.

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ANNEX 2

OVERVIEW OF LESSONS LEARNED

NAME OF ANALYST : NEILS MOGENSEN (DENMARK)
Number of reports analyzed: One

1 Hull failure

1.1 Importance of careful survey and maintenance by owners and crew of old bulk carriers.

1.2 Importance of proper and careful periodic construction surveys of old bulk carriers by classification societies, and feed back to owners.

1.3 The use of loading instruments when loading bulk carriers.

1.4 The value of free fall lifeboats, capable of safe launching in all weather.

1.5 The value of survival suits for all crew members for vessels without free fall lifeboats.

NAME OF ANALYST : MR. K.L. LEE (HONG KONG, CHINA)
Number of reports analyzed: Four

2 Fire or explosion

2.1 Licensed business areas on a passenger ship should be subject to the same safety management policy, procedures and inspections as any other parts of the ship.

2.2 Staff of licensed businesses on a passenger ship should receive the same safety training as received by other regular crewmembers.

2.3 Importance of fitting appropriate fire detectors in areas that have potential fire risk and can be separated from other areas protected by fire detection system.

2.4 Importance of ensuring the audibility of alarm and public address systems in different areas of a ship.

2.5 A final head count should be included in the evacuation plan of a ship to ensure that all personnel are accounted for.

2.6 CO_2 can knock down a fire quickly, however its cooling effect is limited. To prevent re-ignition, the space containing the seat of fire should be effectively sealed.

2.7 When applying boundary cooling to contain a fire, all sides of the space should be monitored.

2.8 A smoke helmet is not as effective as a self-contained breathing apparatus (SCBA) in fire fighting, especially on vessels with only a small crew.

2.9 The fire party should be led by a more senior officer, who should use his experience and knowledge to assess the situation and consider the most appropriate means to fight the fire.

3 Person overboard

3.1 Rough weather may preclude the use of a rescue boat. Other means to recover a person from the water in adverse weather conditions should be explored and details provided in the company standing orders and operational procedures manual.

3.2 For passenger vessels, consideration should be given to the risk of allowing passengers access to open decks in adverse weather conditions that preclude the use of the ship's rescue boat.

3.3 Smaller passenger vessels operating in sheltered waters should also be suitably equipped to quickly locate and recover persons who fall overboard.

3.4 Person overboard procedures should be established and practiced along with other emergency drills. The procedures should provide for a specifically assigned lookout to keep track of the victim.

3.5 Understanding of the prevailing environmental conditions is essential in planning and executing a successful search and rescue operation.

NAME OF ANALYST : MR. DAVID CREDE (REPUBLIC OF THE MARSHALL ISLANDS)
Number of reports analyzed: Five

4 Loss of watertight integrity and personnel injuries

4.1 The fact that an inspector or a classification society surveyor did not find any defects on a ship or with a piece of equipment does not mean that defects do not exist.

4.2 Personnel navigating large vessels, or ships with stabilizing devices, may have a tendency to underestimate sea conditions.

4.3 It is important to communicate with passengers during poor weather conditions to ensure that they know what to expect and so that they can take necessary precautions.

4.4 The Master and Officers must keep each other informed of shipboard projects/duties being performed at any given time.

4.5 Personnel should wear harnesses with lifelines when working on deck during adverse weather conditions.

4.6 The Master and the Navigation Watch Officer must be notified when work is being performed on deck, especially during heavy weather.

4.7 Standing orders and written procedures must be carried out to their full extent.

4.8 A Shipboard Response Plan that deals with emergency situations, including those during heavy weather, should be maintained aboard a vessel.

4.9 The performance of physically and/or mentally demanding tasks can lead to a loss of concentration that may result in a casualty.

4.10 The presence and adequacy of shipboard ISM Code safety procedures must be periodically verified.

4.11 Vessel owners and operators should ensure that shipboard personnel are cautioned of the dangers associated with loose fitting clothes coming into contact with moving parts or equipment.

4.12 Changes in working or environmental conditions while performing a task, such as the onset of darkness, can create unexpected job related hazards.

4.13 Risk assessments should be performed for typical shipboard operational and maintenance related tasks.

NAME OF ANALYST: MR. P. FOLEY (AUSTRALIA)
Number of reports analyzed: Three

5 Work-related accidents and falls overboard

5.1 The need for careful planning, good communication between vessels, and careful execution when carrying out the inherently risky operation of transferring a tow.

5.2 Operations involving the suspension of heavy weights from a single point are inherently dangerous. These operations may be considered to be unsafe when they are conducted on ships subject to motion induced by the sea and the movement of the suspended weight cannot be adequately constrained.

5.3 There is a need to ensure a safe method of access between ship and shore when people need to move from one place to the other. Alternatively, a safe method of exchanging documents in all foreseeable conditions should be developed when there is no need to for people to move between ship and shore.

NAME OF ANALYST: CAPT. TETSUZO FUJIE (JAPAN)
Number of reports analyzed: One

6 Grounding

6.1 It is mentioned on the report that it has not been possible to determine the direct causes of the accident as the two people with knowledge of the navigation both lost their lives. The report has no recommendations to make. Therefore, lessons learned from the accident could not be identified.

NAME OF ANALYST: MR. SAMMY PARK (REPUBLIC OF KOREA)
Number of reports analyzed: Four.

7 Contacts and collisions

7.1 The fundamental basis for anti-collision manoeuvres is a good lookout.

7.2 The posting of a dedicated lookout is a sensible and seamanlike precaution in heavy traffic situations like those that exist in the Dover Strait traffic separation scheme (TSS).

7.3 Many navigators might not be fully adept in the use of GPS and track control systems, and this causes them to return to the programmed track after anti-collision manoeuvres. This, in turn, tends to maintain the bunching of traffic on the popular pre-programmed tracks. In the past, when deviation from the charted course was necessary for anti-collision purposes, it was common practice to parallel the required track until the next alter course position was reached.

7.4 Advice received from vessel traffic services (VTS) regarding navigation should not be relied upon implicitly, but be treated only as part of the overall information available. Full use should be made of the vessel's navigational equipment and bridge personnel.

7.5 Not only is it a dangerous practice to rely on VHF radio communications for collision avoidance, but the expectation that the stand-on vessel will give way to a larger vessel makes it extremely so.

7.6 While it is appreciated that it is all too easy to hand responsibility to a pilot, especially on vessels which might not be frequent visitors to certain ports, masters must be fully aware that the ultimate responsibility for the safety of the vessel lies with them. Because of that, they should be prepared to override the pilot's instructions should the need arise.

7.7 A ship owner is to avoid operating its vessel single-handedly, having full regard of the need to maintain a proper lookout and safe navigational watch.

7.8 The non-existence of a perceived "unwritten rule" that high-speed crafts will keep clear of all other craft because of their manoeuvrability.

7.9 A failure to recognise what constitutes a close quarters situation and safe speed in coastal waters.

7.10 Under certain conditions, it is possible that small displayed automatic radar plotting aids (ARPA) closest points of approach (CPAs) could be zero because of side lobe effect of radar beam.

7.11 Providing regular and accurate information in a calm and authoritative manner is among the most important requirements in any passenger-carrying vessel involved in an emergency.

7.12 Ensure that pilots are fully informed by the port authority of the exact positions of vessels anchored in rivers, and of any problems relating to their ability to maintain position.

7.13 Ensure that a sufficiently wide navigable channel remains clear at all times by arrangements for anchored vessels in rivers.

7.14 Ensure the reliability of buoyage in rivers.

NAME OF ANALYST: FRED PERKINS (CANADA)
Number of reports analyzed : Six

8 Explosions and fires

8.1 Ventilation of the tank must be adequate and electrical equipment used must be intrinsically safe/explosion proof.

8.2 Spray painting using a mixture of epoxy paint and thinners can create vapour concentrations within the explosive range of the mixture's compounds.

8.3 The safety management system should set out procedures for painting in enclosed spaces and the material safety data sheets which provide flash points, explosive limits and ignition points for the paint base, hardener and thinner should not be onboard the vessel.

8.4 There is a need to ensure having sufficient time to conduct tank cleaning operations to minimize the possibility of missing steps in or not paying adequate attention to the operation.

8.5 Crews are required to take training in tanker operations; however, there is a need to continually reinforce that training onboard and to ensure that it is properly applied.

8.6 In any tanker operation, the crew must continually assess the risk of a hazardous situation developing and should ensure checks are in place and used.

8.7 Fuel transfer operations need to be continually monitored and automatic alarm systems should be properly maintained and not by-passed.

8.8 Training in the operation of fitted fire fighting systems should require crew to explain their understanding of the system and its procedures and to physically demonstrate their ability to operate the systems.

NAME OF ANALYST: PAULO CORREIA (PORTUGAL)
Number of reports analyzed: Eight

9 Collision

9.1 Duty of keeping clear of the overtaking vessel until she's finally past and clear.

9.2 The officer of the watch (OOW) shall assess the course of other vessels nearby to determine if risk of collision exists.

9.3 In the event of an emergency radio, it's important to establish communications with the other vessel.

9.4 The vessels should take in advance actions to avoid a collision.

10 Fire or explosion

10.1 Detachable pipe connections in fuel oil pressure pipes should be protected and at safe distance from heated surfaces and electric equipment.

10.2 Regular inspections for detection of leakage or accumulation of fuel oil and evaluation of vibrations.

10.3 Importance of correct owner/company safety management, proper maintenance and installation of fuel oil system equipment, pipes, valves, fittings and connections.

10.4 Crew well-trained in fire-fighting operations (organization, command, techniques and control).

11 Damages to ship or equipment (resulting in a collision)

11.1 Engines tested before berthing operations for satisfactory operation ahead and astern.

11.2 Steering gear primary and secondary systems tested before berthing operations.

11.3 Correct operation and procedures of equipment controls.

12 Capsizing or listing

12.1 Officially approved information should be given to the skipper of stern trawler fishing boats about the loading, trim, and stability conditions of the vessel in operation.

12.2 The skippers should be aware of the procedures to free the trawl from a seabed obstruction and related basic principles of stability considering bad weather conditions and following and quartering seas.

12.3 Vessel superstructure weathertightness shall be kept by all means at sea.

12.4 Know sea state threshold beyond which fishing work should be avoided or extra-caution considered.

12.5 Know instructions to free the trawl from a seabed obstruction and related basic principles of stability.

NAME OF ANALYST: DOUG RABE (UNITED STATES)
Number of reports analyzed : Six

13 Explosions and fires

13.1 The security of compression fittings cannot be guaranteed. The elimination of compression fittings from fuel systems would significantly reduce the risk of fire from fuel leakage.

13.2 Loosening of fasteners and failure of components on diesel engines due to vibration often cause fuel leaks and resulting fires. The isolation of fuel lines from hot surfaces can prevent fires.

13.3 Cargo surveyors may not understand the risks of their activities and may not employ safety procedures adequate for a particular cargo or vessel. Vessel deck officers should ensure that cargo surveyors equipment and procedures are safe.

13.4 Shipboard piping systems must be designed and installed to prevent inadvertent tank overflows in all expected conditions of vessel trim.

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ANNEX 3

LESSONS LEARNED FOR PRESENTATION TO SEAFARERS

FIRE

What happened?

While loading a cargo of benzene into 12 tanks, a vessel was boarded by a cargo surveyor. The pumpman observed the cargo surveyor taking samples from the aftermost tanks and working forward. Approximately 25 minutes after the last tank was loaded, an explosion occurred and fire developed near the forward part of the cargo area. The fire was extinguished in several minutes by the Master and another crewmember using deck monitors. The no. 1 port cargo tank lid was blown off and other damage was noted on nearby structures and pipework. The cargo surveyor was injured.

Why did it happen?

A static charge had developed in the cargo tank prior to the explosion. The cargo surveyor used a metallic can attached to a fiber rope to obtain samples which caused a discharge of static electricity within the tank. The cargo surveyor was not aware of the risks associated with the equipment he was using and had not followed established procedures. Vessel crewmembers did not confer with the cargo surveyor regarding his methods and equipment.

What can we learn?

Cargo surveyors may not understand the risks of their activities and may not employ safety procedures adequate for a particular cargo or vessel.

Deck officers should ensure that cargo surveyors equipment and procedures are safe.

What happened?

A fire broke out in the provision room of a general cargo ship having only a crew of five. The crew were unable to contain the fire and the fire spread to the accommodation. The Master was forced to abandon the ship and all crew were rescued by a helicopter. The whole accommodation block was subsequently burned out.

Why did it happen?

There was only one self-contained breathing apparatus (SCBA) set on board which inhibited the capability of the crew in fighting the fire. A CO_2 extinguisher was used to knock down the fire; however, it re-ignited as the space was not effectively sealed. The spread of the fire into the accommodation could not be controlled because the crew failed to follow boundary cooling techniques and monitor all sides of the provision room. Further, the senior officers had failed to take control of the fire party, to assess the situation and consider using different medium to fight the fire.

What can we learn?

CO_2 can knock down a fire quickly, however its cooling effect is limited. To prevent re-ignition, the space containing the seat of fire should be effectively sealed.

When applying boundary cooling to contain a fire, all sides of the space should be monitored.

Smoke helmet is not as effective as SCBA set in fire fighting, especially on vessels with only a small number of crew.

The fire party should be led by a more senior officer, who should use his experience and knowledge to assess the situation and consider the most appropriate means to fight the fire.

What happened?

While at anchor, the crew was engaged in cleaning and painting the topside ballast tank as part of an ongoing maintenance program. The tank had been opened some days before and the Mate tested the tank for oxygen levels a few times and found them to be 21%. After approximately 2 hours of painting, using a spray gun to apply epoxy paint with thinners, there was an explosion which blew the tank apart. Five crew members died and three were missing.

Why did it happen?

The epoxy paint contained more than 30% thinners and spray painting using such a mixture can create vapour concentrations within the explosive range of the mixture's compounds. The tank was ventilated using a fan blowing air through a manhole and a compressed air line situated in the tank which was inadequate. A cargo light was used to illuminate the work area which was not intrinsically safe/explosion proof.

What can we learn?

The crew needs to appreciate the potential of an explosion when spray painting. The safety management system should set out procedures for painting in enclosed spaces and the material safety data sheets which provide flash points, explosive limits and ignition points for the paint base, hardener and thinner should be onboard the vessel.

What Happened?

During a short transit to the next port, the crew started tank cleaning operations. They fitted a water-driven fan to ventilate the tank with ducting extending to the lower portion of the tank. After completing the ventilation of the tank, two crew members entered the tank to remove residual oil. There was an explosion which tore away bulkheads to adjoining tanks and A-1 Jet Fuel and Kerosene slops were ignited. The hull was breached in way of the tanks and the engine room and the ship flooded rapidly, developed a starboard list and sank. The crew escaped by jumping into the sea and seven were recovered by passing ships, 3 died and 6 were missing.

Why did it happen?

The source of ignition was not identified; however, it was highly probable either due to a discharge of static electricity from winter clothing or from the ventilation ducting, or to an ordinary metal paint can that was used to carry tools into the tanks coming in contact with metal and causing a spark. The crew was under pressure to complete the tank cleaning operation due to the short duration of the transit.

What can we learn?

There is a need to ensure sufficient time for tank cleaning operations to minimise the possibility of missing steps or not paying adequate attention to the operation.

Crews are required to take training in tanker operations; however, there is a need to continually reinforce that training onboard and to ensure that it is properly applied.

What happened?

The ship was alongside with containers onboard containing explosives. An engineer was transferring heavy fuel oil and did not monitor the operation. The tank and vents filled resulted in the fuel oil becoming mixed with diesel fuel in another tank. The oily mixture continued up vent piping to a vent collection chamber where a flange was not connected and spilled on the deck and down into engine room spaces below. The oily mixture ignited, the fire developed rapidly and the engine room spaces filled with smoke. The crew and shore fire fighting personnel fought the fire but were hindered by the smoke. They tried to activate the CO_2 system twice and thought that it had discharged. After several hours of effort, the fire was brought under control and extinguished. Two crew members died.

Why did it happen?

The ignition source could not be determined but was probably as a result of some of the oily mixture coming in contact with an incinerator.

The engineer did not properly monitor the fuel transfer operation and the tank level monitoring systems were fitted with alarms which had been over-ridden by placing a pencil in a toggle switch used to acknowledge alarms.

The venting system was in the process of being cleared of blockages and several flanges had been disconnected at a collection chamber where several vents come together.

Fire and watertight doors were open which allowed the smoke to enter various spaces including the Fire Control Room and CO_2 room, hampering the response and an attempt to release the CO_2 manually.

What can we learn?

With the venting system being open to clear blockages, procedures with physical “lock-outs” were needed to ensure there is no transferring of fuel.

If automatic alarm systems are not functioning, a safe guard that was required is not being maintained. Appropriate actions by the company or officer responsible have to be taken to either repair the system or introduce procedures to ensure the safe-guard is maintained.

The ship's fire response plan should be followed. The less than adequate command and control of the response resulted in delays and uncoordinated actions such as the failure to establish fire boundaries and communications and to activate the CO_2 system.

A lack of training and awareness of the operation of certain fitted fire fighting systems underlines the need to be able to demonstrate their ability to function through drills and exercises.

Awareness of possible means to evacuate an engine room may have allowed the crew member to consider alternative escape routes.

What happened?

The ship was alongside undergoing repairs following a period of time that it had been laid up. During the process of replacing an expansion joint in one of the tanks, it was realized there was a quantity of Premium Motor Spirit in the tank. An electrical submersible pump was to be used to pump the oily water mixture. The pump was lowered in the tanks and soon after it was started, an explosion occurred severely rupturing the cargo tanks. As a result of the explosion, 6 shore workers and one of the ship's officers died. As well, 1 shore worker and another of the ship's officers were admitted to hospital.

Why did it happen?

There was an explosive meter on board and tanks had been tested some time before; however, there is nothing to indicate that the atmosphere in the tank had been tested on the day of the explosion.

The ship's eduction pump was not used and the electrical submersible pump that was used was faulty or not intrinsically safe to be used in such conditions.

What can we learn?

When working with oily water mixtures in tanks, ship's crew members should not assume that the tank is gas free and should only use equipment designed for such purposes.

LOSS OF LIFE AND PERSONAL INJURY

What happened?

The Chief Officer and five crewmembers were checking the anchor securing arrangement during a heavy weather passage. The ship began pitching and two waves swept over the bow. One seaman was able to obtain cover from the seas. The Chief Officer and other four crewmembers, who were facing aft at the time, were unaware of the approaching seas. The impact of the waves tossed them from the forecastle to various locations on the forward deck. The Chief Officer and one seaman died as a result of their injuries. The remaining injured seamen were ultimately air lifted to a hospital.

Why did this happen?

The Chief Officer, acting on his own initiative, placed himself and those assisting him in a high risk situation by checking the anchor securing arrangement in heavy weather without first assessing the risks. He did not notify the Master or the Officer of the Watch that personnel would be working on the forecastle deck and they were both unaware of the task being performed. The Chief Officer underestimated the weather conditions and the potential effects on the mission being attempted. He, and the five crew members assisting him, all failed to wear safety harnesses with lifelines.

What can we learn?

Lifelines attached to the railings may have prevented the mariners from being washed from the forecastle deck and could have reduced the extent of the injuries.

It is important to notify the Master and Officer of the Watch when work is being performed on deck, especially during adverse weather.

It is easy for even experienced personnel to underestimate the potential effects that adverse weather may have on the jobs being performed.

What happened?

The Bosun, with the assistance of a Deck Cadet, two Ordinary Seamen, and three Able Bodied Seamen, had just completed changing the cargo wire on No. 2 crane. They worked from 10:00 hours until 17:45 hours with approximately 45 minutes for lunch. The sun set at 16:53 hours and it was getting dark when the job was finished. It was now time to ensure that the wires were running freely. The Bosun, standing on top of a small platform on top of the crane, unclipped his safety belt from the platform rails and directed the Deck Cadet to operate the crane. The Bosun was unaware that his unclipped safety belt had become entangled with the moving luffing wire of the crane. Moments later he was drawn into the crane between the sheaves and the luffing wire. The crane was stopped and he was freed; however, his leg was nearly severed and he was hemorrhaging. He died of massive traumatic injuries shortly after the paramedics arrived.

Why did it happen?

The Bosun was concentrating on the operation of the renewed cargo wire and he did not notice that his unclipped safety belt had become entangled with the luffing wire. This may have been due to a lapse after the completion of the physically and mentally demanding task of renewing the cargo wire. It is also possible that darkness contributed to the casualty.

What can we learn?

Personnel involved with mentally and/or physically demanding tasks may encounter periods where they have a loss of concentration.

The Bosun might have been more aware of hazards associated with his disconnected safety line if warnings had been given regarding the dangers of loose clothing and personal safety equipment becoming entangled with moving objects.

The onset of darkness changed the working environment and may have contributed to the casualty.

What happened?

While transferring a tow from one ship to another, a crew member was killed by a tugger wire. The tugger wire was being used to transfer a heavy towing wire from the ship picking up the tow to the towing ship. The tugger wire had been attached to the towing wire, which was lying on the deck of the ship picking up the tow. The deceased crew member was in the process of leading the tugger wire around a towing pin at the stern of the towing ship when the crew of the other vessel dropped the tow wire off their deck prematurely. The tugger wire became rapidly taut under the weight of the towing wire and swept across the deck of the towing ship. The crew member, who was working inside the bight of the tugger wire, was thrown 4-5 m in the air by the wire and then landed heavily on the deck. He sustained serious internal and external injuries and died before he could be evacuated by helicopter.

Why did it happen?

The crew on the ship picking up the tow had fastened the tugger wire to their towing wire prematurely before it had been led around the towing pin on the other ship. There was a failure of communication, which led to the crew releasing the towing wire from their deck in contravention of instructions from their Master. The crew of the towing ship were working inside the bight of the tugger wire and consequently in the path of the sweeping tugger wire.

What can we learn?

Operations involving heavy wires or wires under load are risky and need to be carefully planned and carried out.

All crew involved in these operations need to fully understand the procedure and maintain good communications particularly when there is more than one ship involved.

Do not take unnecessary risks by working inside the bight of a wire or mooring line.

What happened?

While at anchor, the crew of a ship were in the process of removing and stowing tween deck hatch covers. They were using the ship's crane to lift the hatch covers and move them to the stowage position forward of the accommodation. The ship was moving in the sea which was causing the suspended hatch covers to swing. The chief officer placed himself in a narrow space between a suspended hatch cover and the accommodation's forward bulkhead. The hatch cover began to swing and trapped the chief officer against the accommodation bulkhead. His pelvis was crushed and he sustained serious internal injuries. He died before he could be evacuated by helicopter.

Why did it happen?

It was accepted practice on the ship to conduct the hatch cover operation while the ship was at sea or at anchor and subject to sea motion. There was little consideration of the dangers associated with moving the hatch covers at sea and no instructions from the company regarding the operation. The chief officer had placed himself in the restricted space between the hatch cover and the accommodation bulkhead. He may have been misled by the ease with which the suspended hatch covers could be rotated by hand and thought that he could control the 17 ton hatch cover when it was swinging.

What can we learn?

Operations at sea that involve heavy lifts are risky and should be avoided when the vessel is rolling.

If these operations must be performed, ensure that the suspended weights are adequately restrained from swinging.

Never place yourself in a restricted position adjacent to a suspended weight without leaving a means of escape.

While heavy weights suspended from a single point may be rotated easily, they exert a large force when swinging.

What happened?

While a ship was alongside a jetty in poor weather the Mate fell between the ship and the jetty fenders. The ship had just finished loading and was lying with the top of its bulwarks some 2 m below the jetty deck. The Mate was on deck and was trying to pass some documentation to a person standing on the jetty when he slipped and fell. His pelvis was crushed and he sustained serious internal injuries when the swell caused the ship to close on the fenders. Two crew members, who were working on deck, saw the mate trapped between the ship and the fenders and assisted him back on board. The Mate lost consciousness and died a short time later.

Why did it happen?

There was no safe means of access between the ship and the jetty in the form of a gangway and the ship was moving substantially in the prevailing weather conditions. The relative levels of the jetty and the ship's bulwarks meant that the Mate had to stand on the slippery bulwark and reach up to pass the documentation. He was in a hurry as the weather was getting worse and there was concern that the ship may be damaged by its movement alongside the jetty.

What can we learn?

Ensure that there is a safe method of access between ship and shore when people need to move from one place to the other. Alternatively, ensure a safe method of exchanging documents in all foreseeable conditions when there is no need to for people to move between ship and shore.

Always ensure you have adequate handholds when moving about on a moving ship.

Do not take dangerous "short cuts" to save time.

COLLISION

What happened?

An overtaking vessel collided with a stand-on vessel at a speed of about 6 knots faster than the stand-on vessel in the southwest (SW) traffic lane of the Dover Strait Traffic Separation Scheme (TSS). Consequently, the stand-on vessel foundered and its master died.

Why did it happen?

The officer of watch (OOW) of the overtaking vessel did not notice the stand-on vessel, either visually or by radar until the collision was imminent and therefore was not keeping a proper lookout. The OOW of the stand-on vessel was distracted from lookout duties by a mobile telephone call. He was therefore unaware of the developing situation and, as the stand-on vessel, was unable to fulfil his obligations under the collision regulations.

Dedicated lookouts were not posted on either vessels.

What can we learn?

A fundamental basis for collision avoidance is a good lookout.

In heavy traffic situations like those that exist in the Dover Strait TSS, the posting of a dedicated lookout is a sensible and seamanlike precaution.

Dangerously close overtaking has become commonplace in the SW lane of the Dover Strait TSS. Dangerous situations arise where vessels of markedly different speeds are travelling on coincident tracks.

CAPSIZE

What happened?

A stern trawler fishing vessel of 24 m in length was trawling in heavy weather, in following seas, when the trawl was caught on a seabed obstruction. The Skipper used the engine power to free the trawl, without success. During this operation, a large amount of water flooded the freeboard deck (working deck) through the superstructure aft doors which were open. The Skipper changed the course, the vessel was hit by 2 or 3 waves, capsized, and sank. Consequences of the casualty were two fatalities, two persons missing, one person seriously injured, total loss of the vessel and minor pollution.

Why did it happen?

The Skipper didn't release the winch brakes or run the trawl warps off. The trawler capsized due to a combination of factors, such as water on the freeboard deck, free surface of liquids, increased loads in the warps caused by the increased engine power, asymmetric and transverse loads on the trawl cables, and the impact of waves.

What can we learn?

Skippers/operators of stern trawlers should be aware of the procedures to free the trawl from a seabed obstruction and related basic principles of stability considering bad weather conditions and following and quartering seas.

During fishing operations the vessel superstructure weathertightness shall be kept by all means.

Sea state thresholds beyond which fishing work should be avoided or extra-caution taken should be established.

***

ANNEX 4

DRAFT AMENDMENTS TO REPORTS ON MARINE CASUALTIES AND INCIDENTS (MSC/CIRC.953 – MEPC/CIRC.372)

1 At the end of paragraph 6, the following is added:

"Life-saving appliance casualty record → **Annex 10**"

2 At the end of the "List of Annexes", the following is added:

"ANNEX 10: LIFE-SAVING APPLIANCE CASUALTY RECORD
This form will apply to all casualties involving life-saving appliances."

3 The text of the existing annex 1 is replaced by the following:

"ANNEX 1

IMO MARINE CASUALTY AND INCIDENT REPORT

SHIP IDENTIFICATION AND PARTICULARS

Administrations are urged to supply the ship identification information listed in this annex for all marine casualty reports submitted to the Organization.

SHIP PARTICULARS

1. IMO Number:

2. Name of Ship:

3. Flag State:

4. Type of Ship

.1 Liquefied Gas Tanker ☐
.2 Chemical Tanker ☐
.3 Oil Tanker ☐
.4 Other Liquids (non-flammable) Tanker ☐
.5 Bulk Dry (general, ore) Carrier ☐
.6 Bulk Dry / Oil Carrier ☐
.7 Self-Discharging Bulk Dry Carrier ☐
.8 Other Bulk Dry (cement, woodchips, urea and other specialized) Carrier ☐

.9 General Cargo Ship ☐
.10 Passenger / General Cargo Ship ☐
.11 Container Ship ☐
.12 Refrigerated Cargo Ship ☐
.13 Ro-Ro Cargo Ship ☐
.14 Passenger / Ro-Ro Cargo Ship ☐
.15 Passenger Ship ☐
.16 High Speed Craft ☐
.17 Other Dry Cargo (livestock, barge, heavy cargo, etc.) Carrier ☐
.18 Fish Catching Vessel ☐
.19 Fish Factory Ship / Fish Carrier ☐
.20 Offshore Supply Ship ☐
.21 Other Offshore Ship ☐
.22 Research Ship ☐
.23 Towing / Pushing Tug ☐
.24 Dredger ☐
.25 Other Activities Ship ☐
.26 Non-Propelled Ships ☐
.27 Other Ships Structures ☐

5. Type of service:

( ) International
( ) Short international
( ) Coastal sea trade
( ) Inland waters
( ) Other, please state:
( ) Not reported

6. Were any voyage related restriction limits placed on the ship? Explain:

7. Gross Tonnage:

8. Length overall:

9. Classification Society:

10. Registered Shipowner:

11. Ship Manager/Operator:

12. Previous names:

13. Previous Flag:

14. Previous Class Society:

15. Date of contract/keel laid/delivery:

16. Date of major conversion:

17. Deadweight:

18. Hull material

.1 steel ☐
.2 light alloy ☐
.3 ferrocement ☐
.4 wood ☐
.5 GRP ☐
.6 composite materials ☐

19. Hull construction

.1 single hull ☐
.2 double hull ☐
.3 double bottom ☐
.4 double sides ☐
.5 mid deck ☐
.6 other ☐

20. Propulsion Type (type, fuel, etc.): Steam ☐ Diesel ☐ Other ☐

.1 Bunkers:

Heavy Fuel Oil (HFO) ☐ Medium Fuel Oil (MFO) ☐ Marine Diesel Oil (MDO) ☐

21. Nature of cargo (e.g. oil, dry bulk and goods under the IMDG Code):

22. Building yard:

23. Hull number:

24. Date of total loss/constructive total loss/scrapping:

25. Number of Crew on ship's certificate:_____

26. Number of Passengers on ship's certificate:_____

27. Number of persons onboard at the time of the casualty / accident:

.1 Crew:_____

.2 Passengers:_____

.3 Others_____

PRELIMINARY CASUALTY DATA

1. Date and time (local onboard):

2. Position/ location:

3. Initial event[1]

☐ collision
☐ stranding/ grounding
☐ contact
☐ fire or explosion
☐ hull failure/ failure of watertight doors/ports, etc.
☐ machinery damage
☐ damages to ship or equipment
☐ capsizing/ listing
☐ missing: assumed lost
☐ other

[1] For an explanation of the terms below see annex 2

4. Consequences

☐ total loss of the ship
☐ ship rendered unfit to proceed*
☐ ship remains fit to proceed**
☐ pollution
☐ loss of life
☐ serious injuries

5. Summary of events"

4 The text of existing Annex 6 is replaced with the following:

"**FIRE CASUALTY RECORD***

In addition to supplying the information requested in this annex, Administrations are urged to also supply the information listed in other relevant annexes of MSC/Circ.[953]#-MEPC/Circ.[372]#, in particular the information contained in Annex 1 (ship identification and particulars).

1 Operational Condition of Ship:

( ) Loading
( ) Unloading
( ) Awaiting departure

* The ship is in a condition, which does not correspond substantially with the applicable conventions, presenting a danger to the ship and the persons on board or an unreasonable threat of harm to the marine environment.

**The ship is in a condition, which corresponds substantially with the applicable conventions, presenting neither a danger to the ship and the persons on board nor an unreasonable threat of harm to the marine environment.

The numbers of new MSC/MEPC circular will be inserted.

( ) Under repair (afloat or drydock)
( ) Other, please state:_____
( ) Not reported

2 Local conditions when fire was discovered:_____

.1 Time (local onboard) at which fire was discovered (Daylight or darkness):__

.2 Wind force (Beaufort scale and direction):_____

.3 State of sea (and code used):_____

3 Part of ship where fire broke out:_____

4 Probable cause of fire:_____

.1 Briefly describe on board activities that were contributing factors (cargo operations, maintenance, hot work, etc.):

.2 Probable cause of ignition:

5 Explain how persons onboard were alerted:

6 Means by which fire was initially detected:*

( ) Fixed fire detection system
( ) By ships crew or passenger
( ) Not known

7 Briefly, describe the performance of structural fire protection (fire resisting and fire retarding bulkheads, doors, decks, etc.) with respect to:

.1 Containment and extinguishment of any fire in the space of origin:_____

.2 Protection of means of escape or access for fire fighting:_____

.3 Adequacy of structural fire protection:_____

8 Ship's portable fire-extinguishing equipment used (foam, dry chemical, CO_2, water, etc.):

9 Fixed fire-extinguishing installations:_____

.1 At site of origin of fire (specify the type):_____

.2 Adjacent areas (specify the type):_____

.3 Fixed fire-extinguishing systems used in an attempt to extinguish the fire?__

* A '✓' is to be inserted, as appropriate.

.4 Did the use of fixed fire-extinguishing systems contribute to the extinguishment of the fire?_____

10 Briefly explain the action taken by the crew to contain, control and suppress fire and explosion in the space of origin:

11 Was outside assistance provided (e.g. fire department, other ship, etc.) and, if so, what equipment was used:

12 Determine qualifications and training of all ship's crew involved in the incident, not only the fire-fighting operations, but also any related actions that may have contributed to the fire (see item 4):

13 Report on whether company or industry procedures, including hot work procedures, were in place and relevant to the operation concerned:

14 If the procedures were in place, were they correctly implemented?

15 Time taken to fight fire from first alarm:

.1 To control the fire:_____

.2 Once controlled, to extinguish the fire:_____

16 Total duration of fire:_____

17 Damage caused by fire:

.1 Loss of life, or injuries to personnel:

.2 To the cargo:

.3 To the ship:

.4 Release of pollutants:

18 Was there any failure of the fire-fighting equipment or systems when used?

If yes, were the equipment and/or system maintenance records up to date (e.g. servicing)?

19 Was there an adequate supply of air on board for self-contained breathing apparatus or was outside assistance needed to supply such air?

20 Observations and comments:"

5 The following new annex 10 is added after the existing annex 9

"**ANNEX 10**

LIFE-SAVING APPLIANCE CASUALTY RECORD

The purpose of this casualty record is to enable the gathering and collation of statistical data on both novel and traditional life-saving appliances, in order that the safety of these appliances may be assessed and improvements made if necessary on the basis of reliable risk information.

Administrations are urged to supply the additional information listed in this annex for all casualties involving life-saving appliances, adding any other information which would provide lessons to be learned concerning the use of life-saving appliances.

1 Location of casualty
(See annex 2, items 3.1-3.10)

.1 Was the ship: underway □ in port □ at anchor □

2 Local conditions

2.1 Local time (24 hrs clock)**:**

Daylight □ Darkness □

2.2 Wind force (Beaufort scale):

2.3 Wave height (observed):

2.4 Ice conditions Yes □ No □

3 Type of life-saving appliance involved

3.1 Inflatable liferaft: □ Capacity_____ POB_____

.1 Davit launched Yes □ No □

3.2 Marine Evacuation System (MES): □

.1 Vertical □ Slide □

3.3 Lifeboat □ Capacity_____ POB_____

.1 Davit launched □ Free fall □

3.4 Buoyant apparatus □

3.5 Ship's rescue boat □

3.6 Other:_____ Capacity:_____ POB:_____

4 Type of personal life-saving appliance used:

4.1 Immersion suit □

4.2 Lifejacket □

4.3 Personal Flotation Device (PFD) □

4.4 Lifebuoy □

5 Reason for deployment of life-saving appliance:

5.1 Emergency evacuation / abandonment □

5.2 Crew training □

5.3 Deployment as required by regulations □

5.4 Approval Trials (give details) □

6 Nature of casualty/incident

(See annex 1, paragraph 5)

7 Details of injuries/fatalities:

7.1 Number of life-saving appliance related fatalities

Crew:_____ Passengers:_____ Others:_____

7.2 Number of life-saving appliance related injuries

Crew:_____ Passengers:_____ Others:_____

8 Other relevant details:

9 Description of causes/contributing factors

(see annex 2, paragraph 10)

APPENDIX

GUIDANCE FOR PREPARING THE LIFE-SAVING APPLIANCES CASUALTY RECORD

The following design factor examples could be taken into account when preparing the description of contributing factors for the purpose of entering the life-saving appliances casualty record:

1 The design made it hard for people to carry out reasonable tests.

2 The design provided no means to detect predictable hazard conditions.

3 Use of the design was vulnerable to predictable human failings.

4 The design was inadequately specified for the required duty.

5 Operation of the design was vulnerable to circumstances."

***

ANNEX 5

CASUALTY ANALYSIS PROCEDURE

Procedures for the method of work and the development of recommendations for consideration of Sub-Committees

1 GENERAL

The Sub-Committee on Flag State Implementation (FSI), at its eleventh session, agreed to re-establish the Correspondence Group on Casualty Analysis and instructed it to review the current method used by the working group for analyzing casualty reports and making recommendations to other Sub-Committees with a view towards improvement, taking into account document FSI 11/4/1 and the views expressed by FP 46 (FP 46/16, paragraphs 7.11 and 7.12), and to propose a feedback mechanism so that the overall casualty analyzing process can be measured to gauge its level of success.

2 PROPOSED PROCESS OF ANALYSIS OF CASUALTY INVESTIGATION REPORTS

2.1 Casualty investigation reports are submitted to IMO and in accordance with the terms of reference of the Casualty Analysis Working Group (CAWG), they are grouped in categories and assigned to various analysts who form the Correspondence Group on Casualty Analysis. The categories are:

.1	Collision	.6	Machinery damage
.2	Stranding or grounding	.7	Damages to ship or equipment
.3	Contact	.8	Capsizing or listing
.4	Fire or explosion	.9	Missing
.5	Hull failure or failure of watertight doors, ports, etc	.10	Other

2.2 Intersessionally, the members of the correspondence group prepare casualty analyses, an overview of lessons learned, and a draft text of lessons learned for presentation to seafarers. This work is submitted to the next session of the FSI Sub-Committee.

2.3 When the CAWG convenes at the Sub-Committee meeting, the working group is to review and verify the work of the correspondence group and to concur that it should be included in the CAWG's report to the Sub-Committee.

2.4 The CAWG would also examine the analysis of investigation reports to determine if there are potential safety issues in way of trends or recurring causes or contributing factors. This would include an ongoing review of reports on casualty analyses that had been prepared for previous FSI meetings. Any potential safety issue is submitted to the FSI Sub-Committee for its review and determination if the CAWG should undertake to assess it using the principles of formal safety assessment (FSA) steps 1 and 2.

2.5 A potential safety issue may also be identified by another Sub-Committee which, as a result of its work or its review of casualty information, notes that a potential safety issue may

exist and asks the FSI Sub-Committee to determine if the CAWG should assess the issue further. A third means of identifying a potential safety issue is where an IMO Member submits a paper providing appropriate information for the consideration of the Sub-Committee.

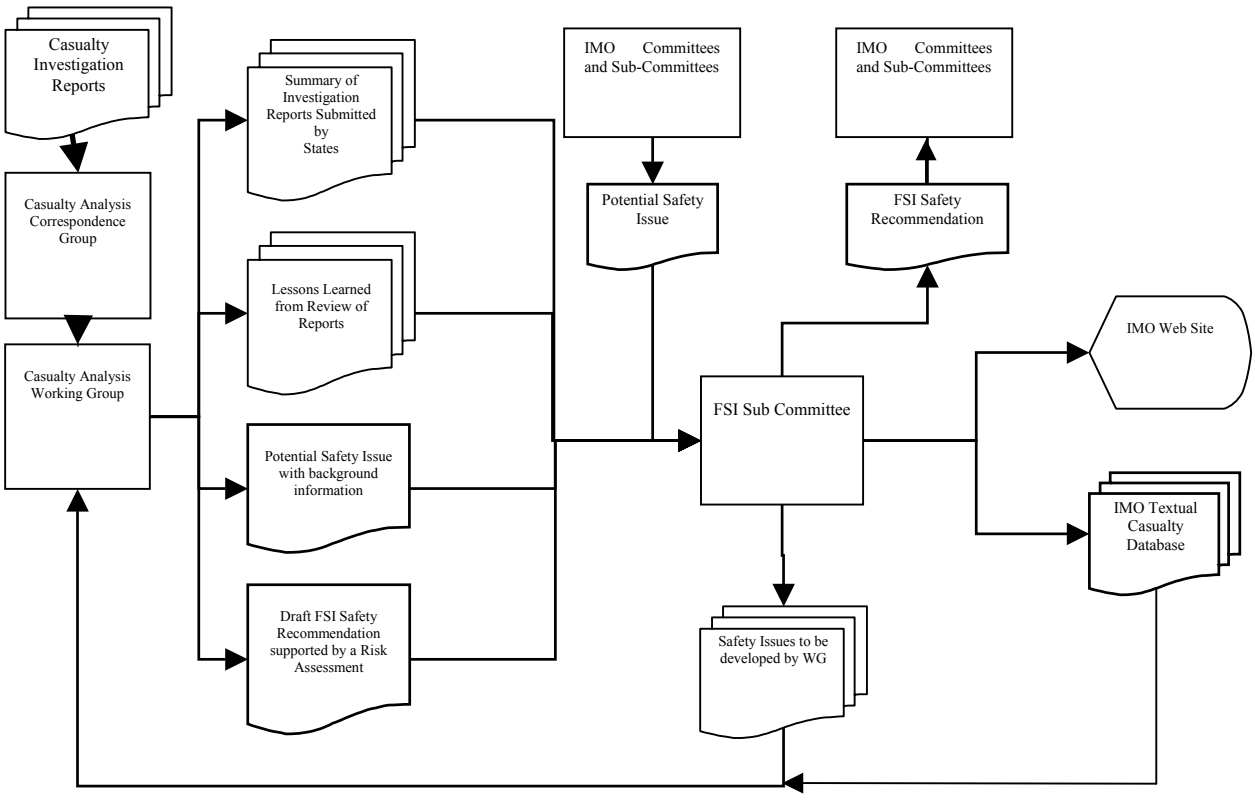
2.6 Where the CAWG is asked to assess a safety issue using FSA steps 1 and 2, the group will determine how to accomplish the task using the FSA methodology as described in the following section. Upon completion of the assessment, the group will submit a draft FSI Safety Recommendation to the Sub-Committee for their consideration.

2.7 The CAWG at each session of the FSI Sub-Committee, will submit the following:

.1 the casualty analyses report;
.2 overview of lessons learned by category;
.3 draft lessons learned for presentation to seafarers;
.4 potential safety issues, when appropriate; and
.5 draft safety recommendations, when appropriate.

2.8 At each FSI meeting, a report on the analysis on investigation reports has been submitted to the Sub-Committee and over the years, these reports have come to form a textual database. The Secretariat will provide the CAWG with this database so that a complete list of casualty analyses and lessons learned can be used in the identification of potential safety issues.

2.9 The following is a graphic representation of the flow of casualty information:



3 PROCEDURE FOR EVALUATING SAFETY ISSUES

Gathering Information

3.1 When the Sub-Committee directs the working group to assess a safety issue, the CAWG would have probably only included information relating to a number of casualties where reports have been submitted to IMO. Recognizing that these reports are only those that are serious or very serious casualties, further fact finding is required to validate the safety issue. Therefore, the Sub-Committee, when directing the CAWG to undertake an assessment of the safety issue would, at the same time, ask participants of the Sub-Committee to provide information that they may have in national databanks.

Hazard Identification

3.2 The CAWG would conduct a review of casualty reports submitted to IMO where contributing factors are pertinent to the validation of the safety issue. Additional information provided by States would also be reviewed. The identification of a hazard should start with the determination of safety significant events leading up to the casualties in order to identify any commonality. The events would then be analyzed to determine what actions occurred or conditions were present during the time leading up to the event and would present an unacceptable level of risk. Such actions and /or conditions would be identified as a hazard and a risk assessment would be carried out.

Estimated Risk Assessment

3.3 The level of risk would be assigned to the hazard by determining the frequency of a hazard occurring and the consequences of that hazard.

3.4 With respect to frequency, the group may include the following in their considerations:

.1 Is there a history of occurrences like this one or is this an isolated occurrence?
.2 How many similar occurrences were there under similar circumstances in the past?
.3 How many pieces of equipment are there that might have similar defects?
.4 How many operating or maintenance personnel are following or are subject to the practices or procedures in question?
.5 To what extent are there organizational, management, or regulatory implications which might reflect larger systemic problems?
.6 What percentage of the time is the suspect equipment or the questionable procedure or practice in use?

3.5 With respect to adverse consequences, the group may consider:

.1 How many persons could be affected by the risk?
.2 What could be the extent of property damage?
.3 What could be the environmental impact?
.4 What is the potential commercial impact?
.5 What could be the public and media interpretation?

3.6 An assignment of risk as high, medium, or low would be based upon the criteria found in Appendix A. Where the CAWG has identified a hazardous situation where the estimated risk is high, a draft problem statement would be developed for review by the Sub-Committee.

Risk Control Options

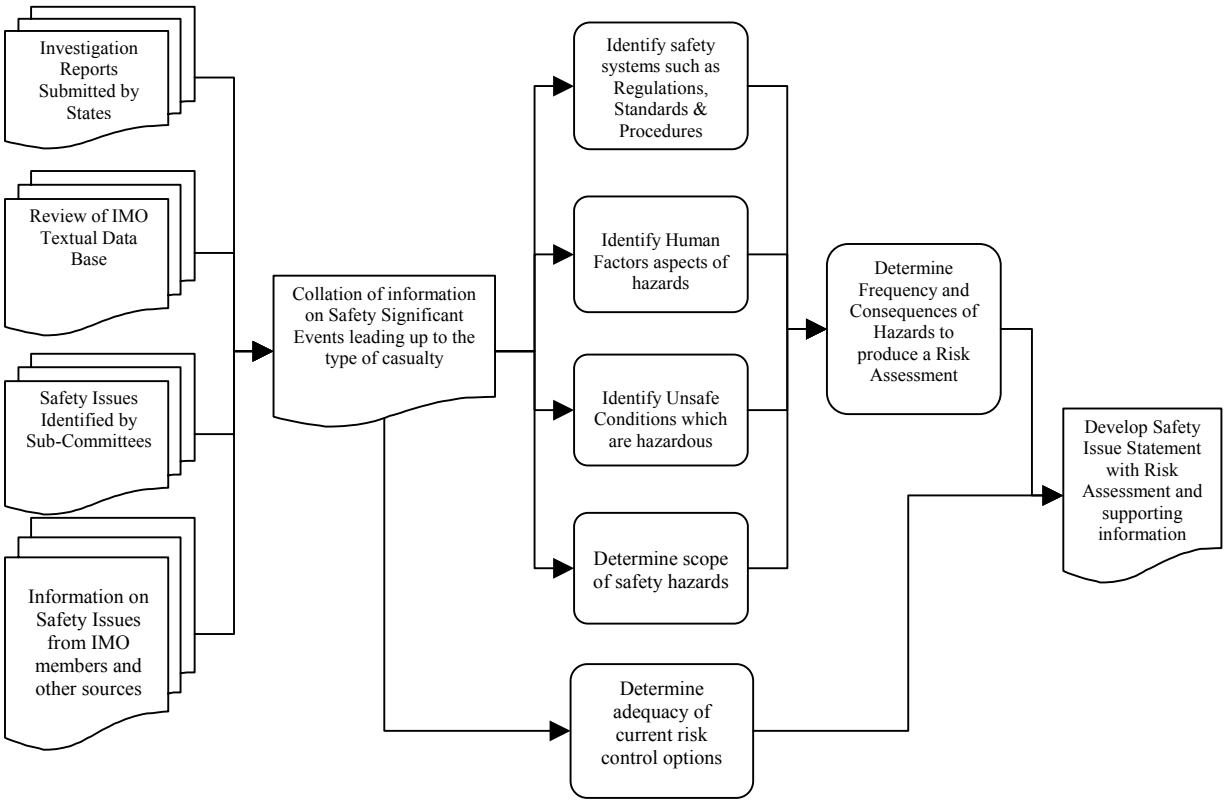
3.7 In determining risk, the appropriateness of existing risk control options would be evaluated by determining what risk control defences need to fail for the adverse consequence to be realized. Where appropriate, the CAWG would identify potential changes or modifications to existing risk control defences for the consideration of the Sub-Committees.

FSI Safety Recommendation

3.8 The CAWG would prepare a report of a draft safety recommendation and submit it to the Sub-Committee. The report would contain the problem statement, a description of the hazards and an assessment of risk. There would also be an indication of the scope of the safety issue which would describe the normal circumstances leading up to a hazardous situation within a segment or portion of the ship operations. The CAWG would also include a description of hazards not assigned a high risk.

3.9 The Sub-Committee would then have the opportunity to agree with and accept the report, ask that further analysis be conducted, or advise that it does not agree with the report. Where it concurs with the CAWG, the FSI Sub-Committee would forward the recommendation to the appropriate Committee or Sub-Committee for their consideration and action.

3.10 The following is a graphic representation of the process to validate a safety issue:



Appendix A

Assignment of Estimated Risk Level

1 Risk analysis has two components:

.1 probability of adverse consequences; and

.2 severity of consequences.

2 The evaluation of risks is undertaken using available data, supported by judgements on the severity of potential adverse consequences and the probability of those consequences.

3 The Risk Matrix below would be used for guidance in doing qualitative assessments.

		Probability of Adverse Consequences (Over Time)				
		Frequent	*Probable*	*Occasional*	*Unlikely*	*Most Improbable*
Severity of Consequence	*Catastrophic*	High	High	High	Medium	Medium-Low
	Major	High	High	High-Medium	Medium	Low
	Moderate	High	Medium	Medium	Medium-Low	Low
	Negligible	Low	Low	Low	Low	Low

4 Definitions - Probability of Adverse Consequences

4.1 *Frequent* - Likely to occur often during the life of an individual system or occur very often in the operation of a large number of similar systems (equipment, vehicle, planes, vessels, etc.).

4.2 *Probable* - Likely to occur several times in the life of an individual system or occur often in operation of a large number of similar systems.

4.3 *Occasional* - Likely to occur sometime in the life of an individual item or system, or will occur several times in the life of a large fleet, similar items, components or system.

4.4 *Unlikely* - Unlikely, but possible to occur sometime in the life of an individual item or system, or can reasonably be expected to occur in the life of a large fleet, similar items, components or system.

4.5 *Most Improbable* - So unlikely to occur in the life of an individual item or system that it may be assumed not to recur. Or, it may be possible, but unlikely, to occur in the life of a large fleet, similar items, components or system.

5 Definitions - Severity of Consequences

5.1 *Catastrophic* - Death or loss of system or plant such that significant loss of production, significant public interest, or regulatory intervention occurs or reasonably could occur

5.2 *Major* - Severe injury, major system damage, or other event that causes some loss of production, that affects more than one department, or that could have resulted in catastrophic consequences under different circumstances.

5.3 *Moderate* - Minor injury, minor system damage, or other event generally confined to one department.

5.4 *Negligible* - Less than the above

***

ANNEX 6
CASUALTY ANALYSES INFORMATION RELATING TO TRAINING ISSUES FOR PASSENGER SHIP

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
OTHER **ARATERE** **PASSENGER SHIP** **BAHAMAS** **12596** **NEW ZEALAND**	12/06/2000	The dry deployment of an inflatable liferaft was being overseen by a servicing agent using a demonstration unit on board a passenger ferry. The liferaft canister was placed in a cradle next to one of the vessel's liferaft davits. Its lifting ring was attached to the davit's off-load suspension hook and the liferaft lifted clear of the cradle and swung outboard. It proved difficult to initiate inflation. While attempting to pull the liferaft inboard to investigate the failure to inflate, the suspension hook's lanyard was inadvertently pulled by the agent, so cocking the hook. He made an effort to un-cock the hook but, because he was not familiar with the mechanism, did not recognize that he had been unsuccessful. The liferaft was eventually inflated while inboard. Its weight was then partially taken manually to clear the fishplate before pushing it clear of the side of the vessel. At this stage, the suspension hook opened allowing the liferaft to fall to the adjacent quay. There were no injuries.	Crew and service agent were unable to tell at a glance whether the hook had been properly un-cocked. The on-board training manual showed a suspension hook having a different indication of the cocked and un-cocked conditions to the hooks in use. The difficulty in initiating inflation caused the incorrect lanyard to be pulled.	Contents of the training manual did not cover the type of suspension hook fitted to the liferaft davits. The liferaft servicing agent, while familiar with liferafts, had insufficient knowledge of the ship's suspension hooks to operate them correctly. Ship's staff appeared to assume the servicing agent's knowledge of liferafts extended to suspension hooks and so allowed him a significant role in the operation.	

Type of Casualty Ship's name Type of ship Flag Authority Tonnage Reporting State Second ship (if any)	Date of casualty	Event	Causes	Issues raised Human factor	Action
COLLISION **NORWEGIAN DREAM** **PASSENGER SHIP** **BAHAMAS** **50760** **PANAMA/** **BAHAMAS** **EVER DECENT** **CONTAINER SHIP** **PANAMA** **52090**	24/08/1999	ANALYSIS BASED ON REPORT FROM PANAMA (FSI 11) : - The two ships collided in the vicinity of F3 light buoy in N.E. approaches to the Dover Straits. - The container ship suffered substantial damage to her port side that opened No.3 hold to sea. She took an immediate heavy port list, but prompt action by the ship's crew brought it under control. A very serious fire broke out in the above deck containers. It was brought sufficiently under control by the ship's crew with help from a salvage team with firefighting tugs in 8 days, to allow the ship to proceed to Zeebrugge for discharge and damage assessment. - The passenger cruise ship suffered serious damage to her bow but retained watertight integrity and was able to continue to Dover to land her passengers and assess damage. - There were no deaths or injuries to personnel on either ship. ANALYSIS BASED ON REPORT FROM BAHAMAS (FSI 9): Collision in clear weather leading to damage to both ships and outbreak of fire in containers aboard container vessel.	ANALYSIS BASED ON REPORT FROM PANAMA (FSI 11) : - The collision was mainly caused by the failure of the passenger cruise ship, which was the give way vessel in a crossing situation, to make sufficient alteration of course or speed to avert collision. - Collision could also have been averted by reduction of speed by the containership. - The containership limited her ability to act when she overtook another vessel from the port side of the other ship thus preventing herself from taking one of the possible avoiding actions viz. a large alteration of course to starboard. - The VHF conversation between the two vessels might have delayed a sense of urgency from building up in the minds of the bridge officers on the two vessels. - Contributory factors to the fire on the containership have not been investigated. The main cause of the fire however was the collision impact between the two ships. ANALYSIS BASED ON REPORT FROM BAHAMAS (FSI 9): Distraction and information overload leading to confusion. Probable confusion of true and relative radar vectors. Watch not doubled up - Inadequate bridge manning. Non-optimal use of radar. Watch not doubled as per owners orders. Situational factors arising out of design of Traffic Separation Scheme system. Volume and concentration of shipping and rapidly changing situation. Both ships restrained in their choice of action by other shipping. Container ship not crossing Traffic Separation Scheme at right angles. Container ship did not take sufficient action to avoid collision.	ANALYSIS BASED ON REPORT FROM PANAMA (FSI 11) : - COLREGS state clearly that collision avoidance can be carried out by using helm and/or alteration of speed. There appears to have been marked reluctance to consider a variation of speed as an option by the two vessels in this case. - The use of VHF as a collision avoidance tool can be counter-productive. If the COLREGS are being followed correctly it would not be necessary to use VHF for collision avoidance and thus be distracted from the attentiveness in watchkeeping. - When overtaking another vessel, careful consideration should be given to the side on which to overtake. Factors to be taken into account should include available sea room and possible need to take avoiding action in respect of other vessels in the vicinity. - Several issues relating to design considerations and dangerous cargo stow on the container ship have been raised in the report. Preliminary details of these and other relevant issues were submitted by the flag State and United Kingdom to the Sub-Committee on Fire Protection under FP 44/13/1 on 17 December 1999. ANALYSIS BASED ON REPORT FROM BAHAMAS (FSI 9): Bridge manning in concentrated traffic areas. Radar training and awareness. Situational factors caused by concentration of traffic through Traffic Separation Scheme management. ANALYSIS BASED ON REPORT FROM PANAMA (FSI 11) : Inadequate bridge manning level on the passenger cruise ship - only one officer and one rating were on the bridge at the time of collision. The Master was not on the bridge. Such manning was considered inadequate given the busy traffic in the region and the requirements for additional tasks to be performed such as reporting of position to Coastguard. ANALYSIS BASED ON REPORT FROM BAHAMAS (FSI 9): Yes. Planned action did not achieve outcome (mistake). Bridge not properly manned for situation contrary to owners' standing orders (violation).	Report noted

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FIRE **SPIRIT OF TASMANIA** **FERRY** **AUSTRALIA** **31356** **AUSTRALIA**	24/02/2001	On 23/02/2001, a fire broke out in the photography shop of the passenger ro-ro ship while she was proceeding from Melbourne to Devonport with 967 passengers on board. The Master initiated the muster signal and sent fire-fighting team to tackle the fire. The team tried initially to extinguish the fire using hand held fire extinguishers but the fire kept re-igniting. A fire hose was used in the second attempt and the fire was extinguished in five minutes. All passengers were mustered at their designated muster areas in about 30 minutes after the muster signal was initiated. The mustering was generally effective except that a few passengers remained asleep in their cabins, as they were not awoken by the alarm. Also there were some passengers moving back against the flow of other passengers evacuating from the accommodation. The passengers were released after the smoke in the accommodation was cleared and the ship resumed her voyage. Apart from the fire damages inside the photography shop there was no other casualty in the incident.	- The fire was caused by a short circuit in an electric extension lead supplying power to a fridge inside the store area of the photography shop. - The short circuit was caused by breakdown of insulation as heavy load of boxes of photograph envelopes had been stowed on top of the extension lead for several months. - Neither the short circuit protection nor the earth leakage detection in the ship's electrical system was able to detect or limit the damage caused by the short-circuiting. - As the photography shop was a licensed business area on the ship, access by ship's staff was limited and the extension lead had not been inspected at any time prior to the fire. - The danger of stowing boxes on top of the extension lead had not been identified by any crew inspection and the photography shop staff had not received any training in recognizing such danger.	- Licensed business areas on a passenger ship should be subject to the same safety management policy, procedures and inspections as any other parts of the ship. - Staff of licensed businesses on a ship should receive the same safety training as received by other regular crew members. - Appropriate fire detectors should be installed in areas that have potential fire risk and can be separated from other areas protected by fire detection system. - It is important to ensure that alarm and public address systems in different areas of a ship are audible. - A final head count should be included in the evacuation plan of a ship to ensure that all passengers are accounted for. The Master's decision to initiate muster signal at an early stage of the fire is considered appropriate, as mobilization of a large number of passengers will take time. Clear instructions and proper guidance to passengers are important to avoid confusion and panic under an emergency situation.	Report noted.

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MACHINERY DAMAGE **SUN VISTA** **PASSENGER SHIP** **BAHAMAS** **30440** **BAHAMAS**	20/05/1999	The vessel suffered a power failure at 14:32 hrs LT while at sea with 456 passengers and 632 crew on board. A fire started in the engine room at or about the same time. Initial efforts to locate and extinguish the fire were unsuccessful. The engine room was sealed off and carbon dioxide smothering gas released. Auxiliary and emergency sources of electrical power also failed and the vessel drifted thereafter without power. The engine room skylight and a side shell door in the engine room were then opened to facilitate the clearance of smoke and entry of a fire fighting party which also failed to locate and extinguish the fire. The fire subsequently spread to the boiler room, where it later burned with great intensity, and into the accommodation and service spaces surrounding the engine and boiler room casings. Passengers and crew were evacuated to the open decks as a precautionary measure soon after the power failure and remained there until the order was given to proceed to muster stations at 18:05 hrs. The order to abandon ship was given at 18:30 hrs. All passengers and the majority of the crew had been evacuated in lifeboats by 18:52 hrs. A small operational crew remained on board after the main evacuation and were evacuated before the vessel sank. Although some problems were experienced in proceeding to muster stations and boarding the lifeboats, all passengers and non-essential crew were successfully evacuated from the vessel without any serious injury. A distress signal was transmitted from the vessel and received by a number of merchant ships in the area. It was also forwarded to the Malaysian Search and Rescue Co-ordination Centre at Port Klang by Falmouth MRCC. An offshore supply tug with fire fighting capability and two container vessels responded immediately to the request for assistance. The tug pumped water into the vessel as requested to assist in limiting the spread of the fire. This resulted in the vessel listing and flooding of the machinery spaces through a shell door in the engine room. The door was	The fire most probably originated in the main switchboard, following problems with electrical equipment and circuit breakers which were resolved by temporary measures, and the vessel sank because of failure to ensure that a shell door and watertight doors in machinery spaces were securely closed, leading to progressive flooding when the vessel heeled under the effect of water pumped from one of the assisting vessels.	The condition of the ship, and in particular the auxiliary and propulsion machinery, created the circumstances in which a fire was likely to develop. A closer scrutiny of the vessel by the Classification Society might have identified the most serious of the mechanical failings and required remedial action to be taken. Some of the safety systems were lacking when required. The fire detection system was ineffective in locating the seat of the fire and the fire dampers allowed the fire to spread when it might have been more successfully smothered. No electrical power was available from the emergency alternator and the emergency lighting failed to operate. The emergency fire pump could not be used because of lack of electrical power. These factors made the work of the fire fighting team more difficult. Had the condition of the machinery spaces been recognized by the ship Managers, Owners and Classification Society, it is possible that the fire might have been more effectively contained. The ease with which fires can spread and intensify is well illustrated in this case. However, if the watertight doors had been closed, the spread of fire would have been less rapid, and if the engine room workshop shell door had been kept closed, the vessel would have remained afloat. It would still have been necessary to evacuate passengers and crew but the ship would have survived, though probably extensively damaged by the fire. The general condition of the vessel created the circumstances in which the risk of mechanical failures and fires increased, and this, compounded with the errors in fire fighting, led to the loss of the vessel. It is the opening of the engine room workshop shell door and failure to close the engine room watertight doors to limit flooding to the engine room that were responsible for the vessel sinking and no acceptable justification for this has been identified. The competence of some of those in charge of lifeboats was inadequate. This was in part caused by the engagement of some lifeboat commanders on fire fighting and other supervisory duties related to abandoning ship. Some crew designated to operate lifeboat engines were also engaged on fire fighting duties and their duties in the lifeboats had to be performed by other crew. The vessel was however evacuated in daylight hours without serious injury to any person as a consequence of the timely commencement of the procedure and an appreciation by the Master of the problems encountered. Although some of the lifeboat commanders lacked the skills and experience required to handle a lifeboat in an emergency, most of them displayed an acceptable level of seamanship. The lifeboats were successfully marshalled and remained together in a group. This facilitated the rescue from the lifeboats by the three merchants ships which responded to the call for assistance. The crew undoubtedly faced a complex situation in attempting to control the fire. While they had been trained in fire fighting and	It should be noted that the Flag State has already made the report available to IMO for use in its review of the safety of large passenger vessels to avoid any such recurrence.

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		opened earlier to gain access and was not thereafter closed. Flood water entered the adjacent machinery spaces culminating in progressive flooding which led to the sinking of the vessel at 01:22 hrs on 21/05/99.		exercised in regular drills on the vessel, this would not have replicated the scale or complexity of the situation which they faced on SUN VISTA. They might have benefited from enhancement of the normal fire fighting training required by the STCW Convention to include specific training for control of major fires on large passenger vessels. Although the proposal to open the engine room workshop shell door was made by the Chief Engineer, the Captain and the members of Sembawang Emergency Response Team agreed to it without question. This was an error of judgement by all concerned. In view of the obvious risks of flooding, the opening of this door should have been questioned. It also allowed air to flow into the engine room and diluted the concentration of CO2 in the engine room, thereby re-activating the fire which until then had been partially controlled. The closing of the workshop shell door was delegated to two engine room ratings working under difficult conditions without supervision. They were expected to perform a task which is judged to have been beyond their physical capabilities in the conditions in the workshop. In view of the importance of closing the workshop shell door, it should have been performed under the supervision of a responsible Officer. It is clear from the photographic evidence that the workshop shell door was not closed, though there is some conflict in the evidence as to when this became known to the Captain, Chief Engineer and Sembawang Emergency Response Team. The entry in the Sembawang Emergency Response Team log gives reason to conclude that all three knew that this door was open while the vessel was heeling 5º at 19:20 hrs on 20/05/99, and that steps should have been taken to ensure that the watertight doors in the engine room were closed in order to limit flooding to the engine room. Some confusion and misunderstanding resulted from the inability to give instructions to all passengers and crew simultaneoulsy over the PA system, and some disorder resulted from undue haste and crushing in making way to the lifeboats. Stricter control of the passage of passengers and crew in going from deck 10 to the lifeboat embarkation stations would have avoided the disorder in reaching the boarding gates.	

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