REPORT ON SHIPPING CASUALTIES

2014, 2015 & 2016

DIRECTORATE GENERAL OF SHIPPING, INDIA

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FOREWORD

Maritime world is transforming at an unprecedented pace. Whether it is the concept of 'Maritime Autonomous Surface Ships', opening of polar waters, implementation of MLC, stricter emission controls or lower freight rates for a while, etc., one fundamental principle that has consistently prevailed, through all changes and circumstances, is that shipping should remain safe, secure, energy efficient and environmentally sound. India is committed to the principle and strives for its implementation domestically and globally.

As Indian mercantile marine surges ahead, the need for safety enhancement becomes more significant. Indian ships are increasing in numbers, types and in size, our ports, shipyards and waterways are getting busier and we are progressively increasing our contribution in world's marine manpower pool. While this Directorate assures that the Indian maritime industry progresses at a fast pace, it also has the responsibility to ensure proper regulation. Various new measures have been initiated and existing ones strengthened. These measures range from strengthening of seafarers' training and employment to measures relating to VTS, reception facilities and navigational safety in Indian ports. Appraisal of NOS-DCP, making the PSC & FSI regimes more rigorous, coordination with stakeholders to enhance navigational safety among fishermen, initiation of implementation of TSS on Indian coast, advancements in LRIT and DGComm center and engaging with relevant authority to ease satellite communication on Indian coast, etc. are other initiatives undertaken. Measures to expedite rehabilitation of and compensation to the affected have been further strengthened.

Publication of the summary of casualties is also a step in the same direction. Casualties for the period 2014-16 have been analysed in order to enable the maritime fraternity to devise and adopt corrective and preventive measures. Case studies have been included for readers to identify lessons learnt and to adopt best practices that will promote safety at sea.

A total of 39 accidental deaths and 56 accidental injuries in three years within the realm of Indian maritime administration is a reason enough to call for serious introspection and immediate action. A majority of these casualties could have been easily averted by application of basic competencies, proficiencies and/or seamanship. What is of further concern, is the observable inadequacy of ship and shore teams in handling contingencies and their aftermath in many a case. Another notable shortcoming is the discernible break in 'on- board' communication and mentorship. This loss in camaraderie and experience transfer has not only added to stress, especially among the young, but has also adversely affected the 'on-board' learning.

The aforesaid calls for untiring perpetual efforts, as well as novel ideas from all stakeholders in international and Indian maritime domains. Accidents must be eliminated. While the Indian maritime administration remains committed to the cause, maritime industry has to place greater impetus behind safety, security and environment protection, imbibing them as their second nature. We shall remember that 'safety doesn't happen by accident'.

Be safe. Jai Hind.

(Dr. Malini. V. Shankar)

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PREFACE

India is ushering on path of an unprecedented growth in the field of Mercantile Marine. Employment of Indian seafarers has soared over the past four years. Movement of ships on the coast of India and through its waters has increased significantly. While this amelioration is laudable, challenges persist. One such challenge is the continued occurrence of casualties involving Indian seafarers, ships and/or facilities. While there is a reduction in their numbers, the condition is still far from satisfactory.

A casualty, other than harming life, property and/or environment, can also severely dent the morale of an industry and society. The Indian maritime administration is committed to their cessation. In this direction each casualty, occurring within the realm of Indian administration is investigated exhaustively and trends analysed. Actions, underpinned by proportionate regulation where necessary, are then initiated to avert happening of such casualty in future. Analysis of casualties for the years 2014-16 has been included in this report

Learning from the experiences of others is an invaluable quality. Various case studies have therefore also been included in this publication for the stake holders to learn from. Such case studies are also promulgated at regular intervals through the Directorate's website. I hope that lessons of hindsight shall be included into training, education and mentoring to improve risk intuition and aversion.

This report also calls for an increased effort on part of Indian ships' and port facilities' owners and operators, some of which may incur costs. However there is an old adage, if you think safety is expensive, try having an accident!

I commend the Directorate's team behind this publication and hope that this will contribute towards strengthening of safety culture in the Indian maritime industry.

Jai Hind.

(Amitabh Kumar)

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PROLOGUE

The Directorate General of Shipping has brought out the 'Report on Casualties for the period 2014-16' and I commend the team for their efforts. The report will hopefully bring awareness on various issues related to casualties and contribute in improving industry's preparedness towards safety, security and environment protection.

Every casualty, however trivial, poses a challenge. The Indian Maritime Administration while empathising with the ones affected is mandated to examine the casualty to ascertain its root cause, take necessary corrective measures and disseminate the information to all stakeholders to prevent its re-occurrence. This report is a compilation for the industry to learn from.

Shipping is a vital component of the international logistics chain. It has always had to deal with challenges due to the sheer diversity of its operation, its operating environment, and hazards encountered. Hence, timely risk identification, assessment, control and mitigation is essential to prevent casualties.

Technological changes are now transforming the traditional shipping industry and every change is generally accompanied by its own unique challenges. Despite the advancement in technology, accidents continue to occur with entry into enclosed spaces continuing to remain a major challenge. Similarly, incidents of collision, grounding, explosion, etc., continue to occur and will need to be addressed.

India as a fast growing economy needs to play its role in the maritime sector and we remain committed to takes steps to ensure that shipping continues to be a safe, secure, environmentally friendly and efficient means of transportation for mankind. The Indian Maritime Administration reiterates its commitment to take all steps required for enhancing safety, security and environment protection.

Be Safe. Jai Hind

(Capt. K P Jayakumar)

Disclaimer

These case studies are for the purpose of disseminating information for the benefit of the public and industry at large. The information is of a general, informational nature but does not constitute legal advice and should not be construed as such.

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CONTENTS

Executive Summary

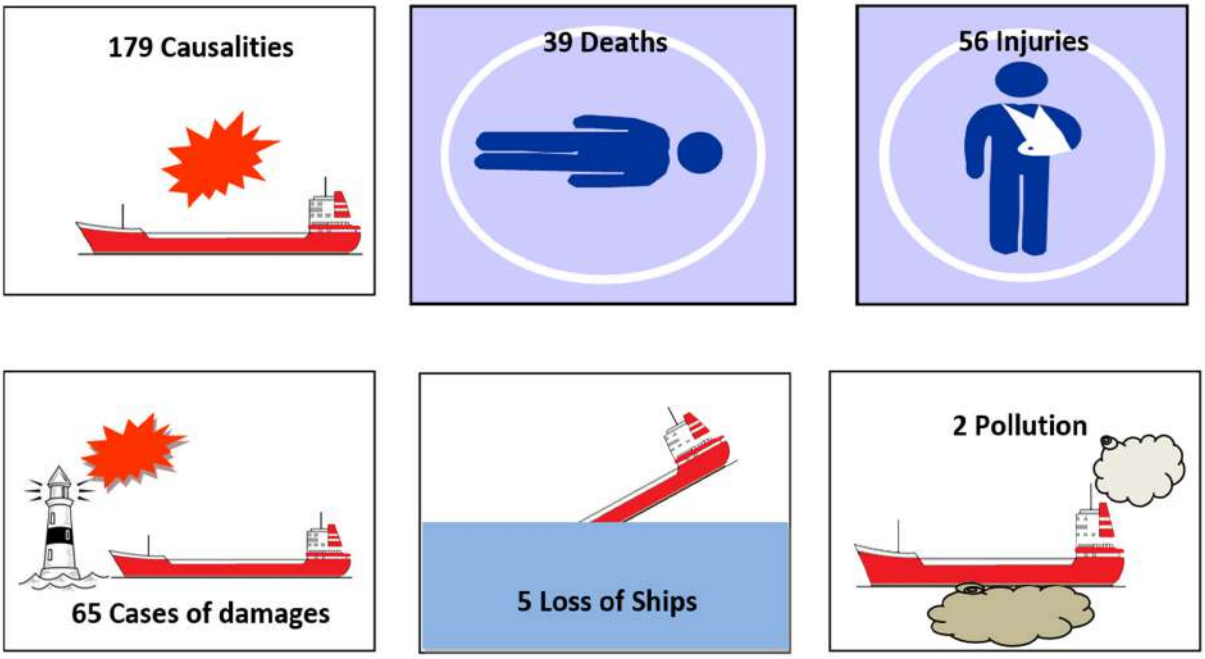
1. Article 94 of the United Nation's Convention on Laws of the Sea (UNCLOS) places responsibility on the flag state to carry out inquiry into every marine casualty or incident of navigation on the high seas involving a ship flying its flag and causing loss of life or serious injury to nationals of another State or serious damage to ships or installations of another State or to the marine environment. Also under SOLAS regulation I/21, Load Lines Convention article 23 and MARPOL articles 8 and 12, each Administration undertakes to conduct an investigation into any casualty occurring to ships under its flag.

2. The Indian maritime administration conducts investigations and inquires into marine casualties in accordance with Part XII of the Indian Merchant Shipping Act, 1958 (as amended).

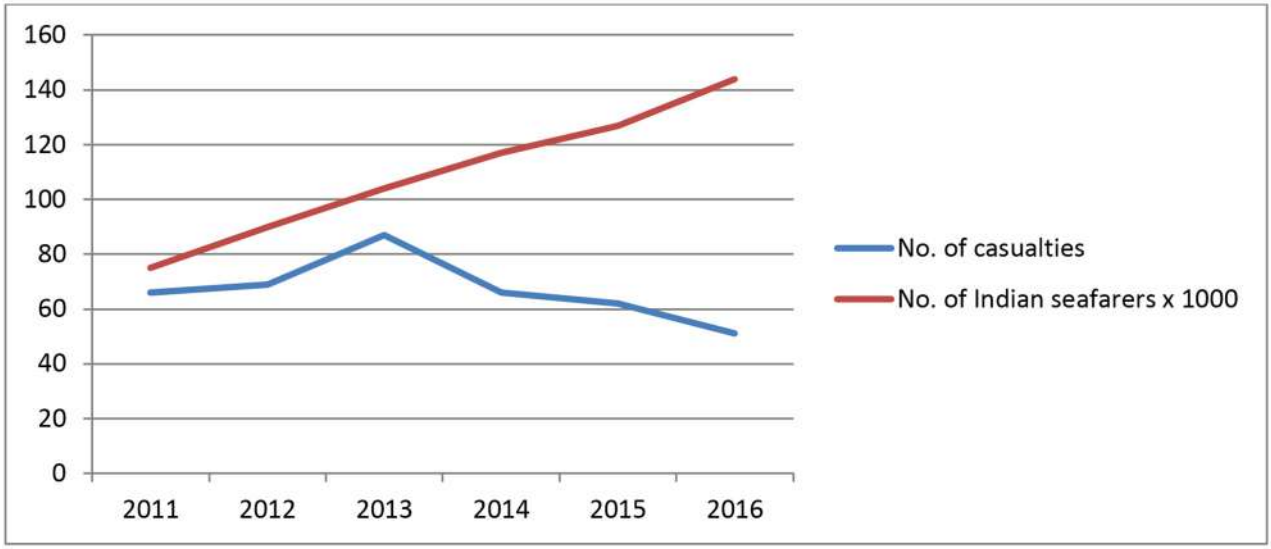
3. Other than investigating marine incidents happening on Indian vessels, the Indian Administration also participates in investigations involving Indian nationals on foreign ships as well as casualties which may not have direct involvement of any Indian seafarer but which happen in Indian waters.

4. Amongst other objectives, one of the primary aims of a marine casualty investigation is to gather information that could be used to prevent future accidents. An investigation may also assist in determining what changes in the present regulations and/or their implementation might be desired.

5. This report covers the incidents which were reported to Indian administration involving Indian vessels, Indian nationals on foreign vessels as well as other maritime casualties in Indian waters over the years 2014, 2015 & 2016. A brief overview is as follows:



6. During the years 2014-16, while the number of Indian seafarers employed worldwide increased by a strong 38.6% the number of casualties reported in relation to them remained nearly the same, rather reduced.

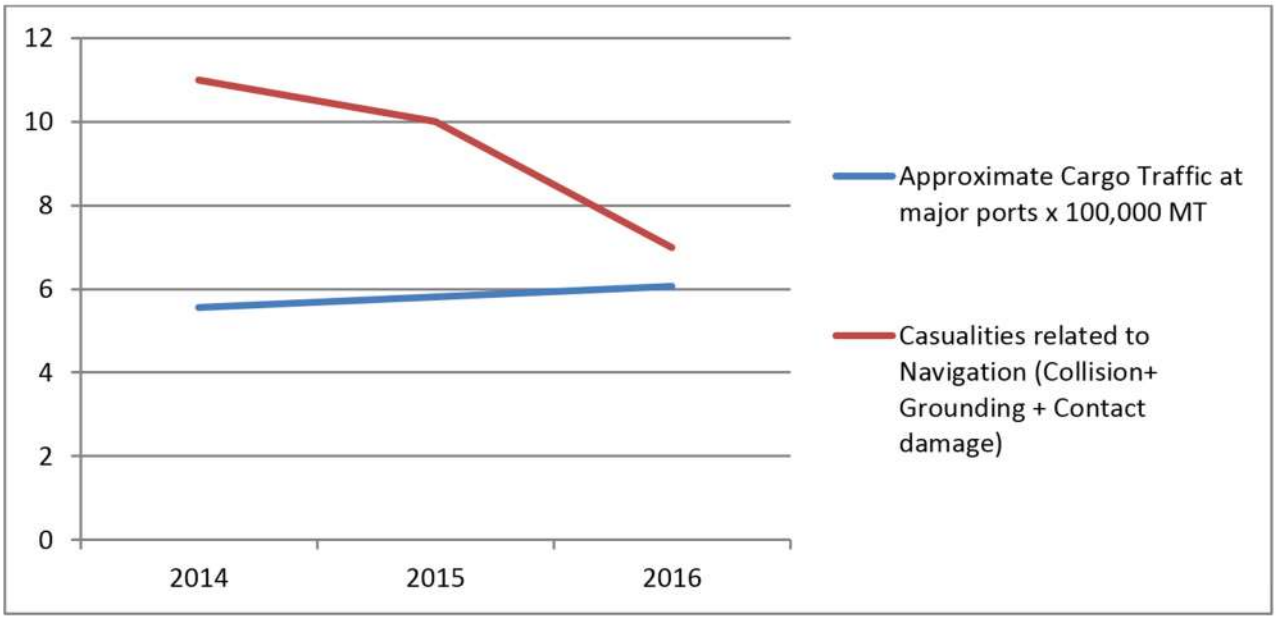


While this reduction in number of casualties vis-à-vis number of seafarers employed is a change in positive direction, the nature of casualties remained a cause of concern. As can be observed in the report, various casualties could have been averted by application of basic competencies, proficiencies, skills and/or seamanship which a seafarer is expected to acquire during various pre and post sea competency and modular trainings. Analysis of these casualties led the Directorate to have a closer look at maritime training in India. Strong reforms have been implemented leading to metamorphic amelioration in maritime training in India in past two years. However, improvisation is a continuous process. The existing trainings modules, both pre sea and post sea, are being reviewed with greater emphasis on safety enhancement and in light of contemporary technology and practices in use on board ships. Implementation of centralized exit exams for various modular trainings is being examined at the Directorate, which shall be a major step towards casualty avoidance.

7. Another negative trend which has emerged in the report is the increased involvement of young and inexperienced in causalities. While lack of experience may remain a shortcoming, the trend is also indicative of lack of proper supervision, guidance and above all mentorship from the seniors. Diminishing of mentorship, which has remained a core element of onboard training, is also indicative of break in onboard dialogue and this has also led to increase in psychological stress. Lack of situational awareness also emerged as a major contributing factor in various incidents.

8. No abatement in the number of deaths and missing persons also remains a matter of concern. While implementation of MLC 2006 has certainly improved the ambient working and living conditions on board ships, level of psychological stress remains high. Easing off satellite communication facilities on Indian coast may help seafarers on Indian coast to get relief through communication with their near ones and the Directorate is engaging with relevant authority for the same.

9. India is progressing in the field of mercantile marine. This has led to an increase in maritime traffic on the coast of India as well as in its waters, including ports, rivers and estuaries.



Apart from facilitating such growth, the Directorate has ensured that progress should not go unregulated. Other than reining in substandard shipping through its PSC and FSI regimes, the Directorate has helped other stakeholders, primarily the ports and fisheries, in enhancement of safety standards. Audits under NSPC, conduct of workshops for ports and State maritime boards on VTMS/VTS, conduct of workshops on collision avoidance for fishermen and with States' fisheries departments, participation with IPA in drafting of Recruitment Rules for Pilots, realignment of 'safety fairway' off Mumbai etc. are some of the many steps. Still navigation related incidents have occurred in Indian waters and this calls for continuous, rather enhanced, vigil in this direction. The Directorate has initiated the process for establishment of Traffic Separation Scheme on the coast of India. Timely promulgation of Maritime Safety Information has been strengthened.

10. It has also been noticed that many incidents are not reported to the administration in time. The Directorate has an established DGCOMM center, functioning 24 x 7 to receive such reports and coordinate contingency measures. It is required that DGCOMM centre be informed about any incident at the earliest.

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II - BRIEF CASE STUDIES

2014

Casualty Summary 01

Death of a seaman due to asphyxiation/ toxicity on a bulk carrier

1. What happened?

A gearless bulk carrier was discharging coal cargo at an Indian port, when an ordinary seaman (OS) was asked to collect cargo sample from one of the cargo holds. While doing so, the OS, a foreign national, succumbed to the effect of toxic gases that were present in the cargo space, leading to his death.

2. How it happened?

A foreign flagged bulk carrier with foreign crew was discharging coal cargo at an Indian port.

As per the master many persons boarded the vessel at multiple times, all claiming to be cargo surveyors, and asked the vessel to provide cargo samples.

Against one such request, the duty officer instructed an on duty ordinary seaman (OS) to collect cargo sample from one of the cargo holds. He instructed the OS to take help from another seaman, whoever was working nearby, however did not explicitly identify that seaman for him. The OS also somehow decided to do the job alone. This could have been due to the fact that drawing of cargo samples had become a sort of routine activity at that port as multiple persons, all claiming to be cargo surveyors, had been asking for the same at frequent intervals.
The duty officer also therefore, neither carried out any risk assessment nor did he fill any enclosed space entry permit for the job.

The OS decided to climb down into the cargo hold using the Australian ladder.

An Australian ladder on a bulk carrier, however, without the enclosing trunk. (Image for illustration purpose only)

Australian ladder on this particular vessel was a spiraling type. A steel trunk arrangement was enclosing the ladder. The trunk was fitted to provide protection to persons, using the ladder, from falling as well as to protect the ladder against damages from grabs, bulldozers and other equipment while loading and unloading of cargo in the hold would be in progress.

The trunk was fully enclosed with just two openings, one at the entry point at top of the cargo hold and other near the bottom end of the vertical ladder. The bottom opening was just 2-3 meters above the cargo hold bottom.

There were no other means or openings available for ventilation of the trunk space. At the time of incident, the cargo hold was 70-80% full of coal cargo and therefore the bottom opening got covered with coal. This caused the bottom opening to get blocked shut. Since the cargo was coal, the trunk space got filled with toxic gases. Although gas sampling record was being maintained for the cargo hold, it did not include the Australian ladder's trunk space.

While climbing down into the hold, the OS was overcome by the toxic gases present in the trunk space and became unconscious. Duty officer got suspicious when OS did not return with samples for prolonged time and also did not respond to radio calls. Emergency alarm was raised on board and search party later spotted OS lying unconscious in trunk way. He was evacuated from the cargo hold, given first aid on board and rushed to local hospital where he was declared brought dead.

3. Why it happened?

3.1 Most proximate cause:

Asphyxiation and /or intoxication, due to the properties of bulk coal cargo.

3.2 Contributory factors:

(i) There was a total failure of permit to work system. Enclosed space entry procedures were not followed. Though company's Safety Management System had procedure for 'enclosed space entry', it was not followed since the duty officer never expected the ordinary seaman will enter the Australian ladder space. Besides, as samples were being drawn frequently at the port due to requests from multiple personnel claiming to be cargo surveyors, the hazardous operation had started being considered ordinary and therefore permit was not drawn.

(ii) Lack of experience and improper job assignment -The ordinary seaman who died in the unfortunate incident was earlier working in galley and had been transferred to the deck department just two months prior to the accident.

(iii) Due attention was not paid to the hazards associated with the cargo. Coal is known to emit methane, hydrogen sulphide and carbon monoxide gases but the dangers were not understood by or communicated to the crew. Probably unaware of the dangers, the OS entered the space without ensuring that appropriate precautions were in place.

(iv) Ship-shore interface was not effective. No procedures had been established to deal with shore people who boarded the vessel, claiming to be cargo surveyors, and asked ship's crew to provide cargo samples at random.

(v) There was a deficiency in the design of the Australian ladder as no ventilation had been provided in the Australian ladder's trunk space, other than the openings at top and at bottom.

4. Lessons learnt:

(i) ISM procedures, in particular the 'permit to work' system, must be effectively implemented and followed by motivation and commitment.

(ii) Spaces on board the vessel, which may fall into the category of 'Enclosed space' should be identified, recorded and informed to all. This list must be reviewed and updated regularly.

(iii) Independent and exclusive mechanical ventilation, with local operating switch, may be considered for the confined Australian ladders and booby hatch entrances for ships carrying cargoes which are susceptible to emit gases.

(iv) Regular training in regards to hazards of confined spaces must be carried out in addition to the bimonthly 'Enclosed Space Entry and Rescue Drill' as required by SOLAS.

(v) All vessels must carry suitable equipment to measure atmosphere in the enclosed spaces, prior entry. Such equipment must be maintained in order.

(v) Ship's staff, in particular the support level staff and trainees, should be trained in identifying the hazards stated in Material Safety Data Sheets (MSDS) and Shipper's declaration for any particular cargo and the associated precautionary actions. The MSDS should be discussed amongst crew during pre arrival cargo operations meeting.

Casualty Summary 02

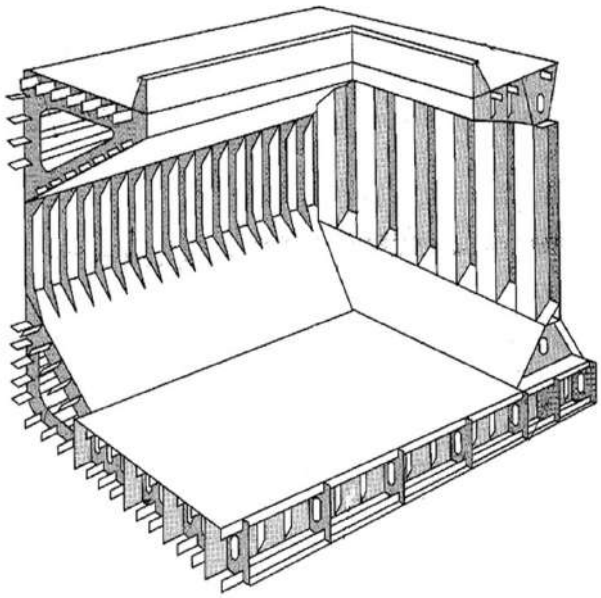
Accidental death of two crew members due to asphyxiation.

1. What happened?

Death of master and electrician in an enclosed space due to asphyxiation.

2. How it happened?

A bulk carrier had been undergoing survey throughout the day. Late evening, nearing end of the day, only one survey item had remained pending. This was demonstration of the alarm system, fitted on board to warn the vessel's staff about any undesired ingress of water into the cargo holds. Such demonstration would require ship's staff to climb down into the lower stool space of the cargo hold, whosever's alarm was being tested, and to manually activate the alarm's sensor fitted therein.



(Image for illustration purpose only)

In this regards, an attempt had been made previously during the day also, at around 03:00 p.m., to enter stool space of one of the cargo holds.However, the same had to be abandoned as while entering the stool space, personal gas detector had sounded warning, indicating low level of oxygen (O2).

Entrance from main deck to stool space

(Image for illustration purpose only)

Way down to a lower stool space

(Image for illustration purpose only)

Testing sensor for water ingress alarm

(Image for illustration purpose only)

Ventilation of the stool space had been continued ever since, still it was taking considerable time for O2concentratio level to improve.

At 09:00 p.m., as only functional test of cargo hold water ingress alarm was remaining pending, the master decided to go ahead with the enclosed space entry despite the O_2 reading still being only 19.9%.

Accordingly 2nd officer, along with 2 ABs (Able seaman), organized man entry into lower stool space of one of the cargo holds. Gas readings of atmosphere in the space were taken by multi gas detector. To worsen the situation, the tube which was lowered into the stool space to draw gas sample into the 'portable gas detecting equipment' was not long enough to reach till the bottom of the stool space. Gas concentrations were recorded as O_2 =19.9 %, H_2S =0.0, CO=O.O in the enclosed space entry check list. This checklist was further signed by master and chief officer of the vessel. 2nd officer and 2 ABs stood by on the deck, near entry point of the ladder which descended into the lower stool space, while chief officer stationed himself on bridge. He remained in constant communication with 2nd officer through walkie talkie. Electrical engineer and electrician entered into the stool space around 09:30 p.m with electrician entering first electrical engineer was carrying a personal 0_2 meter with himself, however no personal meter was available with electrician.

While both were climbing down the ladder, personal 0_2 meter with electrical engineer triggered alarm indicating deficiency of oxygen. Soon, the electrical engineer started feeling suffocated also. The electrical engineer stopped descending. However electrician, who was lower on the ladder than him, continued to climb down into the enclosed space. By the time electrical engineer could warn electrician, he observed that electrician, who by this time had reached the last step of the ladder, suddenly collapsing and falling down. The electrical engineer immediately climbed back out of the space. Gasping for breath, he reported the incident to 2nd officer. 2nd officer immediately notified the bridge, chief officer and master.

Master &chief officer rushed to the site with other crew members. Without taking any precautions or protective gear, the master immediately went down into the lower stool space to rescue the electrician. One AB also followed him, however he was donning a 'Self Contained Breathing Apparatus' (SCBA) for his own safety. The A/B carried with him an 'Emergency Escape breathing Device' (EEBD) also and requested master to don it. But master remained busy trying to revive the electrician and ignored his request. He, rather, used the EEBD to revive the electrician, but did not succeed. After some time the master also succumbed to asphyxia and collapsed besides the electrician.

The stool space was narrow. The crew first tried to take out the unconscious bodies of master and electrician from the space by cutting a hole into the space from cargo hold side but did not succeed. Later, both bodies were lifted out through the manhole using ropes. Electrician's head was found bleeding on the rear and he was immediately sent to hospital by port arranged ambulance. Master was later on taken to hospital by the port vehicle. On arrival at the hospital, both were declared 'brought in dead condition'.

3. Why it happened?

3.1 Most proximate cause:

Probable cause of both the casualties is asphyxia and/or toxicity. This depletion of oxygen could also have been due to leakage of CO_2/CO gas from the adjacent cargo holds.

3.2 Contributory factors:

(i) 'Permit to work' system was not effectively implemented and appears to have been a mere paper exercise. Although checklist had been used it was not followed in spirit. Master had decided to go ahead with the enclosed space entry despite the O_2 reading still being only 19.9%.

(ii) Equipment used for gas measurement were inadequate. The tube, through which the gas sample was drawn from the stool space into the 'portable gas detecting equipment' was not long enough to reach till the bottom of the stool space. O_2 content of the lower stool space had in fact therefore not been verified at all prior to entry. This proved fatal as CO_2 or CO being heavier may have settled in the lower part displacing oxygen from there.

(iii) The stool space, that was entered, was very narrow and possessed a zigzag passage. The possibility of pockets of toxic gases getting trapped is always present in such constructions, which in this case may have gone unchecked.

(iv) Inadequate emergency preparedness.

(v) Master's illogical and rash thinking and non observance of contingency procedures. The 2nd casualty i.e. of the master himself, could have been totally avoided, if the master would not have entered in that space under emotional impulse and had taken precautionary measures.

(vi) Fatigue might have set in as the staff was involved in survey since morning. Also haste to complete the job could have clouded the situational awareness and rational thinking of the staff.

4. Lessons Learnt:

(i) Gas testing and other contingency equipment should be ship specific. Their suitability should be verified for each particular ship. Hoses and tubes, which are used for drawing samples should be long enough to reach the lowest and farthest part of any enclosed space in a single length, without any joints.

(ii) Regular training of ship's staff (bimonthly in accordance to SOLAS) should be carried out in 'Enclosed Space Entry and Rescue Drill'. Such drills should be made realistic, without endangering the ship's staff and should cover all enclosed spaces, in turns. Efficacy and sufficiency of equipment shall be verified during such drills.

(iii) Filling of an 'enclosed space entry check list' should be followed in spirit. Doubts or ambiguity, if any, must be clarified by top management. Help may be sought from shore based authority.

(iv) More awareness of ship's construction especially when ventilation and air exchange is restricted.

Casualty Summary 03

Explosion in cargo space of a container vessel, resulting in death of a seaman

1. What happened?

A crew member on a foreign flagged container vessel suffered fatal injuries due to fire and explosion in one of the cargo holds, while the vessel was at sea.

2. How it happened?

A foreign flagged container vessel was en-route from an Indian port to Colombo. A few hours after its departure from the Indian port i.e. at around 10:30 am, an explosion was heard from cargo hold No. 2 and heavy smoke started emanating from the hold.

Vessel initiated emergency response and commenced fire fighting procedures. All ventilations flaps and dampers were shut except one vent flap on port side & two flaps on crossway. The same had become inaccessible due to heavy smoke. They were shut later by fire fighters donning SCBA.

As one of the measures to extinguish fire, $C0_2$ was released in No.1 & No. 2 cargo holds, consuming all the quantity of $C0_2$ that had been provided on board that ship for those two specific holds.

Basis various parameters observed, by noon time it was assumed that fire in the cargo hold had subsided. However boundary cooling and monitoring of temperatures of areas in and around the two cargo holds were continued. Vessel, thereafter resumed her voyage and returned to its designated course, from which it had altered to minimize wind flow to the seat of fire. It also started to increase its speed. It was noted that holds' temperatures were on decline. Temperatures in the port and starboard side tunnels of cargo hold No. 2 were observed to be as 50°C. Small amount of smoke was still emanating from hold No.2.

After about 03 hours, i.e. at around 01:30 p.m., it was observed that smoke from cargo hold No. 2 had increased. Additional $C0_2$ bottles were connected to CO_2 line for cargo hold No. 2 and $C0_2$ was again released into the hold. After some time temperatures at various points of cargo hold No. 2 were again checked and this time the port and starboard side tunnels measured 40°C. Also the smoke emanating from the cargo hold was observed to be significantly reduced. At this time, temperature of hatch cover at bay 10 showed 28°C.

Late in the afternoon, it was decided that boundary cooling of holds nos. 1, 2 and 3 would be continued throughout the night and also sprinkler system for cargo hold No. 2 to be kept open. Monitoring of temperatures of cargo hold No. 2 was also planned to be carried out over night and deck and engine watches were set accordingly. Temperature in the port and starboard tunnel spaces of cargo hold No. 2, was measured to be 32.5° C at this time, thereby showing a reduction.

In the evening, around 06:00 p.m., another heavy explosion was heard from cargo hold No. 2 which blew apart, hatch cover of 2AP. When the smoke subsided, also body of a crew member, an ordinary seaman (OS), was found hanging on ship's port side railing. The OS was unconscious, with no pulse or breathing and was bleeding through his ears.

Efforts were made to revive the OS, including seeking of 'radio medical advice', however without any success. At 08:00 p.m. the OS was declared dead by ship's Master. The vessel was diverted to and anchored at the nearest port. There next day morning, it was boarded by a doctor who confirmed death of the OS.

Meanwhile the crew continued fire fighting in order to keep the cargo hold and ship's hull cool. While there were no reports of any damage to the environment, the vessel's water tight integrity was questionable due to unsecured hatch cover.

Experts in salvage and fire fighting were engaged the next day who carried out containment of heat source in the under deck cargo.

3. Why it happened?

3.1 Most proximate cause:

(i) Most likely cause of the accident was the cargo of CALCIUM HYPOCHLORITE or a similar chemical, stowed in containers, inside hold no.2, which had been incorrectly declared as AQUA CLEANING AGENTS.

(ii) In the absence of proper identification of the cargo, requirements with respect to stowage, segregation and carriage may not have been implemented properly.

3.2 Contributory factors :

(i) As cargo may have been incorrectly identified the vessel could not initiate correct emergency procedures.

4. Lessons learnt:

The shipping companies/shipper should ensure that the details of cargo are made available to the Master so that the appropriate stowage can be determined to ensure that such containers are quickly accessed and hazards associated with the cargo, are effectively dealt with in good time.

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Casualty Summary 04

Accidental fall into water, while reading ship's draft & subsequent death of 2nd officer

1. What happened?

2nd Officer fell overboard, reportedly while reading ship's draft, and subsequently died due to drowning.

2. How it happened?

The deceased 2nd Officer had joined the vessel just two hours prior to the fatality. The vessel was starboard side alongside at an Indian port and was in the process of discharging coal cargo. Routine familiarization for the in-coming officer had been carried out on the bridge by 3rd Officer and Master. After the familiarization, 2nd Officer went on to deck and was seen taking starboard side draft from the jetty. He safely came back on board at around 11:45 a.m. Thereafter he was seen crossing over to the port side, presumably for taking port side draft.

At around 12:00 noon, chief officer, who was on the portside bridge wing, noticed some movement in the sea. Soon he realized it to be a person in water. He directed crew members, who were present on deck, to release life buoys on port side and accordingly two lifebuoys were immediately thrown into the sea. The person, later identified to be the deceased 2nd officer, surfaced from underneath the water. He was called repeatedly, however did not invoke any response and the body was noticed floating motionless.

Rescue boat could not be lowered as it was fitted on the starboard side of the vessel, the side on which the vessel was tied up with the jetty. However, lifeboat on the seaward side i.e. port side was somehow also not lowered. Meanwhile the local ship's agent who was present on board was requested by the master to call for boat and an ambulance. Shore boat arrived at the scene within 8 minutes of request. 2nd officer's body was lifted from water and taken to port facility's hospital. At the port facility's hospital, all attempts to revive 2nd officer proved futile. He was then shifted to the nearest government hospital, where he was declared 'brought dead' on arrival.

3. Why it happened?

3.1 Most proximate cause

There was evident failure of permit to work system. Procedures for 'working aloft or overside' were not adhered to. Instead of following established safe procedures and using proper protective equipment, the 2nd officer may have tried to cut corners by holding on to the ship's side rails and lean over the side to read the mid-ship draft and accidently fell overboard. The vessel had high free board at that time. He had also not informed anybody nor did he keep a person standby with him.

(Image for illustration purpose only)

3.2 Contributory factors

(i) Starboard lifeboat not lowered to retrieve 2nd officer from water. This could have saved critical time that was wasted in waiting for shore boat.

(ii) Since 2nd officer had joined just 2 hours prior it is possible that he may have been overcome by fatigue due to lack of sleep or time difference due to travel.

4. Lessons learnt:

(i) It is imperative to comply with safe working practices while working out board or near ship's side, including when reading ship's draft(s). Checklist for working over side must be used and all precautions specified therein must be strictly adhered to, including proper supervision.

(ii) Drills for 'rescuing persons from water' should include scenarios of rescuing persons from water while the vessel is alongside and when the rescue boat is rendered non-launchable due to it being fitted on the landward side.

(iii) Consideration must be given to fatigue level of a new joiner before assigning job or transferring responsibility.

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Casualty Summary 05

Injury to deck cadet from a pressurized air hose, while working on deck

01. What happened?

Deck cadet (apprentice) on board a general cargo vessel received severe injury to his right eye, while air hosing the deck.

02. How it happened?

Deck cadet had been assigned the job of cleaning the deck after it had been de-rusted. He was using a pressurized air hose for the same. On completion of the job, cadet just left the hose loose and unattended without shutting off the air or decoupling the nozzle. The unattended pressurized air hose re-bounced and hit him, resulting in severe injury to his right eye.

Cadet was immediately administered first aid on board and sent to a hospital ashore for further treatment.

3. Why it happened?

3.1 Most proximate causes

Deck cadet had left the pressurised air hose, unattended, which re-bounced and hit him under the eye.

3.2 Contributory factors

(i) Safe working practices not followed while working with high pressure pneumatic equipment.

(ii) Lack of training and experience.

(iii) Failure to wear personal protective equipment, especially face shield for the protection of face and eyes.

(iv) Lack of supervision by senior officer(s) on board.

04. Lessons learnt:

(i) Use of compressed air to clean work place should be discouraged.

(ii) The competence, training level and experience of ship's staff must be taken into account prior assignment of any particular task.

(iii) Always use proper 'personal protective equipment' (PPE) suitable for the work being undertaken.

(iv) Proper supervision is essential to reduce/ eliminate accidents.

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Casualty Summary 06

Head injury to seaman while working in engine room

1. What happened?

Third engineer suffered head injury, while participating in breakdown repairs in engine room of a Liquefied Petroleum Gas (LPG) carrier.

2. How it happened?

Main engine of a foreign flagged LPG carrier had to be stopped at sea due to high exhaust temperatures. Inspections revealed a broken bolt on piston crown of one of the engine units. The same had to be renewed and this required stoppage of engine and elaborate work including extraction of the affected piston.

Piston hanging from crane
(*Image for illustration purpose only*)

Breakdown of main engine had taken place after the normal working hours. Meeting of engine staff was held and scope of work and the risks involved were discussed.

Work commenced at about 07:30 p.m. It was ensured that all had some rest period before commencement of work. It was also planned to carry out the work in shifts as it was expected to consume extended time.

As the vessel was in open sea, susceptible to rolling and pitching due to waves' action, rope stays were tied to the piston to control its swinging when the same would be drawn and would be hanging suspended on the crane. After securing such ropes, the piston was lifted off the supporting device.

However during one roll of the vessel, the rope stays failed to restrain movement of the hanging piston adequately and it went on to hit one of the supports. A plate, which was supporting the stuffing box, slipped off and fell down on the pipe below it. While falling further down the plate got deflected towards the staircase and landed on the helmet of 3rd engineer, inflicting injury to his forehead and nose. 3rd engineer was taken to the engine control room (ECR) and administered first aid. He was then shifted to hospital wherein he was kept under constant supervision for the next few hours till the bleeding had completely stopped. Skin closure sutures were applied to close the deep cuts on his forehead and nose.

Main engine repairs were completed during morning hours of the next day. Vessel was then diverted to a nearby port where the 3rd engineer was transferred to local hospital for further treatment.

3. Why it happened?

3.1 Most proximate cause:

(i) Lack of attention and situational awareness by the 3rd engineer.

(ii) Inadequate securing of the piston as its movement was not sufficiently restrained.

3.2 Contributory factors?

(i) Vessel rolling, during lifting of piston.

(ii) Conditions which forced the job to be carried out in open sea.

(ii) Lack of supervision by senior officers.

Loose objects, including those which had been opened/ dismantled during the course of work, not secured sufficiently

4. Lessons learnt:

(i) Detailed 'risk assessment' shall be carried out prior undertaking such tasks, including for hazards that may be posed due to the vessel being in open waters.

(ii) Proper Supervision is essential to reduce/ eliminate accidents. In this particular case, the 3rd engineer could have been alerted of approaching danger, by an attentive supervisor.

(iii) Properly rigged and controlled guiding ropes may avoid / minimize the accidents when lifting heavy weights.

(iv) All loose objects to be properly secured.

(v) Additional help from other departments need to be considered. In this case a deck hand, such as an AB, would have been useful.

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Casualty Summary 07

Injury to finger, while shifting ventilation fan on deck

1. What happened?

Bosun, on a vessel, suffered injury to the middle finger of his right hand while shifting an electrical ventilation fan on deck.

2. How it happened?

Ventilation of top side tanks (TSTs) was in progress on a foreign registered bulk carrier. Heavy duty electrical fans were being used for the purpose.

Deck crew had been instructed to shift ventilation fans from top of one TST to another prior to closing work for the day.

While bosun had full crew at his disposal, he decided to shift the fan all alone and also did not switch off the power. The middle finger of his right hand got caught with the blade of the ventilation fan and got lacerated.

3. Why it happened?

3.1 Most proximate cause:

The finger getting cut by the fast moving blade of the heavy duty ventilation fan.

3.2 Contributory factor

Not switching off power. Undue haste to close the work for day. Bosun decided to carry out the work alone and did not even switch off the power.

4. Lessons learnt:

Shortcuts should be avoided.

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Casualty Summary 08

Collision between vessel and fishing boat, leading to capsizing of the fishing boat and death of five fishermen and one more going missing.

1. What happened?

During its sea-trials, a vessel (Vessel 1) collided with a fishing boat resulting in loss of lives of six fishermen and sinking of the fishing boat. Bodies of 5 fishermen were recovered. However, body of one fisherman could not be recovered.

2. How it happened?

A fishing boat was trying to locate fish in an area outside the port. Its crew members had their dinner and by 11:00 p.m. all crew went to sleep except 1st Tindal, who was steering the vessel. At approximately middle of the night, 1st Tindal handed over steering to 2nd Tindal, but continued to check for fish till about 01:30 a.m. After this, he also went to sleep. At about 04:30 a.m., 2nd Tindal also went to sleep after stopping the vessel and switching on all deck lights. No crew member was on watch after that time.

Meanwhile, nearby on 'Vessel 1', the Navigating Officer (N.O.) came on to the watch at 04:00 a.m. The N.O. had been on the watch earlier also, when the vessel had sailed out of the port the previous night. He had been on the bridge till about 09:30 p.m. He had, thereafter, again gone to the bridge at around 10:00 p.m. and was later called once more to the bridge, where he stayed between 01:50-02:45 a.m. the fateful morning. The later call was due to a malfunction in the multi-function display (display of radar and ECDIS).

During the present watch, which he had taken over at 04:00 a.m., the N.O. was assisted on the bridge by 'quarter master', 'side boy', 'port look out' and 'starboard lookout'. In addition, there was an aft lookout (life buoy sentry).

At 04:00 a.m. there were no visible targets on either side of the vessel.

The N.O. picked up a target on the radar at a distance of approx. 6.0 nautical mile. This target was the fishing vessel.

As per the Captain's night orders, the N.O. gave wake-up call to C.O. at 05:00 a.m. and informed him about the merchant ships in the vicinity. He however failed to inform C.O. about the fishing vessel that had been sighted right ahead.

At about 05:05 a.m. the 'port lookout' reported to N.O. that the light was opening to red 20° with a distance of about 3-4 nautical miles. At this time the port lookout also reported seeing the red light of the vessel but could not make out whether it was the all-round light or the side light. The port lookout reported the sighted light was drawing left and had moved to red 30-40° with a distance of about half nautical mile. The port lookout thereafter reported seeing the green light of the target vessel, which was also observed by the N.O. The N.O. therefore concluded that the target vessel, which was the fishing boat, had altered course towards its port side as the red light was diminishing and as only the while light and green lights were now visible.

At this moment the fishing vessel started flashing a light towards 'Vessel 1' and it started moving rapidly to cross ahead of 'Vessel 1' from its port side to the starboard side. The N.O. therefore ordered the course of 'Vessel 1' to be altered to its starboard side, from the existing 335° to 350° in order to avoid the fishing boat. On seeing that the boat was continuing to head towards the ship, N.O. ordered the wheel to be put to starboard 5° and immediately thereafter to stardboard10°.

In spite of the avoiding action taken, the N.O. saw the fishing boat going into the shadow zone of the forecastle of 'Vessel 1' on its port side. Soon a distinct jerk/vibration was felt on the 'Vessel 1'.

Collision between 'Vessel 1' and the fishing boat appears to have occurred at about 05:16 a.m. It also appears that the stem of the vessel

collided with the starboard forecastle area of the fishing boat.

3. Why it happened?

3.1 Most proximate cause:

(i) In view of the foregoing, the collision probably occurred as the navigation officer (N.O.) of 'Vessel 1' did not take early action and allowed the situation to develop into a close quarter situation despite picking up the fishing boat on radar at a distance of about 6 nautical miles.

(ii) Action taken by 'Vessel 1', to avoid collision, was also insufficient and in effective. The vessel which is highly maneuverable should have opted for a larger alteration of course.

(iii) 'Vessel 1' did not draw attention of the fishing boat by any sound and/or light signals.

(iv) Ineffective look out on the fishing vessel and inappropriate maneuver by the fishing boat who seems to have deliberately proceeded to obstruct the passage of 'Vessel 1'.

3.2 Contributory factors:

Fatigue: While most of the crew on fishing boat were asleep the N.O. on 'Vessel 1' also seems to have been fatigued. This would have adversely affected his reflexes and ability of comprehend the situation.

4. Lessons Learnt:

(i) COLREGs shall be duly complied with, including keeping a proper look out. Early and definitive action avoids dangerous situations from developing.

(ii) The on board management shall ensure that proper rest is accorded to all.

(iii) N.O. should have requested for more rest before coming on watch.

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Casualty Summary 09

Contact of vessel with jetty during berthing operations resulting in damage, both to the vessel and the jetty

1. What happened?

An Indian container vessel made contact with jetty during berthing at an Indian port, resulting in damages to both the vessel and the jetty.

2. How it happened?

The container vessel arrived at 'pilot boarding station' of the port at around 03:30 a.m.. It had been allotted a particular berth at the container terminal of the port. Main engine had been tried out satisfactorily, for 'ahead' and 'astern' movements, prior to vessel's arrival at the pilot station.

Vessel was not having anchor on its port side as the same had got lost in an earlier incident. The port authority had been duly informed regarding absence of this anchor. Also, the port authority had been requested to berth the vessel starboard side alongside so that replacement anchor could be connected to vessel's port side. Due to this request of the vessel, a cut off time of 04:00 a.m. had been given for embarking the pilot so as to enable the vessel to berth with the flood tide.

Another coastal feeder container vessel was also expected to arrive at the pilot station at 03:00 a.m. It was decided by the port that the feeder vessel will embark its pilot at 03:00 a.m, prior to the container vessel under consideration.

Somehow, the feeder vessel got delayed by half an hour. However, order of pilots' boarding was kept unchanged and the feeder vessel went on to embark its pilot first, as was decided.

Thereafter, the container vessel embarked its pilot at 03:54 a.m. While the pilot was climbing up to the bridge of the container vessel, its master tried out astern movement on the vessel's main engine. On arriving at the bridge, Master/Pilot exchange was carried out, wherein the pilot specifically asked if there were any problems with the ship's engines. This was because of the reason that the port, in the past, had experienced problems related to ship's maneuvering with sister ships of the container vessel. Rather, it was because of these problems that certain conditions and limitations had been imposed by the port on movement of those sister vessels when within its port limits.

The master assured the pilot that there were no problems on that particular vessel. He however, also informed the pilot that astern movement should only be given at speed below 4 knots. This container vessel also, in past, had instances of failure of main engines to kick start in astern direction.

After embarking its pilot, the container vessel commenced its approach through the channel. The engine had been kept on 'slow ahead' so as to allow sufficient distance between itself and the feeder vessel, which was proceeding ahead of it. This distance was being maintained in order to ensure that tugs should become available for berthing of the container vessel after berthing the feeder vessel. VTMS was also keeping the pilot informed about progress of berthing of feeder vessel and the pilot on the container vessel was adjusting vessel's speed accordingly.

The container vessel transited the approach channel without any problem, till around 04:47 a.m. At this instant, when the vessel was a little short of its berth, its main engine was stopped to slow down the vessel. The vessel, however, lost steering and started swinging to its starboard side. To check the swing a kick ahead, a short start of engine on dead slow ahead, was given with wheel hard over to port side. Though this arrested the starboard swing, it commenced vessel's swing to port. Engine was stopped once again. With engine stopped, the vessel again stopped responding to steering and continued swinging to port, towards the berth.

At this instant the pilot called for astern movement by advising 'dead slow astern' command. However, the main engine did not respond. The engine turned on air but did not kick on fuel. This was attempted twice after which the pressure in the air bottles had come down too low to be able to give any more kicks. Valves of the air bottles were opened so as to equalize the pressure of the air bottles and another kick was given however the engine did not pick up on fuel even then.The vessel, at this instant still possessed a speed of approx. 3.8 knots and was swinging to its port side. To worsen the situation 'no' tugs had been made fast to the vessel till that time. This, because the tugs had yet not arrived after berthing the feeder vessel.

The vessel had only one starboard side anchor, which was dropped to control forward advance of the vessel. This also did not help as it reduced the vessel's speed only partially and the vessel made heavy contact with the jetty at 04:50 a.m.

While vessel suffered structural damages, two pillars of the terminal also got damaged.

3. Why it happened?

3.1 Most proximate cause:

Machinery failure. Failure of the main engines to go astern when required. Also the air reservoir got exhausted just after three kicks, whereas the regulations require 12 consecutive starts.

3.2 Contributory factors

(i) High speed of approach to the jetty, which became more precarious in the absence of tugs.

(ii) Failure of the company and vessel's management. Though the container vessel and its sister ships had been experiencing similar problem for some time, sufficient remedial action had not been taken to deal with it.

(ii) Bridge team did not challenge the Pilot's actions, nor did they raise concern with the pilot regarding high approach speed. They also agreed to go ahead with berthing without availability of tugs.

(iii) Approach angle almost perpendicular to the berth.

(iv) There was failure on part of the Port management as tug boats were not made available for the maneuver despite it being known that the vessel was short of one anchor and was proceeding towards the berth with a following tide.

(v) Failure of the VTMS to alert the vessel in time for its approach speed being excessive.

4. Lessons learnt:

(i) The berth should be approached at a safe speed. Due regards shall be had to possible machinery failure(s). Contingency measures should be thought of.

(ii) The passage plan and mooring arrangement at the berth should be examined and agreed to by the pilot and vessel's staff, prior to the commencement of approach. Such exchange should be detailed and include arrangement of tugs.

(iii) The responsibility of the safety of vessel rests with the master, with pilot contributing in an advisory position. If any act of the pilot is causing concern challenge must be raised by vessel's staff.

(iv) Port operations and VTMS must also exhibit due diligence in allocating resources to different maneuvers ensuring that the resources, be they the tug boats or mooring boats or mooring gangs, will be timely and sufficiently available.

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Casualty Summary 10

Passenger jumps overboard from the vessel, at anchorage

1. What happened?

A passenger from a passenger vessel jumped overboard, while the vessel was waiting at the outer anchorage of a port, awaiting berthing.

2. How it happened?

On arrival at an Indian port, a passenger vessel had been made to wait at anchorage for a day. Pilot had been scheduled to board the vessel next day morning at 07:00 a.m. to berth the vessel inside the port. All passengers were informed accordingly.

As per the routine, evening video cinema was exhibited on the swimming pool deck after dinner and passengers appeared to be in a relaxed mood. The movie ended at around 11:00 p.m. and the passengers started moving towards their respective bunks, when a loud noise of somebody jumping into the sea was heard. Few passengers close to the incident spot, witnessed a person jumping overboard and trying to swim away from the ship.

A life buoy was immediately thrown towards the person in water by the on-duty fire patrol, who also informed the 'officer on watch' (OOW) over portable radio. Emergency procedures were initiated including alerting VTMS and Pilot station. They were requested to further inform local 'search and rescue' (SAR) authorities. Maritime Rescue Coordination Centre (MRCC) was informed over INMARSAT 'C'.

Search operations were carried out by the ship's rescue boat and with the help of fishing boats in proximity. Efforts to find the missing passenger were continued till next day early morning, however the missing passenger could not be traced.

3. Why it happened?

3.1 Most proximate cause:

The action of passenger appeared to be case of suicide. Hand written letter recovered from his personal belongings revealed that he was depressed. He had resigned from his last employment and was returning home from his place of employment with very minimum paraphernalia.

3.2 Contributory factors

The vessel's staff could not detect the signs of depression and suicidal tendencies in the passenger.

4.0 Lessons learnt:

(i) Any abnormality or signs of depression in passenger(s) should be identified and the passenger referred to counselor.

(ii) Welfare officer / Guides should be passenger friendly and be able to identify and counsel the depressed, isolated and traumatized passengers.

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Casualty Summary 11

Vessel suspected of touching ground, off berth

1. What happened?

An Indian cement carrier of approx. 12000 GT suspected of having touched the ground on its starboard side, while departing from an Indian port.

2. How it happened?

The vessel, a cement carrier, was departing an Indian port under pilotage and with the assistance of 2 tugs. Around 11:00 a.m., vessel cleared the jetty. As, vessel was heading outwards at a speed of 0.8 knots, the master and bridge team noticed vessel was losing speed.

At around 11:10 a.m., engines were stopped, suspecting that the ship's bottom may have touched the sea bottom on the vessel's starboard side. Readings on echo sounder were inconclusive and did not indicate any depth under keel.

Manual soundings were taken using hand lead line. The same indicated lesser depths on starboard side of the vessel, in front of its accommodation block. It was suspected that the vessel may have touched the bottom there. From soundings, nature of sea bottom appeared to be that of soft mud.

Around 11:20 a.m. the vessel was moved into area of deeper depths with the assistance of tugs, where it anchored. Checks were carried out on the vessel and its condition was found satisfactory.

3. Why it happened?

3.1 Most proximate cause:

Incorrect declaration of water depths in the area lying just off the berth. Depths indicated on the chart were also not conforming with the actual.

The declared depth at the berth was 9.5 m. With expected prevailing tide of 0.66 m added to it, depth available at berth should have been 10.16 m. Accordingly, the depth during passage, after casting off from the berth, should have been a minimum of 10.96 m. However, when measured using hand lead line it was observed to be only 9.30 m.

3.2 Contributory factor

i) Inadequate sounding of the sea bottom by relevant authorities.

ii) It could have been that silting near the break water/ south end of the jetty might have increased over a period of time, which went unnoticed.

4 Lessons learnt:

i) The available depths at berth and in the channel should be confirmed from various sources including port authorities and pilot, particularly when calling at smaller ports.

ii) Same should form part of Master- Pilot exchange.

iii) If in any doubt, the vessel should verify the actual depths, using various means.

iv) Draft used for evaluating under keel clearance should be dynamic and incorporate possible reduction of depths due to formation of sand waves etc.

Casualty Summary 12

Casualty (Death) of a third party worker due to electrocution in an enclosed space.

1. What happened?

Death of a shore labourer on an Indian passenger vessel, when the vessel was undergoing repairs/maintenance at an Indian dry-dock.

2. How it happened?

An Indian passenger vessel was undergoing repairs at an Indian dry-dock. At the time of the incident, master and chief officer of the vessel were engaged in other activity.

One of the jobs at the dry-dock was cleaning of the vessel's sewage holding tank. The tank was required to be cleaned so that it could be surveyed.

In the process, the sewage holding tank was opened up and made gas free. The tank being gas free was checked by ship's staff and thereafter handed over to a third party contractor, a workshop, for cleaning.

This 3rd party contractor further sub contracted the work to another entity, a workshop headed by a local person. However, this workshop was not authorized by the vessel's owners for such kind of work. This workshop deployed seven personnel for working inside the tank.

The seven workers were not equipped with personal protective equipment and were rather working barefoot and half naked. The working equipment being used by them were also unsafe.

The workshop personnel were also neither familiar with the 'enclosed space procedures and the work environment' on board a ship nor were they trained in any kind emergency procedures, including basic first aid.

During the work a hand held lamp, belonging to the workshop, was lowered inside the tank through manhole by workshop's person. One of the other workshop worker, who was inside the tank went ahead to hold the lamp and got electrocuted.

Duty engineer was informed who announced the incident on public address system. Ship staff immediately rushed to the accident site. The casualty was given first aid by ship staff and thereafter he was shifted to the hospital where he was declared dead on arrival.

3. Why it happened?

3.1 Most proximate cause:

Death due to electrocution

3.2 Contributory factor

i) The work had been outsourced to a subcontracting workshop whose track record with respect to safety had not been verified. As is evident, the workshop personnel were not familiar with neither the 'enclosed space procedures and work environment on board' nor were they trained in emergency procedures, including basic first aid.

ii) The workers were not equipped with personal protective equipment and were rather working barefoot and half naked. The working equipment being used by them were also unsafe.

iii) It is likely that the person may been sweating and already exhausted while working inside the tank. This may have reduced his resistance. Also the hand held lamp was not fitted with a safety glass and once the body came in contact with a live source of electric current, it may have lead to the casualty.

iv) Casual approach of Master/Ship staff towards the safety of workshop personnel on board, who missed noticing such lapses in safety measures. The tank was made gas free

and handed over to the workshop. Henceforth no supervision was maintained by the vessel's staff. This caused delay in raising of alert and summoning of help. Also crucial vital seconds, in switching off the power were lost.

v) Credentials of the workshop had also not been verified.

vi) Lack of clarity in the company's safety management system regarding responsibility of safety of third party workers when working on board their ship.

vii) Non availability of emergency response equipment such as stretcher and SCBA at entrance to the enclosed space. These caused delay in evacuating the casualty from the enclosed space to hospital.

4. Lessons learnt:

i) Explicit and well defined guidelines must be stated in company's safety management system with respect to vessel's responsibility towards the safety of shore personnel, including any third party workers.

ii) Ship's staff, shall maintain situational awareness of activities on board the ship, even though not directly involved with third party workers.

Casualty Summary 13

Engine crew missing at sea

1. What happened?

An engine crew went missing from a tanker vessel while the vessel was at sea.

2. How it happened?

The engine crew had joined the vessel just a few days prior to the incident and had been carrying out his duties satisfactorily since then. However on the 18th day after joining, he refused to go down to the engine room for watch and also demanded immediate repatriation to his home.

The matter was communicated to the company's office who agreed to relieve the crew member on compassionate grounds at the next port.

Meanwhile, senior officers on the vessel decided to keep him off the watch till next port.

On the day of the incident, the particular crew member was last seen at around 02:00 p.m., resting in his cabin.

However, at dinner time his absence was noticed. Search was conducted on the vessel but the engine crew could not be found. Man overboard procedures were initiated, including informing the nearest 'Search and Rescue' (SAR) facility. Search was carried out for the missing crew member, including using aircraft, but the missing engine crew could not be located.

3. Why it happened?

3.1 Most proximate cause:

The crew member probably jumped from the ship, under depression.

3.2 Other contributory factors:

(i) Despite being aware of the disturbed mindset of the crewmember effective counseling was not provided to him by ship's staff to help allay his fears and anxiety. His kin(s) could have been involved in the process over telephone.

(ii) Also no watch was kept on the crew.

4. Lessons learnt:

i) Officers on vessels should be trained in identifying psychological distress in crew and to provide 'First aid counseling'.

ii) Companies should incorporate compassionate procedures to handle psychologically distressed seaman, if any, on board their ship.

iii) Ship owners/ managers/ operators should evolve psychometric testing methods which would identify traits that would lead to suicidal tendencies in marine environment. A brief of the findings of the psychometric test, should be available with the ship's master.

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Casualty Summary 14

Death of seaman due to medical condition and delay in administering proper medical treatment.

1. What happened?

An Indian seaman was found unconscious while working on deck. He later died. Proper first aid and medical procedures were not administered timely.

2. How it happened?

A foreign flagged container vessel with multi nationality crew was on a transoceanic voyage.

On the day of the incident work was allocated, as usual, to all crew and tool box meeting held in the morning. At 08:20 a.m, after the tool box meeting, all deck crew proceeded to deck on their allocated jobs. The deceased person, a repair fitter, had been allocated the job of renewing deck railings at a particular point. He had been assigned an ordinary seaman (OS) for assistance.

At 08:30 a.m, after arranging tools at the worksite, the fitter instructed his assistant OS to go and switch on certain deck lights. The OS followed suit and left to switch on the lights and also to bring some paint with him. The fitter, at this time was left behind alone.

The OS returned after approximately 15 minutes along with Bosun and an able bodied seaman (AB) to find the fitter lying on main deck in an unconscious state. The AB immediately informed bridge about the situation through hand held radio (walkie talkie). Thereafter the three seamen shifted the unconscious fitter on to upper deck.

The master having come to know of the incident arrived at the upper deck at 08:50 a.m. Chief engineer had already arrived at the site by that time and had commenced administering cardio pulmonary resuscitation (CPR) to the unconscious fitter. On examination, master found vital signs of the fitter missing.

At 09:03 a.m., master called up the designated person ashore (DPA) who in turn advised him to rather seek radio medical advice.

Meanwhile, vessel's staff tried to treat the unconscious fitter on board, with automated external defibrillator (AED). Steps as per the AED prompts were followed, but the equipment didn't give any prompt/advice for administering shock even after repeated attempts.

Between 09:10 a.m and 09:17 a.m, master tried to obtain radio medical advice from two shore based centers, but in both centers he faced language barrier as the doctors on the other side could not communicate in English. Finally at 09:17 a.m. he managed to converse with a doctor at one of the two centers. On doctor's advice Glycerol Tri-nitrate tablet was administered sublingually to the patient. Meanwhile, CPR and administration of oxygen was continued on the unconscious fitter as well as efforts were continued to provide shocks by AED.

It was assumed that AED may not be functioning due to ship's vibrations and therefore vessel started reducing RPM at 09:48 a.m. in order to reduce external vibrations. Trials were again made to use the AED however the equipment still didn't give any prompt/advice for administering shock.

At 10:15 a.m., nearly one and a half hour after first sighting of the fitter in an unconscious state, the fitter was declared dead in consultation with the shore based radio medical advice center.

3. Why it happened?

3.1 Most proximate cause:

Medical casualty, most probably due to heart ailment.

3.2 Contributory factor

(i) Lapses and delays in administration of first aid and appropriate medical treatment. Instead of wasting time in shifting the casualty to upper deck, the three seamen should have started administering CPR immediately on scene. They should have been instructed accordingly by the officer on bridge. The master too instead of wasting valuable time in communicating with DPA should have administered medicine timely or arranged for seeking radio medical advice.

(ii) The vessel's staff were not familiar with the use of medical equipment available on board. The AED could not be used till last moment.

4. Lessons learnt:

(i) Time is of greatest essence in case of any medical emergency. While effective shore based training is the key and therefore requirement of refresher for medical related courses has been implemented, it is equally imperative that the ship's staff familiarizes themselves well with the medical equipment available on board.

(ii) Procedures to avail radio medical advice shall be readily available with the ship's staff and form part of passage plan.

(iii) Medical equipment provided on board shall be verified to be fit for use in marine environment, like in this case it is doubted that that the AED may not have operated due to ship's vibrations.

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Casualty Summary 15

Serious injury to leg of seaman in mooring related accident.

1. What happened?

Right foot of an Indian seaman got severed at ankle due to the leg getting entangled in eye of a mooring rope. He therefore got pulled on to the winch.

2. How it happened?

An Indian Liquefied Petroleum Gas (LPG) vessel was sailing out of an Indian port around noon time. At 12:35 p.m., all ship's mooring lines had been cast off from the jetty and the vessel was getting clear of the jetty.

Forward mooring station was initially being manned by 2nd officer, two able bodied seamen (ABs) and one ordinary seaman (OS). However, as soon as the last line was cast off from the jetty, one of the two ABs was called up on to the bridge of the vessel for steering. The second officer meanwhile, continued to man the forward mooring station, now with only one AB & one OS.

They were securing the mooring ropes. 2nd officer was working on the starboard winch with OS, while AB was working 'alone' on the port side winch. The AB was picking up last of the head ropes. The port winch at this time was being operated in an automatic mode, with AB having engaged the port winch lever on auto mode on full speed. As soon as the eye, at the end of the rope, got retrieved onboard the AB showed hurry to stop the winch lever. At this time, his right leg got entangled with eye of the rope and the AB got pulled on to the storage drum along with the rope which was getting hoisted on to the drum in automatic mode. This caused right foot of the AB to severe off from his leg, at its ankle joint.

Second officer immediately switched off electric power and informed bridge.

Vessel was anchored off the terminal and medical assistance sought. Injured AB was transferred to shore based medical facility.

3. Why it happened?

3.1 Most proximate cause:

AB getting pulled on to the storage drum as his leg got entangled in the eye of a mooring rope.

3.2 Contributory factor

(i) Less staff to man forward station as one AB had been called to the bridge.

(ii) The winch being operated in an auto mode with no emergency stoppage available with the operator.

(iii) Lapse in concentration of the AB when rope got retrieved on board. He may not have anticipated that the mooring rope would fall in his way.

4. Lessons learnt:

(i) Accident avoidance during mooring operations require continuous training with ship's specific arrangement.

(ii) Whenever auto mode is used on an machinery an emergency shut down arrangement should be readily available with the operator.

(iii) Vessels must regularly review man power requirements vis-a-vis various activities.

Casualty Summary 16

Damage due to contact with Jetty

1. What happened?

An Indian dredger vessel suffered damage on its bow due to coming in contact with a jetty while being shifted between two berths.

2. How it happened?

An Indian dredger vessel was being shifted from one berth to another in an Indian port. Pilot was on board and two tugs were being used, one tied to forward part and another to the stern of the dredger.

While the tug boat at stern was made fast using tugboat's mooring rope the tug boat that was made fast to the forward part of the dredger vessel was using the dredger's mooring rope during the shifting movement.

The movement was going on smoothly till the vessel came near to the jetty. Pilot ordered tug boats to 'slow pull out' in order to break the movement of dredger vessel towards the jetty. In doing so, the tug boat that was made fast to the forward part of the vessel gave a sudden jerk. Because of this jerk, the mooring rope that was making it fast to the dredger parted. With nothing to check, dredger vessel's bow went on to hit the jetty. Also, there were no fenders at the corner of the jetty. This contact left a slight dent on the port bow of the dredger vessel.

3. Why it happened?

3.1 Most proximate cause:

i) Inappropriate response of the tug.

ii) Parting of rope which had been provided by the dredger to the tug.

3.2 Contributory factor

i) Lack of experience of tug's crew.

ii) Improper seamanship as anchor was not used to check the swing.

4. Lessons learnt:

i) Mooring ropes, on board any ship, should be maintained in optimum condition and inspected at regular intervals. Attention shall also be paid to the stowage location of the ropes, in particular if stowed in close proximity to chemicals, oils and/or exposed to weather and sun for prolonged durations. In such cases the ropes may deteriorate significantly, however very few or no visible signs of such deterioration may be present.

ii) Breaking strength of ropes, that are used with the tugs, shall be evaluated vis-à-vis bollard pull of the tugs or the load that the rope is expected to bear during mooring operation. It should be considered that the ropes may have to bear jerk loads, if sudden changes in the tug's pull directions are ordered. Such jerk loads can be considerably higher than the static loads.

iii) Use of anchors should be considered as a contingency measure in such cases, with due regards to the presence of any submerged pipeline, cable or other underwater obstructions.

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Casualty Summary 17

Tug colliding with an oil platform

1. What happened?

A tugboat collided with a process platform incurring damages to both itself and the process platform

2. How it happened?

A barge had been engaged in a pipeline project at an oil field. It was to participate in jacket face survey at various oil platforms in an Indian off shore area.

The barge was being supported by 2 anchor handling tugs (AHTs), which when idle would usually tie up to the buoy.

On the day of the incident, at 02:25 p.m., one of the two 'Anchor Handling Tugs' (AHT) received instructions from its controlling barge to cast off from the buoy and proceed to the barge to receive potable water and carry out crew transfer. This buoy was situated 2.3 nautical miles from the barge. The AHT planned a course to head straight on to the oil platform and then turn the vessel towards the barge in close proximity to the platform.

No communication was made with the control tower of the oil platform in regards to this movement. Later on also, no communication was made, either by the barge or by the AHT with the control tower of the oil platform. The control tower of the oil platform was not informed even when the AHT was entering into the 500 m safety zone around the oil platform.

On receipt of instructions both main engines on the AHT were prepared ready by the duty engineer. Chief engineer was not informed. This reportedly was normal practice on the vessel.

The AHT casted off the buoy at 03:10 p.m. and commenced proceeding towards the barge. The prevailing weather conditions were within the parameters permitted for such operations. At this time bridge team on the AHT comprised of only the master and the 2nd officer. The route selected by them was not the safest, as it shall bring the AHT close to the oil platform. Also approach speed of AHT was excessive. The AHT was not fitted with any current measuring device and speed was being measured only from GPS.

During its approach two calls were made by the barge's control station to the AHT, warning it for its excessive speed.

On entering the 500 meter safety zone around the oil platform, radars on AHT were put on standby.

At 03:20 p.m., main engines on the AHT were stopped to confirm from the barge that no divers were down. After 2 minutes i.e. at 03:22 p.m. the AHT resumed its approach to the barge. At 03:23 p.m. astern movement was given on the bridge telegraph as the distance from oil platform was reducing, however, there was no response for stern movement. Master had misjudged the distance.

As vessel was still carrying ahead momentum and as the engines were not responding to astern kick, master pressed emergency stop to minimize the impact of collision.

At 03:25 p.m. the AHT collided with oil platform causing damages to both the oil platform and itself.

3. Why it happened?

3.1 Most proximate cause:

Shortcomings in Navigation. Safest route was not taken and speed was excessive. The AHT had set a course heading straight on to the platform with plan to turn the vessel very close to the platform, which was a dangerous maneuver.

3.2 Contributory factor

i) Failure in communication.

ii) Inadequacy of Bridge team and casual approach of the AHT's staff. There was no 'lookout' and helmsman on the bridge. There was lack of communication between the 2nd officer and master on the bridge. A very casual approach was made by the AHT's crew for such critical operation. Absence of chief engineer from the engine room further corroborates the casual approach of crew.

iii) Use of 'emergency stop'. Master claimed to have pressed the emergency stop as he did not get astern movement. Since the speed was too high, the stern movement may not have come. However, emergency stop shut down the complete main engine and on the concerned AHT it would have taken up to 15-20 minutes to restore the propulsion power. This caused the main engines to be not available for considerable time due to the activation of emergency stop.

iv) Lack of awareness of marine procedures. There were several unwarranted departures from laid down procedures for vessel to operate in such critical waters.

v) No Risk Assessment was carried out before entering the safety zone of the platform.

4. Lessons learnt:

i) The contractors may be advised to prepare a check-list of important Do's/Don'ts (duly reviewed and approved by platform companies) which should be briefed to the crew members.

ii) All vessels (including barges, supply and support vessels etc.) entering into the 500 m zone of any installation must intimate the control room of the complex and obtain permission from the concerned platform.

iii) The safety audit of supply vessels to be carried out on a random basis.

iv) At the time of deployment of marine spread in offshore field, particularly when barges come to platforms for construction field-activities, the preliminary/preparatory meeting with the platform/OIM must be attended by Master/senior crew of all boats (AHTs, supply vessels etc) also, which are attached to the barge for assistance.

v) The platform should enquire and advise the vessels about 'safe approach speed', while permitting the vessels within 500 m zone of the installation.

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Casualty Summary 18

Tug running aground due to heavy weather

1. What happened?

A tug boat ran aground in an Indian port due to severe weather conditions.

2. How it happened?

An Indian port was threatened by an approaching Tropical Revolving Storm (TRS) which was expected to pass over the port. As a precautionary measure the port sent all merchant vessels, which were in the port, out to open sea. The port authority however advised its tugs to stay within the turning area and not to cross the break waters. Also the tugs were entrusted to take care of the port's mooring launches.

Accordingly, each tug tied up one launch and anchored inside the break waters. As the wind picked up, the tugs weighed their anchors and started maneuvering inside the turning basin. The unmanned mooring launches were being towed by the tugs. After few hours the wind speed increased to nearly 100 knots (approx. 185 km/hr) raising heavy waves inside the harbour. Due to this towing rope of one of the mooring launches parted and the launch started drifting towards the berth at a high speed. To safe guard the jetty from collision with the adrift launch, its assisting 'Tug' was instructed to push the drifting launch away from the jetty, towards nearby shallow waters. This was also aimed at avoiding the sinking of the adrift launch within the port's approach channel.

Winds died down when eye of the storm passed over the port, only to pick up again after couple of hours accompanied with heavy rain and restricted visibility.

The tug under consideration, after pushing the mooring launch towards shallow waters resumed maneuvering inside the turning circle. At this time, master of the Tug observed another tug, which was also maneuvering inside the turning basin, crossing its bow at very close range. He gave wide alteration to port to avoid collision. However, in doing so the tug boat came under the effect of strong prevalent winds which it could not counter and the tug got pushed over by strong wind on to the shallow waters making it run aground.

3. Why it happened?

3.1 Most proximate cause:

Severe weather condition and strong wind which had pushed the tugboat to shallow waters.

3.2 Contributory factor

i) Restricted space available inside the port for more than one tugs to maneuver.

ii) Parting of the mooring line that was keeping fast the launch to the tug boat.

iii) Underestimation of the drag due to wind and waves by the tug's crew.

4. Lessons learnt:

i) Impetus be laid behind training of navigating officers in handling of vessels in heavy weather.

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Casualty Summary 19

Collision/Contact damage between vessels when approaching port

1. What happened?

An Indian bulk carrier of approx 40,000 GT collided with an outbound tanker vessel when approaching anchorage area at a foreign port.

2. How it happened?

An Indian flagged bulk carrier 'Vessel 1' was approaching anchorage area 'A' at a foreign port on a North Westerly heading. Weather conditions were favourable and visibility was good.

'Vessel 1' had also carried out another maneuver just a short while back, at outside port limit (OPL) area. After the maneuver it had again increased its speed to 'maneuvering full' while approaching the anchorage.

While proceeding towards the anchorage, the bulk carrier, 'Vessel 1' sighted a fishing vessel on its starboard bow, which it started tracking on its radar.

At the same time it observed, visually as well as on radar, a tanker vessel ('Vessel 2') on its port bow moving out from 'Anchorage B'. 'Vessel 1' commenced tracking this 'Vessel 2' also on its ECDIS and radar. At this time, it appeared that 'Vessel 2' would pass clear of 'Vessel 1' crossing from behind its stern, from its port side to starboard side.

At 11:50 p.m. 'Vessel 2' was steering a course of 080 degree and moving at a speed of 6.6 knots. Closest point of approach (CPA) of 'Vessel 2' to 'Vessel 1', was about 0.9 nautical mile. However 'Vessel 2' was observed increasing its speed and this was causing a reduction in its CPA distance with 'Vessel 1'.

Suddenly, 'Vessel 2' altered its course to port and started steering 070 degree and increased its speed to 10.3 knots. CPA with 'Vessel 1' was further reduced to about 0.3 nautical mile.

As 'Vessel 1' had a fishing vessel on its starboard side it was observing restriction in altering to starboard.

'Vessel 1' tried to draw attention of 'Vessel 2' through various means however there was no response.

'Vessel 2', the tanker, kept increasing its speed to reach about 13 knots. As a result, the CPA kept decreasing, reducing down to just 0.1 nautical mile. Still no avoiding action was apparent from its side.

All this while 'Vessel 1' continued to draw attention of 'Vessel 2' with all available means and also tried to keep itself maximum to starboard while keeping clear of the fishing vessel which was now on its beam. However, 'Vessel 1' somehow did not reduce its speed.

A minute before collision, 'Vessel 1', the bulk carrier put its wheel hard over to starboard, however it was too late. At about 00:02 a.m. the starboard forward part of the tanker vessel, 'Vessel 2' made contact with port quarter of bulk carrier, the 'Vessel 1'.

While there was no casualty or pollution, damages occurred to shell plating and associated strengthening members on 'Vessel 1'.

3. Why it happened?

3.1 Most proximate cause:

Non adherence of COLREGS and lack of application of seamanship by both the vessels.

3.2 Contributory factor:

i) Approach to 'Anchorage area A' area was planned passing very close to the boundary of 'Anchorage B' and at an acute angle to it.

ii) Poor assessment of the development of close quarters situation by bridge teams of both the vessels.

iii) Speed of 'Vessel 1' was not reduced by Master as an action to avoid a close quarter situation.

iv) Corrective action was delayed.

4. Lessons learnt:

i) While planning passage due regards shall be paid to the expected traffic conditions, including converging and crossing traffic.

ii) COLREGs and principles of good seamanship shall be adhered to at all times.

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Casualty Summary 20

Seaman's right hand's thumb getting cut during mooring operations

1. What happened?

An able bodied seaman (AB), on a foreign container vessel lost top phalanx of his right hand's thumb while making fast a tug boat.

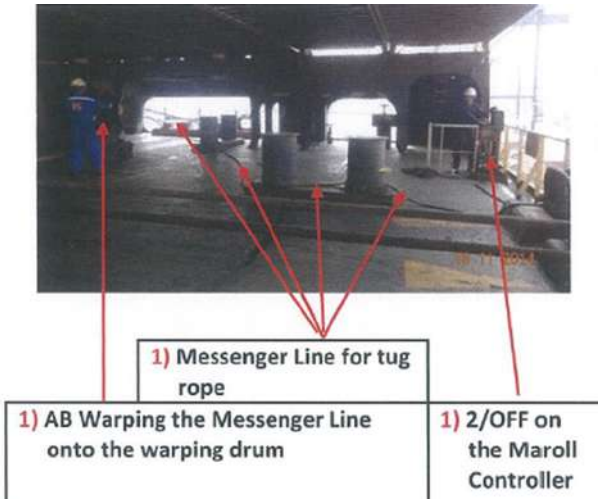
2. How it happened?

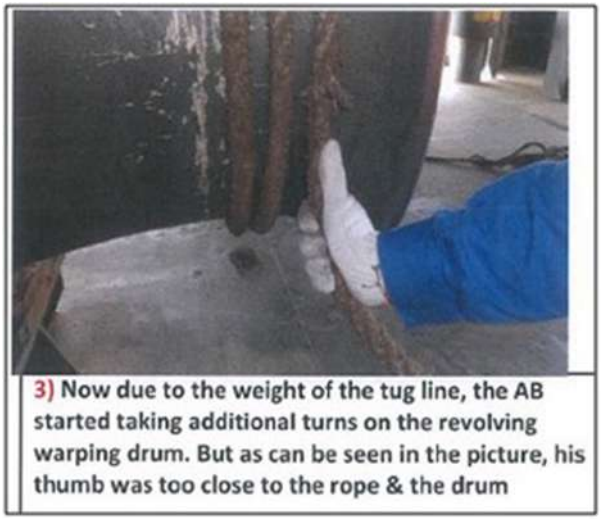
During berthing operations on a container vessel, 2nd officer and AB were instructed to make fast a tugboat on the vessel's port quarter. (port side stern)

This required picking up a heavy rope (tug's line) from the tug. The tug's deck, from where the rope had to be picked up, was lower than the vessel's poop deck, to which the tug's line had to be lifted to. Therefore, in order to lift the heavy line a smaller size rope (messenger rope), which could be safely handled manually by the two seafarers, was passed on to the tug. As these messenger ropes are small in size, usually varying between 16 mm to 20 mm in diameter, they can be easily wrapped around warping barrels of mechanized winches in order to take load of heavier and thicker tug's rope when pulling them up from tug's deck. The tug's staff connected the heavy tug's line to this messenger rope.

On connection of the tug's line, ship's staff first picked up the slack portion of messenger rope manually by hand. As the weight of the tug's line started coming on to the messenger line they started transferring the messenger line to the mooring winch. At this time, 2nd officer was operating the winch and AB was warping the messenger line on the warping drum.

As the weight/tension on the messenger line gradually increased the seaman started taking additional turns on the warping drum to provide more friction and hence better grip.




3) Now due to the weight of the tug line, the AB started taking additional turns on the revolving warping drum. But as can be seen in the picture, his thumb was too close to the rope & the drum


4) Then his right hand thumb got caught between the messenger line & the revolving warping drum.

5) The Revolving drum then dragged the AB to the other side of the drum. Immediately 2nd officer sighted this & stopped the winch.

) Right Hand thumb caught between the messenger ne & the drum & upper digit sheared off.

The warping drum was continuously rotating at that time. Suddenly, thumb of AB's right hand got trapped underneath the messenger line, between the line and the warping drum, and got sheared off.

3. Why it happened?

3.1 Most proximate cause:

Thumb getting caught in between the messenger rope and the warping drum of the winch

3.2 Contributory factor

i) The winch not stopped in time as soon as the thumb got trapped.

ii) Body parts too close to moving machinery.

iii) Inadequate man power assigned for the job.

4. Lessons learnt:

Effective resource management, including human resources, remains a key element in accident avoidance. The management level officers, on board a ship, should ensure that all job stations are adequately and appropriately manned.

Casualty Summary 21

Collision of a bulk carrier with another vessel at anchor, after dragging own anchor

1. What happened:

An Indian bulk carrier dragged its anchor and went on to collide with another vessel also at anchor. The bulk carrier was discharging cargo at the anchorage

2. How it happened?

It had been planned to discharge coal cargo from a bulk carrier (vessel 1) while the vessel would be at anchor. The cargo discharge was to be carried out using floating crane into barges, which would keep coming and going.

At the time of its arrival at the anchorage, the bulk carrier had been fully loaded and was drawing a draft of 17.00 m, even keel. The under keel clearance was just 2.8 m. Due to such substantial underwater volume and reduced under keel clearance the vessel may have been experiencing significant drag forces on its hull due to the prevalent current and/ or tidal stream.

Starboard anchor was used and the bulk carrier had been brought up to 5 shackles on deck.

'Finished with engine' was declared at 04:00 p.m. with instructions for engine to be on 30 minutes notice and short notice in case of an emergency. The bridge watch keepers were instructed accordingly.

The weather at the time of anchoring was favourable with slight sea, low swell, wind force 3 on the Beaufort scale and partly cloudy sky. However, the tidal range on that day was 7.8 m with a current of about 3 knots. The change in tide was expected at 09:30 p.m.

In the evening, at approx. 05:00 p.m. a floating dumb crane was brought alongside the bulk carrier. It was tied up near middle of the vessel on its port side. Discharging commenced from one of the cargo holds into a dumb barge at 05:30 p.m. A tug had also been kept attending at the site.

3rd officer was assigned to watch on the bridge and two seamen were positioned on deck to look after the cargo operations. However one of the two seamen was also involved in other tasks which had been assigned to him by chief officer towards preparation for impending annual surveys at next port. Also 3rd Officer was involved in certain tasks, other than watch keeping, at one time or the other throughout his watch on bridge. Such tasks included corrections of a navigational publication, resetting of a false fire alarm, talking to his family on mobile phone and making photocopies of an instruction manual in the radio room which was situated in a compartment aft of the chart room.

The first barge completed operations and was cast off at 07:40 p.m. The next barge was made fast at around 09:00 p.m.

At around 08:30 p.m., master had written his night orders and also gave some verbal instructions to 3rd Officer. Master had then retired to his cabin.

At around 10:00 p.m., chief officer also wrote his night orders for the duty officers. He had left instructions that duty officers should not leave the bridge at any time. He also then retired to his cabin.

At around 11:00 p.m., master was called by the 3rd Officer to bridge, stating that another vessel was very close to own vessel. The 3rd Officer also told master that own vessel appeared to be dragging anchor and moving at a speed of 2.0 knots. He also informed master that short notice had been given by him to engine room to get engines ready.

Master immediately rushed to the bridge and took over control of the vessel from 3rd officer. He discovered that own vessel had dragged anchor by nearly 1.8 nautical miles and was now situated precariously close to a tanker vessel which was also at anchor. The bulk carrier's distance to the tanker vessel at this time was less than 0.1 nm (1 cable). To worsen the situation, the bulk carrier (Vessel 1) was closing on fast on to the tanker vessel on its port beam.

A barge, into which the cargo was being discharged, was still made fast to the crane being used for discharging which, in turn was still made fast to the bulk carrier.. The barge was made to cast off and towed away by the tug.

Engine got available at around 11:05 p.m.. Master put engine half astern and then full astern to move away from the tanker. Master instructed chief officer and other deck staff to proceed forward for anchor stations.

The carne's staff was instructed by chief officer to shift the crane towards stern of the bulk carrier from its present position near middle of the ship. This was to keep the crane clear from direct impact of the tanker. The staff of the crane proceeded to slacken their ropes from own vessel and move astern.

At 11:15 p.m., the bulk carrier made contact with the tanker vessel in vicinity of its No. 1 cargo hold on the port side of the vessel. Railings, bulwark, fish plate, fair lead rollers, gooseneck vent, forepeak tank air vent and forecastle deck plating on 'Vessel 1' in way of the ship side were damaged.

3.0 What went wrong?

3.1 Most probable cause

The bulk carrier dragged anchor, which remained undetected and the vessel went on to collide with the tanker.

3.2 Other contributory factors:

i) No heed paid to change of tide and change in the direction of tidal stream.

ii) Under estimation of drag on the ship's hull due to current and or tidal stream. The vessel was deep draft with less under keel clearance. Also the scope of the cable was insufficient. The drag force generated due to current and/or tidal stream may have caused anchor to loose ground.

iii) Improper watch keeping on bridge. The vessel was at anchor and it was required that navigational watch had to be continued in its optimum form and officer designated for the same different from one designated to supervise cargo operations. Rather both the watches were left to only 3rd officer on bridge. He too was involved in certain tasks at some time or the other throughout his watch such as corrections

of a navigational publication, attending to the resetting of a false fire alarm, communicating with his family on his mobile phone, as well as making photocopies of an instruction manual in the radio room that was situated in a compartment, aft of the chart room. As a result of all these disturbances during his watch, it seems apparent that the 3rd Officer failed to maintain his situational awareness in the circumstances, with respect to the upkeep of a good navigational watch, his primary duty at that point of time.

iv) No use was made of the tug boat to push the bulk carrier away from the tanker or at least hold it in position.

v) The tanker vessel also did not raise any alert or warn the bulk carrier for its reducing distance from it.

4. Lessons learnt

i) It is imperative that watch keeping during anchorage should be maintained with same efficacy as is maintained when vessel is underway. This becomes even more critical if the vessel is involved in cargo transshipment while at anchor when attention of the watch keeper may get distracted to cargo watch.

ii) All management level nautical officers must be trained to evaluate the drag due to wind and current on a ship's hull. They must also be able to evaluate the holding power of various types of anchors vis-à-vis the nature of sea bottom.

iii) Watch keepers should be focused on their jobs and not be assigned other tasks which may distract them.

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Casualty Summary 1

Collision between Bulk Carrier and a Tugboat, resulting in damages to both

1. What happened?

An Indian bulk carrier collided with a tug boat just after departing the load port, resulting in damages to both the bulk carrier and the tug boat.

2. How it happened?

An Indian bulk carrier had departed from its load port during day hours. As the vessel cleared restricted waters, master handed over control of the vessel to 3rd Officer, who was on duty at that time. Prevalent weather conditions were fine and visibility was good. Other vessels' traffic was also very meager. Vessel was set on a North Westerly course of 317° and steering had been engaged on auto pilot. Both the radars, X Band and S Band as well as ECDIS were in use. X Band radar was operational on a range of 12 nautical miles whereas S Band radar was being operated at a range of 24 nautical miles. However none of the radar overlays were on the ECDIS. Automatic target acquisition by the radars, which had been switched off during the pilotage time, when the vessel was moving out of the port, had somehow not been switched on again after the pilot's disembarkation.

After being handed over control of the vessel, the duty officer noticed two vessels on the horizon on vessel's starboard side. These vessel were situated towards the coast. He acquired both the vessels on his radar and started tracking them. At this time, the duty officer was managing multiple jobs related to navigational watch simultaneously, one of which included plotting vessel's positions on the navigational chart at intervals of 5 minutes.

Since the visibility was good and as there was no planned alteration of course in immediate future, master instructed the duty helmsman to proceed to deck to help other crew members in securing the vessel for high seas. This was acceptable in company's 'Safety Management System (SMS)'.

As a result, the duty officer was left as the sole watch keeper as well as officer of watch on the bridge. Master was moving intermittently between bridge and his office, which was two decks below. The other crewwere on deck, securing the vessel for high seas.

After some time the duty officer observed another vessel, a tug boat, on the vessel's port side. The tug boat was moving towards the coast at a very high speed. Considering high speed of the tugboat, the duty officer somehow self concluded that the tugboat would comfortably cross ahead of the vessel. He therefore neither acquired this vessel on his radars nor did he track its movement by any other means. Also since he felt that the approaching vessel would clear his vessel's bow with sufficient margin, he did not even take any evasive action nor did he inform the Master. To worsen the situation, the duty officer somehow stopped paying attention to the tug boat till it collided with his vessel. At the time of collision master was also present on bridge, however he was stationed on the GMDSS console and was engrossed in paper work.

The bulk carrier collided with the tug boat on its port side.

3. Why it happened?

3.1 Most proximate cause:

International COLREGs and basic principles of navigational watch keeping not followed.

3.2 Contributory factors:

(i) Dedicated look-out was not deployed.

(ii) Insufficient bridge watch level. The bridge watch was reduced to a single person while the vessel was still in an area where traffic could be encountered.

(iii) In effective use of radars and ARPAs.

(iv) Inexperience of the officer on watch. He lost situational awareness at the time of incident.

(v) Ineffective resource management by the Master of the vessel. He had sent down the lookout person despite his need being more on the bridge.

4. Lessons learnt:

(i) Bridge watch levels for various conditions shall be explicitly defined in company's SMS manuals and strictly adhered to.

(ii) IMO's 'Recommendation on operational guidance for officers in charge of a navigational watch' shall be strictly implemented and adhered to.

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Casualty Summary 02

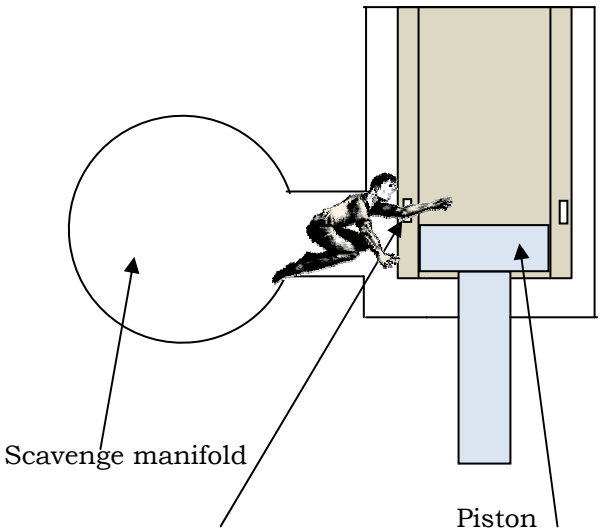
Amputation of both wrists of 3rd Engineer due to accident occurring during scavenge space inspection.

1. What happened?

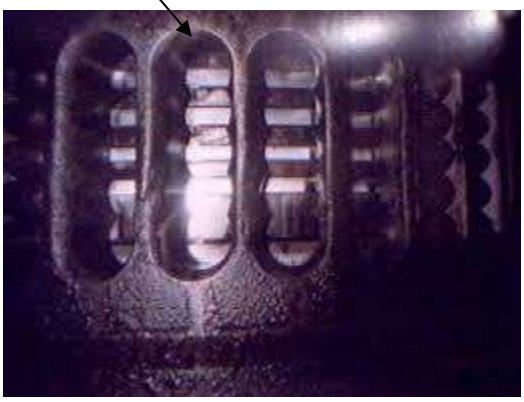
While inspecting scavenge space of main engine, 3rd engineer met with an accident which eventually led to amputation of both his wrists.

2. How it happened?

On the vessel, scavenge space of main engine had been cleaned during the day. 3rd engineer had been assigned the job of inspecting the space and taking its photographs. He was also required to take photographs of inner surfaces of cylinder liners of each unit of the main engine from scavenge space. This he would do by holding camera through the scavenge ports.



Scavenge ports through which hands were put inside liner



By the time 3rd engineer arrived at the last unit, other engine crew had completed removing the cleaning materials and tools from the scavenge space. They, including 2nd Engineer had come out of the scavenge space and stood stand by near the 'manhole entrance to scavenge space', waiting for 3rd Engineer also to exit the space. At this time 3rd engineer got left alone in the scavenge space.

3rd engineer had been trying to click photographs of the upper inner part of the cylinder liner by passing both his hands inside the liner through the scavenge ports and holding the camera therein. In order to carry out inspection it was required that piston of the unit being inspected, be moved up or down. Turning gear was being used for moving the piston in a controlled manner and as required. The 'turning gear's remote controller' was lying on the floor, besides the 3rd engineer. The remote controller is in general designed with a safety feature which requires that the button for turning the engine must be continuously depressed to get the engine to turn and once released it would stop. However, the remote controller on this vessel was reportedly defective.

While 3rd Engineer was absorbed in clicking photos, the turning gear got operated and piston of the unit started moving upwards. This was not noticed or sensed by 3rd engineer until the piston crown touched his hands.

Realizing the seriousness/criticality of the situation, the 3rd Engineer immediately tried to pull out both his hands, leaving behind the camera, but since scavenge ports were small in size he could not pull them out beyond his wristbands before the upward moving piston trapped them within the scavenge ports . Both his hands had now got stuck and crushed in-between the piston and scavenge ports, beyond the wrists.

Upon hearing his cry, 2nd Engineer, who was just outside the scavenge space entrance, rushed into the space and operated the defective 'turning gear remote controller' to move the piston downwards.

However later, at a hospital, both hands of 3rd engineer had to be amputated beyond the wrists.

3. Why it happened?

3.1 Most proximate cause:

Use of a defective 'turning gear remote controller', it being the only one available onboard.

3.2 Contributory factors:

(i) Accidental activation of the turning gear's remote controller due to it accidentally dropping or due to 3rd Engineer unknowingly stepping on it.

(ii) Unsafe procedures deployed by 3rd engineer in taking photographs. The senior management also did not object to or warn him against the same.

(i) Ship reportedly using defective 'turning gear remote controller' sincetake over of the vessel by the existing operator.

(iv) The company not providing a functional turning gear remote controller, although it being communicated about the defects of the one that was available on board.

(v) Confined and restricted working conditions in the scavenge space.

(vi) Enclosed Space Entry Procedures not followed/executed properly as 3rd Engineer was left alone in the space.

4. Lessons Learnt:

(i) Ship staff should not use defective equipment or equipment whose safety features have been circumvented.

(ii) Risk analysis should be detailed, covering every possible eventuality.

(iii) Use of gadgets like selfie stick which will not allow any body part to be put inside the cylinder and such incidence can be easily avoided.

Casualty Summary 03

Death of seaman due to fall from derrick post onto hatch cover

1. What happened?

A seaman suffered death due to fall from top of the derrick post on to the hatch cover below, due to the working platform, on which he was stationed, breaking off from top of the derrick post.

2. How it happened?

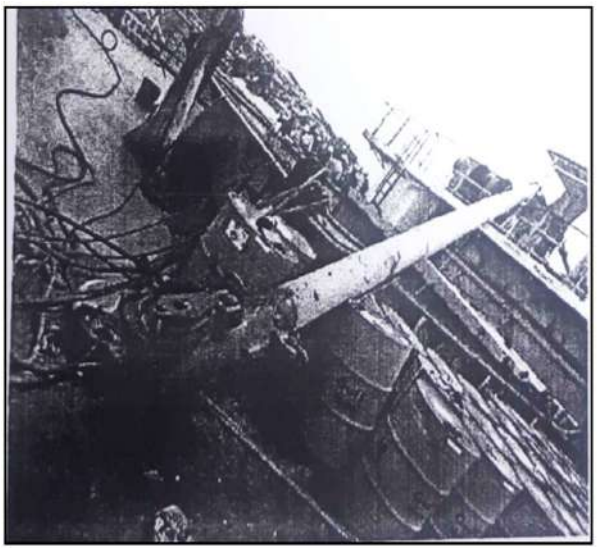
A general cargo vessel, with derricks, was operating cargo at an Indian port. At around 06:00 p.m., it was informed to the vessel's staff, that one of the derricks was neither lowering nor hoisting.

Samson post for derrick

On inspection it was observed that derrick's runner wire had got stuck with the sheaves of the topping block.

To free the same, it was decided to clear the block's pin. However, the topping block was still under load and in order to work on the same it was required that the weight be eased from the topping block and transferred to some other point. In order to do so, another cargo block was fitted. This block was connected to the platform on top of the derrick's samson post. Weight was to be shifted to an additional wire which had been passed through this newly fitted block. While working, the deceased seaman secured his safety belt to guard rails of the same platform on top the mast.

As soon as weight on wire and pin was removed, weight shifted on to the boom causing sudden jerk. This shifting of weight and jerk broke the entire platform, causing the deceased seaman to fall down, along with broken railings, on top of the hatch cover of cargo hold below. He got grievously hurt. He later succumbed to hisinjuries.



3. Why it happened?

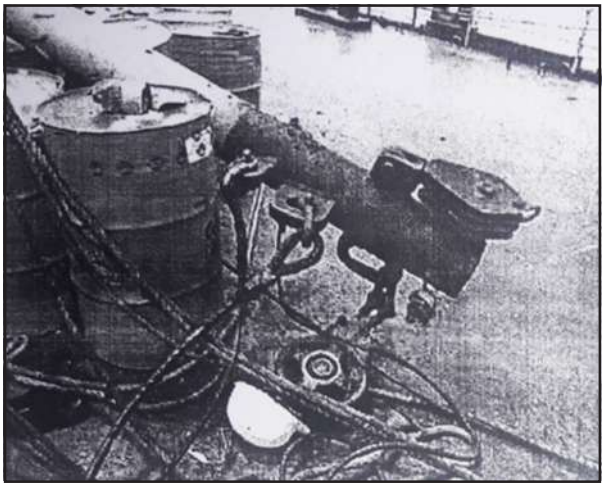
3.1 Most proximate cause:

(i) Death of seaman happened due to falling from a substantial height.

(ii) Structural failure of the platform to which the weight of derrick boom had planned to be shifted and to which the deceased seaman had secured himself.

3.2 Contributory factors:

(i) Poor risk assessment and work planning. No analysis had been made of the load bearing capacity of the mast's platform before deciding to transfer weight on to the same. Also due consideration not given to the fact that load during a jerk could be multiple times higher than the static weight.



(ii) Failure of permit to work system. No evidence of use of checklist or permit for 'working aloft'.

(iii) Poor seamanship, inexperience of deceased seaman and inadequate supervision of work.

4. Lessons Learnt:

4.1 Risk assessment and work planning shall be comprehensive and detailed, incorporating all expected eventualities. Effective use shall be made of 'working aloft' permits.

4.2 Experienced personnel shall be deployed to execute the work safely under constant supervision.

4.3 Strength and load bearing capacity of any structure or fitting be duly evaluated prior putting any load on to it.

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Casualty Summary 04

Injury suffered by 2nd engineer while working on incinerator in engine room

1. What happened?

Second engineer on an Indian ship, suffered deep cut on his right wrist while using incinerator on board, due to sudden closure of the incinerator's sluice door.

2. How it happened?

Shipboard personnel were initiating routine burning of garbage in the incinerator on a ship, when an alarm of 'sluice door open' was received.

Second engineer, who was in charge of the operation, noticed that a wooden piece was blocking closure of the sluice door. He decided to remove the obstacle manually. However, the sluice door of this incinerator was pneumatically operated instead of the common manual operation. Although power supply to the incinerator was turned 'off', 2nd engineer failed to shut off air supply to the solenoid which controlled operation of the sluice door. Also the pneumatic line was not drained/ depressurized.

As soon as the blockage was removed the sluice door closed immediately, trapping second engineer's hand in the process.

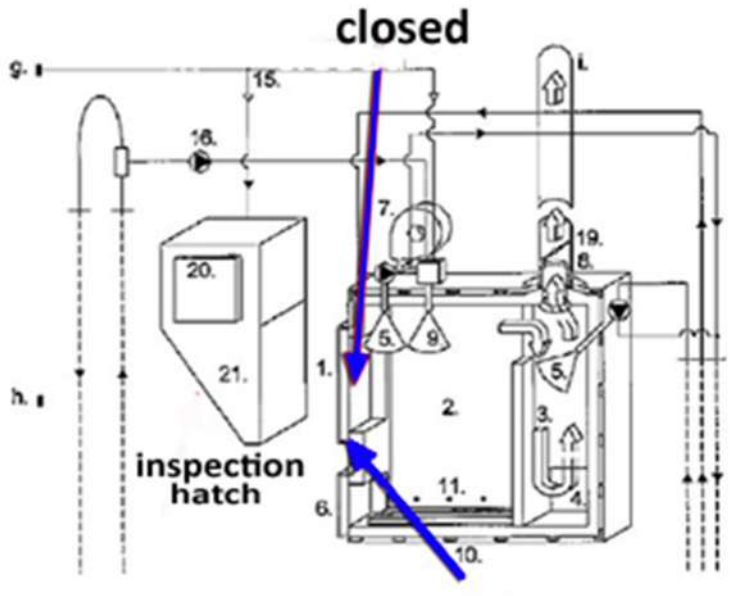

Image for Illustration Purpose only

COMPONENTS:

1. Charging Door
2. Combustion Chanmber
3. Afterburning Chamber
4. Second Afterburning Chamber
5. Oil Burner with Built-in Pump
6. Ash Cleaning Door
7. Air Blower
8. Induced Draught Air Ejector
9. Sludge Burner
10. Double Wall for Air Cooling
11. Combustion Air Inlets
12. Oil Sludge Mixing Tank
13. Mill Pump
14. Circulation Pump
15. Compressed Air
16. Sludge Dosing Pump
17. Heating Element
18. Diesel Oil Tank
19. Damper
20. Feeding Door
21. Sluice

3. Why it happened?

3.1 Most proximate cause:

Haste in completing the task, overlooking safety. Attention was not paid to hazards incidental to such jobs especially in a cramped workspace, such as an incinerator.

3.2 Contributory factors

(i) Inadequate familiarity of the concerned engineer with procedures and mechanisms involved in the functioning of the equipment. Though the power supply to the incinerator was turned 'off'; air supply to the door operating solenoid was not shut nor the pneumatic line drained/ depressurized. This led the door to close suddenly with an impact, once the wooden piece was removed, causing grievous injury to the second engineer

4. Lessons learnt?

(i) The task should have been undertaken only after a thorough risk assessment, considering all likely hazards.

(ii) Any equipment working on pneumatic or hydraulic power source should be disconnected and adequately drained/ depressurized, prior commencement of work on such equipment. The use of Personal Protective Equipment [PPE] at all times is vital for protection and minimizing the damage resulting from any oversight or accident.

(iii) Familiarisation of ship's staff with ship's equipment should be detailed and ship specific. Similar looking equipment on different ships may have one or more different operations mechanisms.

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Casualty Summary 05

Crushing injury suffered by 4th Engineer while working on incinerator on a LPG vessel

1. What happened?

While verifying the functioning of incinerator on a LPG vessel, an Indian 4th Engineer suffered crushing injury to his lower right arm, consequentially leading to medical amputation of the arm.

2. How it happened?

One early morning, while the vessel was en-route at sea, an alarm of 'Sluice inside gate open' was received for the incinerator. 2nd Engineer was informed and the incinerator stopped to cool it down. It was presumed that some piece of garbage may be obstructing closure of the door. It was planned to remove such piece, if any, after lunch.

4th Engineer was assigned the job of removing the obstruction, however was not provided any assistance. Therefore, after lunch, he went to incinerator room alone.

Standing on a small step, he opened the garbage loading door to check where exactly the obstruction was stuck. In order to verify further, he opened the sluice gate by activating the push button. When the sluice gate got opened, he found a wooden piece stuck at the opposite end of the garbage loading door. While he was checking, he accidentally dropped his torch inside the incinerator door.

In a natural reflex, he tried to grab the torch by putting his hand deeper into the space. Unfortunately the automatic sluice door, which had been opened by 4th engineer by activating push button, had already started closing back at this time due to it being regulated by an automatic timer. Even before the 4th Engineer could realize and react, the closing sluice door trapped his arm. 4th Engineer had been working alone. He yelled for help but nobody heard him. The incinerator room on this ship was situated on main deck, in the funnel's space, between accommodation and engine casing. This area of the vessel was very rarely transited by the ship's crew and therefore nobody came to know of the plight of the 4th engineer.

Whereas, absence of 4th Engineer was noticed during the coffee break, nearly 2 hours after the incident, and a call was also made for him through engineer's call, however no serious note was taken when he did not turn up as it was assumed that he may have gone up to his cabin to his wife, who had joined him on that particular voyage only.

It was only after the coffee break, while making his supervisory round, that 2nd engineer found the 4th engineer trapped. 4th engineer was immediately got released and brought to the ship's hospital and medical procedures followed.

Initially it was suspected to be a fracture. However soon it was realised that there was no flow of blood to the arm, elbow downwards. Treatment was given as per medical advice and the vessel was diverted to the nearest port.

At hospital, the surgeon confirmed total obstruction of all blood vessels to hand and forearm. Surgery (fasciotomy) was performed immediately but to no avail and amputation of the forearm could not be averted.

3. Why it happened?

(i) Amputation of the 4th engineer's arm was the result of a medical decision based on (a) the crush injury and (b) delay in release of his arm and (c) delay in providing professional medical help to him.

(ii) The injury was due to timer-regulated closing of the sluice door when the victim was trying to reach for his torch.

3.2 Contributory factors.

(i) The vessel had been recently delivered new, and the incinerator was of a very new type. The vessel's staff did not have experience in all its nuances.

(ii) There was a delay in discovering the distressed situation of the engineer due to the workplace being an isolated location.

(iii) The 4th Engineer was assigned to carry out the job all alone.

(iv) There was delay in the medical evacuation of the victim to shore medical services due to adverse weather conditions and limited medical evacuation facility of the coastal authority.

4. Lessons Learnt:

(i) Familiarisation of crew with various ship specific procedures, equipment and machinery shall be detailed and comprehensive. In case of working with a new type of equipment, the senior officers should draw out the familarisation checklist. All elements shall be extensively covered and manufacturer's manual and guidelines be duly incorporated. Over riding facilities and emergency stopping devices must be clearly identified, including the time for which such facility remains active.

(ii) Working alone in isolated areas has increased risks and should be the subject of a risk analysis. Procedures for regular communication and verification from such location be established and followed. If practicable, working alone should be avoid.

(iii) Safety features of an installation should never be bypassed and procedures be followed.

(iv) The amount of waste fed at any one time should be in quantities that do not tend to block the incinerator doors.

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Casualty Summary 06

Severe Injury to Eye

1. What happened?

An Indian seaman suffered injury to one of his eyes due to it getting hit by handle of the hoisting lever of the life boat's winch.

2. How it happened?

Prior arrival to an Indian port, a foreign flagged vessel of approximately 42,000 GT had planned to lower its lifeboats into the sea and maneuver them in water, while the vessel would wait at anchor for its turn for berthing at the port.

It is a statutory requirement to lower ship's lifeboats into the sea and maneuver them in water, at intervals not exceeding certain stipulated time. The vessel had planned accordingly.

However on arrival at the port, the scope of exercise was reduced to mere swinging out the boats from their stowed position and not lowering all the way, as the sea condition was observed to be rough and unsafe for lowering.

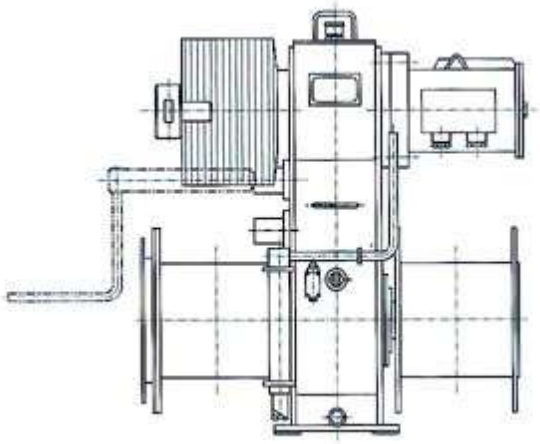
Risk assessment was carried out, precautions taken accordingly and the drill commenced.

However, as soon as the brake was released to swing out the boat, the life boat just started running out freely. Subsequent re-application of brake also could not arrest the uncontrolled freefall lowering of the lifeboat and it got lowered all the way into the sea.

Fearing that boat may get damaged due to the prevalent rough sea, the crew immediately got into the act of hoisting back the life boat.

However, soon it was discovered that the electrical hoisting mechanism for the lifeboat was also not functional. Therefore, it was decided to hoist the boat manually while the electrical engineer trouble shoots the fault within the electrical system.

In order to do so, crank handle was fitted to the manually hoisting lever on the boat's winch and crew started taking turns in heaving up the boat manually by rotating the handle.



(Images for illustration purpose only)

As per his turn, the trainee seaman also came in to participate in heaving. The moment, he put his hands on the handle, electrical engineer, who during this time had made some adjustments on the limit switch, pressed electrical hoisting switch to check its functioning. The electrical hoisting system came live causing the electric motor to rotate. The manually hoisting lever, which is geared to the electric motor, also started rotating at high speed causing the crank handle, which at that time was still connected to it, to also

rotate. Due to the sudden fast automatic turning of the crank handle the crew did not find opportune time to disconnect it from the lever nor could they control the high speed rotation of the crank handle.

The handle swung freely and moved on to hit right eye of the trainee seaman inflicting severe injury to the eye. He was later transferred ashore, with the assistance of coast guard.

3. Why it happened?

3.1 Most proximate cause:

Sudden rotation of crank handle which went on to hit the trainee seaman**.**

3.2 Contributory factors:

i) Brake of the lifeboat winch not holding causing the lifeboat to run down uncontrolled into the water.

ii) Electrical hoisting system not functioning in the initial stage.

iii) Haste due to the emergency situation that got created. The ship's staff intended to hoist the boat at the earliest. However the electrical hoisting mechanism did not respond favourably. Whereas electrical engineer was still trying to rectify the fault, manual hoisting was continued with the handle connected.

iv) Improper communication – Whereas it was known that activation of electrical hoisting will cause the manual hoisting lever to rotate at high speed, no warning was issued by the electrical engineer prior trying out.

iii) Ignorance or lack of training/ familiariation: Vessel's staff was not trained in the alternate hoisting mechanism and may be ignorant of the fact that the manually hoisting lever is geared to the electrical system.

4. Lessons learnt:

i) It is important that situational awareness is not lost during emergency situation and adequate leadership and supervision be provided.

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Casualty Summary 07

Collision between vessels

1. What happened?

While moving outbound from an Indian port, through an area of high traffic density, an Indian registered bulk carrier ('Vessel 1') collided with an inbound Indian River Sea Vessel ('Vessel 2') due to improper identification of the vessel and incorrect action taken therefore.

2. How it happened?

After casting off from the jetty and passing abreast of a few subsequent berths, 'Vessel 1' was caught in a situation where it had two outbound vessels ahead of it and another outbound vessel moving parallel to itself on its port side. All these vessels were moving in the same direction as that of 'Vessel 1'.

At this time there were two inbound vessels also coming in from the opposite direction into the port, one of which was the River Sea vessel i.e. 'Vessel 2'.

'Vessel 1' over heard 'Vessel 2' on VHF requesting it to pass portside to portside of each other. At this time 'Vessel 1' had a vessel approaching towards it fine on its port bow and which at that moment was at a distance of around 9 cables from it. 'Vessel 1' assumed it to be 'Vessel 2', the vessel which had requested it to pass portside to portside on the VHF. In such a situation passing port to port appeared normal, rather good. It therefore confirmed back passing port to port to 'Vessel 2', again over VHF.

However this identification of 'Vessel 2' by 'Vessel 1' was grossly incorrect as actually the vessel, that it had been assuming to be 'Vessel 2', was a barge i.e. the 2nd inbound vessel. 'Vessel 2', with whom 'Vessel 1' had agreed over VHF was in fact coming in behind the barge. However, 'Vessel 1' continued to believe on its identification and did not make any other efforts for further positive identification of 'Vessel 2'.

Following path of the navigable channel, the two outbound vessels ahead of 'Vessel 1' started turning to their starboard one by one. At this time a bright light was observed by 'Vessel 1' from about 11^0 of arc, on its starboard wow. This bright light was directed towards 'Vessel 1' and was impairing the visibility from its bridge. While bridge team on 'Vessel 1' was struggling to deal with this bright light focused on to them, within few seconds red side light of a vessel emerged from behind the earlier seen bright focusing light. This was in fact the port sidelight of 'Vessel 2' .

On observing the red side light at just one point, i.e. 11^o on its starboard bow, 'Vessel 1' realised its mistake of having wrongly identified the barge to be 'Vessel 2', with which it had been communicating all this while.

By this time, 'Vessel 2' had already arrived precariously close to 'Vessel 1'.

As part of evasive actions, 'Vessel 1' put its wheel hard over to starboard and the main engine's RPM were reduced drastically. The above actions did avert a major incident, however still could not avoid port bow of 'Vessel 2' from touching the port quarter region of 'Vessel 1'.

3. Why it happened?

3.1 Most proximate cause:

Incorrect identification of vessels and incorrect actions planned therefore.

3.2 Contributory factor

i) Over reliance on VHF for collision avoidance.

ii) Lack of situational awareness.

iii) Due regard not paid to the presence of background lights.

iv) Nonutilisation of bridge equipment such as AIS for identification of targets.

v) Proper lookout not maintained.

vi) High traffic density

vii) VTS/VTMS not alerting sufficiently

viii) Improper manoeuvring by 'Vessel 1', as reduction of RPM would have adversely effected the turning ability of the vessel

4. Lessons learnt:

i) Look out shall be maintained using all available means including effective use of bridge equipment, such as AIS, ARPA for positive identification of the other vessels.

ii) Principles of watch keeping to be adhered to.

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Casualty Summary 08

Head Injury

1. What happened?

An Indian trainee seaman suffered head injury, while working on a foreign general cargo vessel due to falling in between two cargo hatches.

2. How it happened?

It had been a normal working day on a foreign flagged general cargo vessel. The vessel was out at sea en-route between two ports.

It was late evening and ship's crew, which included Indian nationals, were finishing work for the day. The vessel was also rolling and pitching due to the prevalent moderate swell. Earlier during the day, the vessel had received some rain also.

One of the last activities, that was being undertaken for the day was transferring of a rope from aft to forward part of the ship. This rope was being pulled over the top of cargo holds. One deck trainee seamen (DTSM) had been told to wait on top of hatch cover of no.2 hold while bosun and other crew were securing the deck.

The DTSM decided to crossover from hatch cover of no. 2 hold to that of no. 3 hold. While doing so, the DTSM slipped and fell through the gap in between, on to the main deck. Rear portion of his head and the neck below the protection of helmet went on to hit one bracket of the hatch coaming, thereby inflicting injury.

3. Why it happened?

3.1 Most proximate cause:

The DTSM not being able to station himself properly on the walkway.

3.2 Contributory factor

i) Rain, which had been received in afternoon.

ii) Vessel's movement due to swell.

4. Lessons learnt:

i) Working aloft permit to be used.

ii) Crossing over between heights to be avoided unless the passage between two such places is served by well identified safe and secure means/ passageway.

Casualty Summary 9

Seaman falling over board, leading to his death

1. What happened?

A seaman fell overboard from an Indian general cargo vessel, while the vessel was loading cargo at an Indian port. The seamen could not be saved and his mortal remainswas recovered later from the water.

2. How it happened?

An Indian general cargo vessel was loading cargo at an Indian port.

The vessel was port side alongside. At around 11:20 a.m. a seaman working on the deck heard screams from water over the shipside. He saw a fellow seaman struggling to stay afloat in the water. He immediately threw the nearest lifebuoy, but seaman in water could not get hold of the same and sank in the water.

Ship staff immediately lowered rescue boat and searched for the overboard seaman but without any success. Port authorities were called in for assistance.Body of deceased seaman was recovered later at 01:30 p.m. on the same day.

Ship side railings not fitted, by design (Image for illustration only)

On investigation it was found that the deceased seaman had been assigned the job of de-rusting (chipping) the deck below the cradle of starboard side rescue boat. He was assigned to work alone and any supervision had also not been deployed.

This place, where the seaman was assigned to work, fell close to the ship's side and protection of side rails was also not present. Probably the seaman lost situational awareness and tripped over the side falling into the water

3. Why it happened?

3.1 Most proximate cause:

Seaman loosing balance and tripping over the ship's side through an area where protection from side rails was also not present.

3.2 Contributory factors

i) Improper risk assessment and job allocation. The person assigned to work in close proximity of ship's side all alone.

ii) No use of personal protective equipment.

4. Lessons learnt:

i) Safety while working over or near the side of a ship depends heavily on an effective permit to work system through which it is ensured that suitable precautions are in place, including donning of appropriate flotation aid(s) and use of fall prevention equipment.

ii) Any work, over or near the side of the vessel must be properly supervised. Single person should not be assigned to such jobs.

(iii) Temporary railing, which can be dismantled at short notice, be erected at such locations for the duration of work. Workmen should be informed of limitations of such alternate arrangement.

Casualty Summary 10

Injury to a finger on the left hand of a seaman

1. What happened?

An Indian seaman suffered injury to one finger of his left hand while adjusting the gangway on a foreign flagged vessel.

2. How it happened?

A foreign flag vessel of about 20,000GT was alongside berth in a foreign port. Cargo operations were in progress.

On duty deck crew were engaged in activities required for safe watchkeeping during cargo operations. One such duty involved timely adjustment of gangway i.e. the access ladder between ship and the jetty. This ladder needs to be adjusted at regular intervals to accommodate for the change in height of ship's deck from the jetty. The change in height happens due to the vessel rising or lowering in relation to the fixed jetty due to loading/ unloading of cargo and/or other weights on the ship as well as due to rise or fall of tide. Other than ensuring safe access between ship and shore, the aforesaid adjustment is also necessary to ensure that the gangway does not get stuck up with the jetty or any other obstruction leading to its damage.

During watch on the fateful day, this adjustment of gangway got overlooked by crew leading to a situation when the gangway got prone to damage.

In a hurry to safeguard the gangway, the seaman bypassed certain safety checks and trapped his finger in the system, while adjustingthe gangway. The seaman's left hand finger got crushed seriously.

First aid was administered and he was transferred to the local hospital. He was thence repatriated to India for further treatment.

3. Why it happened?

3.1 Most proximate cause:

The seaman acting in duress, thereby circumventing the safety procedures. As there existed threat of immediate damage to the gangway the seaman tried to rectify the fault overlooking safety measures.

3.2 Contributory factors

i) The gangway left unattended for a while leading to the hazardous situation to develop.

ii) Ineffectivewatch keeping in the port.

iii) Inadequate supervision by officers who also did not timely warn the deck crew about gangway.

4. Lessons learnt:

i) Ship's staff should be explained the significance of maintaining calm even during stressful situations.

ii) In port watch keeping procedures should be strengthened to avoid precarious situations being developed. Attending to gangway remains an important element of port watch keeping procedures, in particular in ports with very fast loading/ unloading rates and/or with large tidal range.

Casualty Summary 11

Loss of part of index finger, while clearing bilges, during hold washing

1. What happened?

An Indian seaman lost index finger of his right hand while clearing the bilge cover, during hold washing.

2. How it happened?

Cleaning of cargo holds was in progress on a bulk cargo while the vessel was proceeding at sea. At the time of the incident i.e 11:30 a.m., chief officer, cadet and one able bodied seaman (AB) were engaged in water washing of one of the cargo holds.

The bilge well, into which all the wash water from the hold gets drained and from where it is subsequently pumped out, was covered with protective cover.

This cover was a perforated steel plate. The perforated steel plate was in addition also covered with single layer of burlap to prevent fine coal muck from entering into the bilge well which could have clogged the suction box.

Washing was progressing normal and all the wash water was being pumped out simultaneously through the bilges. However due to the previous cargo being coal, cargo residues slowly started accumulating on top the bilge cover.

Perforated steel plate

Images for illustration only

While chief officer and cadet were busy hosing down port side shell, the AB noticed water getting accumulated at starboard side bilges and therefore decided to clear coal muck from top of the bilge cover. He tried to clear the bilge cover area with shovel, but as water had accumulated to a height about 30 cm above the cover, he preferred clearing the muck using his right hand. In the process, the AB decided to lift the bilge cover by handle. He tore the burlap further. Accidentally his right hand's index finger along with the cotton glove, that he was wearing, got stuck up inside one of the lumber holes adjacent to cover's handle. As there was strong vacuum in the area, due to water getting sucked out, the AB could not clear his finger. Rather, as he struggled more to free his finger the sharp edges of the bilge cover sheared off his right hand's index finger from top to the nail.

All this while he neither informed nor called chief officer for help and it is only after losing the finger that he walked up to the chief officer and reported.

AB was moved from hold to ship's hospital and first aid administered.

Later while the torn glove was recovered, cut part of the finger could not be recovered. The same had probably got washed away in the bilge suction.

3. Why it happened?

3.1 Most proximate cause:

The finger getting cut due to sharp edges of the bilge cover. The situation getting aggravated due to the accumulation of water and presence of strong vacuum.

3.2 Other contributory factors:

i) Proper procedures not being followed and lack of seamanship. Pumping out of the bilges could have been suspended to avoid strong suction and/or the washing could have suspended to avoid further accumulation of water.

ii) Hurriedness to complete the job.

iii) Lack of proper supervision. The team comprised of chief officer, cadet and AB. All were totally engrossed in the work and nobody was supervising the act which caused the AB's situation going unnoticed. Chief officer's prime role was to manage the jobs including the risks that come along with.

iv) Ineffective team work. The communication between team members was ineffective as the chief officer and cadet remained unaware of the adverse situation of the AB.

4. Lessons learnt:

i) Risk assessment or tool meeting or job planning for such jobs should clearly identify supervisors for each team with their roles explicitly defined. Such supervisor(s) may assist in team's activities however should not start performing their duties.

ii) Crew members should be encouraged to use simple machines and tools such as crow bar etc. in carrying out such jobs. Such simple machines not only considerably reduce human effort but also add to the safety.

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Casualty Summary 12

Injury due to fall

1. What happened?

An assistant engineer on board a foreign ship, suffered serious injury due to falling in the engine room.

2. How it happened?

A foreign flagged vessel of approximately 43,000 GT, with all Indian crew, was proceeding on a voyage to a foreign port.

In the morning one day, assistant engineer was found lying on the bottom platform of the engine room. Blood was flowing out from his mouth. Medical advice was sought and assistant engineer was later airlifted from vessel to the nearest port.

As the assistant engineer was not in a position to respond, the reason behind his fall could not be ascertained with certainty. However, the same could be attributed to the engineer tripping and falling due to him being in haste.

3. Why it happened?

3.1 Most proximate cause:

Injury due to falling.

3.2 Contributory factor:

i) Probable haste to complete work

ii) Lack of experience

4. Lessons learnt:

i) Ship is a hazardous area to work in, during safety familiarisation, significance of maintaining calmness and situational awareness be explained to all in particular to inexperienced new joiners.

ii) Adequate supervision shall be provided to inexperienced.

iii) Good housekeeping should be maintained to ensure that sources which may act as tripping agents are properly secured and stowed.

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Casualty Summary 13

Vessel running aground due to rough weather

1. What happened?

A foreign flagged vessel of approx. 18,000 GT with Indian compliment suffered engine room flooding due to heavy weather and subsequently ran aground.

2. How it happened?

A foreign flagged vessel with Indian compliment was engaged on a voyage between two foreign ports.

One day during the voyage, it encountered very rough weather with long and high swell. This caused flooding of the engine room leading to stoppage of the engines. With no power available and under the effect of prevailing heavy weather, the vessel slowly drifted towards a shallow area and ran aground.

There was no loss of life and no pollution reported.

3. Why it happened?

3.1 Most proximate cause:

Heavy weather leads to flooding in engine room.

Loss of power and effect of heavy weather leads to grounding.

3.2 Contributory factors:

(i) Improper and inadequate precautions against heavy weather. Failure to secure the watertight integrity of the engine-room.

(ii) Unexplained ingress of water in the engine-room.

(iii) Failure to find cause of flooding and in taking remedial measures against the same.

(iv) Failure to pump out the water.

(v) Failure to restore emergency power.

(vi) Failure to adjust ship's heading in such a manner so that it drifts away from the danger.

(vii) Failure to anchor the vessel in safe depths, prior to vessel drifting on to shallows.

4. Lessons learnt:

(i) All seafarers must be trained to evaluate the effect of heavy weather on ship and therefore the significance of deploying heavy weather precautions in a timely manner.

(ii) Training should be imparted in identifying the drift patterns for different headings of the vessel under same environmental conditions as merely changing the heading considerable changes the drift direction.

(iii) Training must also be imparted in use of anchors in similar situations and in rough weather situations.

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Casualty Summary 14

Head Injury due to fall in cargo tank

1. What happened?

A crew member on an Indian ship suffered head injury due to falling in a cargo tank.

2. How it happened?

An Indian flagged vessel was cleaning its cargo tanks, while waiting at anchorage of a foreign port, in preparation for its next loading.

A seaman was climbing up the ladder in the process of exiting one of the cargo tanks after cleaning of the tank.

He was climbing in a hurry and in doing so his leg slipped and he fell down in the tank sustaining head injury.

3. Why it happened?

3.1 Most proximate cause:

Slipping and falling from a substantial height leading to injury.

3.2 Contributory factors

i) Rushing after completion of work leads to this incident.

ii) Slippery surfaces in tank, in particular the access ways, including ladders.

iii) Heat exhaustion could also be a probable reason.

4. Lessons learnt:

i) Precautions specified in the enclosed space entry checklists should be adhered till completion of the job, which includes safe exit of all personnel from the space and securing of space.

ii) The access ladders and entry/exits should be clear of obstacles, oil and grease.

iii) While, an enclosed space checklist covers a wide range of hazards the one due to heat and dehydration shall also be considered.

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Casualty Summary 16

Passenger gone missing during the course of voyage

1. What happened?

A passenger went missing from a passenger vessel during the course of its voyage and could not be traced.

2. How it happened?

An Indian flagged passenger vessel was en route from an Indian mainland port towards an Indian island port. A day after its departure from the mainland port, at around 04:15 p.m., a senior member from a team of 19 passengers reported to the officer on the watch that one of their members had been missing since 05:00 a.m. that morning. Search was initiated immediately and continued till late evening, however the missing person could not be traced on board. Coastal state authorities, including MRCC, were informed.

As substantial time had elapsed since the last sighting of the person, during which the vessel had travelled nearly 150 nautical miles, it was decided that turning around the vessel may not help. Passage of the vessel was continued while search for the missing person on board the ship continued.

The search was continued the following day also, however the missing passenger could not be found till arrival destination port.

3. Why it happened?

3.1 Most proximate cause:

Delay in intimation to the vessel's staff about the passenger gone missing. The group in which the passenger was travelling should have alerted the vessel's staff immediately on discovery of the passenger gone missing.

3.2 Contributory factor

i) Inadequate fire patrol. On this passenger vessel although fire patrol was being maintained throughout the voyage for passengers' safety & guidance, they could not detect the passenger leaving the vessel.

ii) Inadequate entry/ exit control measures. Doubts were raised that the passenger may not have boarded the vessel in the first place only and that members of his group were only assuming of having seen him.

4. Lessons learnt:

i) Strict entry/ exit control mechanisms be implemented for the passengers. Once declared boarded, passengers should not be allowed to go back on jetty without being duly accounted for.

ii) Personnel receiving the passengers at the entrance should be trained to identify signs of psychological distress, if any exhibited by a passenger.

iii) Fire patrols should be more strengthened. Members of the patrol should maintain lookout over the side also.

iv) Announcement to be made at regular intervals in PA system during the passage, regarding guidance & safety of passengers.

v) CCTV network installation (on passenger ships) at strategic locations scanning over the sides.

Casualty Summary 17

Injury to left hand of 3rd engineer, due to fall

1. What happened?

While overhauling main engine's exhaust valve, third engineer sustained injury to his left hand due to him falling down from the work platform.

2. How it happened?

Overhauling of main engine's exhaust valve had been planned on an Indian flagged vessel during the vessel's stay at a foreign port.

In preparation of same, a spare exhaust valve had been placed on the working platform. Guard railing at the platform had been opened and temporarily removed to transfer the spare exhaust valve to engine room's workshop.

At the time of the incident, 3rd Engineer was positioned on the working platform next to the spare exhaust valve. A motorman had tried to warn the 3rd Engineer, by shouting, regarding the removed railing however 3rd engineer failed to take cognizance of the same.

While the work was in progress, 2nd engineer left the work site to fetch some bolts. During his absence 3rd engineer tripped and fell down through the space where railing had been opened/ removed. He fell from the workshop platform to main engine's cylinder head platform, injuring his left hand.

3. Why it happened?

3.1 Most proximate cause:

Guard rails continued to remain absent throughout the work. They should have either been put back in place or an alternate arrangement erected once the spare exhaust valve had been shifted to the platform.

3.2 Contributory factor

i) Working aloft procedures were not followed properly. No evidence were available of any risk assessment having been done and/or any permit in this regards issued. No warning notices or signs were put at work place.

ii) Inadequate Leadership/ Supervision. 2nd Engineer, who was responsible for safety was not present at the time of incident. He should have first satisfied that all safety measures/ controls are in place and only then should have gone to fetch the bolts. Moreover if he had assumed the supervisory role then he should not have got involved in the job and kept an oversight.

iii) Lack of situation awareness. The 3rd engineer was lacking situational awareness and alertness about his surrounding. He also did not pay heed to the warning from motorman.

4. Lessons learnt:

i) Working aloft procedures should be implemented wherever applicable.

ii) The safety railing(s), if removed, be immediately fitted back as soon as the job is completed. Even during such time area shall be cordoned off with alternate means such as ropes.

iii) Person-in-charge of safety should only assess and monitor at all times and avoid getting involved in the job.

Casualty Summary 18

Damage to port life boat on a ship

1. What happened?

During a routine abandon ship drill, on board an Indian vessel, wire forming forward falls of the port lifeboat parted, leaving the boat hanging on the aft hook. Further, this sudden transfer of the entire boat's weight on to the aft hook caused the hook to break open from the boat resulting in the boat falling into the water from height.

2. How it happened?

During a routine abandon ship drill, on board an Indian flagged vessel, it was planned to move the lifeboats out from their stowed position. This is statutorily required to be done on a weekly basis. The vessel was making way through the water at this time.

Port side lifeboat was moved out by about one metre from its stowed position. Checks such as free movement of sheaves, functioning of limit switches etc. were made. After successful checks, the lifeboat was being heaved back. It was at this time that wire of the forward fall suddenly broke leaving the lifeboat hanging on its aft hook.

(Parted wire which was fitted as falls)

The entire weight of the lifeboat shifted on to the aft hook with a sudden jerk. As a result, the aft hook got sheared off from the lifeboat's hull resulting in the lifeboat falling freely into the sea underneath.

As the boat's painter was made fast to strong point on the ship, the lifeboat started getting towed in the water.

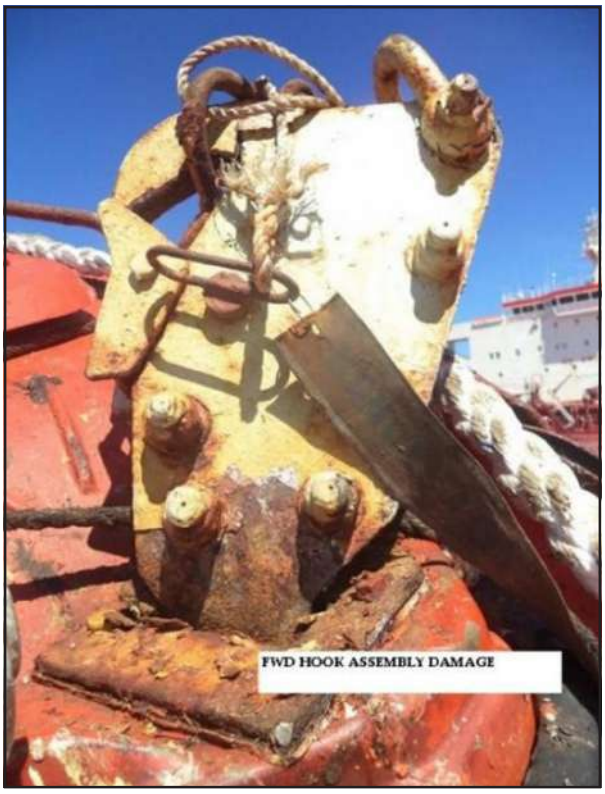
Evasive maneuvers were carried out immediately to avoid the lifeboat hitting the ship side and vessel was brought to halt.

Once the vessel stopped, lifeboat was pulled over to near mid-ship from where it was lifted on to the deck using mid ship crane.

3. Why it happened?

3.1 Most proximate cause:

Inadequate inspection maintenance and lubrication of lifeboat's falls' wires.



3.2 Contributory factor:

i) The dates for renewal of lifeboat falls did not match with dates entered in the Shipboard computerized PMS (Ship Manager).

ii) The shipboard PMS (Ship Manager) did not have any records or job description for lubrication of the lifeboats' wires. The job description included only monthly inspection with no mention of any form of greasing or lubrication.

4. Lessons learnt:

i) When the lifeboats is moved from stowed position or lowered to embarkation level during drills, the fall prevention devices should be fitted to the lifeboat.

ii) Regular checks and lubrication of falls' wires, including static parts of the falls, be included in planned maintenance system.

iii) Records for the change of fall wires be maintained up to date and be cross verified with certificates for the wires.

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Casualty Summary 01

Fire on a Diving Support Vessel

1. What happened?

An Indian diving support vessel caught fire while operating in vicinity of a Single Point Mooring (SPM) in Indian waters, endangering safety of the entire oil installation.

2. How it happened?

After completing diving operations for the day, the diving support vessel was moored to one of the SPM buoys.

At around 06:15 p.m., fire alarm on the vessel got triggered, alarming onset of fire at some place on the vessel.

A fire had got initiated in a cabin that had been assigned as accommodation to four divers. However, at the time of onset of fire there was nobody present in the cabin, as all the four occupants were engaged in work elsewhere on the vessel.

The alarm was acknowledged by master, who rushed to the site to confirm the fire physically. At the same time, other crew members also noticed fire and raised alarm.

The vessel was cast off from the SPM.

One crew member tried to fight the fire with fresh water hose, however could not reach the seat of fire as the hose fell short in length. He came back after donning a breathing apparatus (B. A.) set to find captain trying to fight the fire with portable fire extinguisher. However, intense heat and dense smoke emanating from the compartment was posing difficulty in approaching the seat of fire.

Meanwhile divers, who were the occupants of the cabin and who were informed about the fire by mess man, also arrived at the scene and attempted to fight the fire with portable extinguishers. On opening the door, they noticed that one of the mattresses was on fire. One diver tried to operate the extinguisher which failed to activate.

Crew were mustered. Shore authorities informed. Ventilation & electrical supply to tank top compartment was stopped. C/E somehow assumed that the fire had gone out of control and ordered black out. Generators were stopped and quick closing valves shut. Master wanted $C0_2$ to be released without understanding that it shall be effective in machinery space only, whereas fire was in the accommodation. $C0_2$was released in to the machinery space.

Meanwhile, four other vessels which were operating in the oil field arrived to the assistance of diving support vessel.

The diving support vessel was towed away by two of those vessels, while fire fighting carried out by the other two.

Fire was extinguished at 03:45 a.m the next day, however nearly 10 hours after its outbreak.

As a result of the fire major damages were caused to inside of the accommodation.

3. Why it happened?

3.1 Most proximate cause

Basis the burnt electrical iron found in the cabin, from where the fire erupted, it is strong indication that it may be the likely source of fire triggered by human negligence. The initial thick black smoke was due to the burning of mattresses. Subsequent smoke was from wooden furniture.

3.2 Other contributory factors.

(i) Human Factors – Negligence.

(ii) Inadequate and inappropriate fire fighting techniques deployed.

4. Lessons Learnt:

(i) Drying and ironing of clothes should be carried out at only at designated locations on a vessel.

(ii) The contingency plans should be implemented at the earliest instead of hits and trials. Important time lost at earlier stage may aggravate a situation considerably.

Casualty Summary 02

Collision between a crude oil tanker and a general cargo vessel

1. What happened?

An Indian 'crude oil tanker' ('Vessel 1') collided with a foreign 'general cargo vessel' ('Vessel 2'), when transiting a strait in foreign waters.

2. How it happened?

At 00:00 Hours, an Indian crude oil tanker was navigating through a strait on a course of 193 degrees (True) at a speed of about 12.5 Knots. She was fully loaded with a cargo of crude oil and was drawing an even keel draft of 15.50 m.

The weather reported at this time was slight sea, low swell, wind North-westerly with a force 4 on the Beaufort scale and cloudy sky. The visibility was also reported to be good. 2nd officer had taken over the watch from additional 2nd officer (A2/O). The seaman helmsman (SHM), who was deployed as dedicated look out, had been on the watch since two hours prior i.e.10:00 p.m. the previous night. He had been assigned to continue for another two hours. The 2nd Officer had joined the vessel just 12 days prior to the incident. He had in the past exhibited lack of confidence in operating ECDIS on board and had requested more time from master in familiarizing himself with the same.

The Master was also present on the bridge at 00:00 hours. He was taking assessment of the situation from A2/O as there were some vessels and fishing crafts around. Master completed writing his night orders, checked with 2ndofficer if he was comfortable with the watch and then left once 2nd officer responded in the affirmative, with instructions to call him in case of any issues on the bridge, including traffic.

Around 00:56 a.m., a general cargo vessel was observed on the X band radar & ARPA by 2nd officer at a range of 11.6 nautical miles at a bearing of 247 degrees True on the starboard bow of his vessel. The general cargo vessel was about 100 m long. Its Closest Point of Approach (CPA) at this time was 1.5 nautical miles with a negative Bow Crossing Range (BCR) of 1.8 nautical miles. This indicated that the general cargo vessel would pass from behind the bulk carrier. The CPA alarm was set at 0.5 nautical miles and the TCPA alarm was set at 12 minutes as per master's instructions.

2nd officer also observed fishing traffic on the port bow, two points on the starboard bow and another vessel, right ahead at a range of 13.0 nautical miles. 2nd officer made a few minor alterations to starboard, on autopilot, to avoid traffic and also to return to the original track of 207 degrees True.

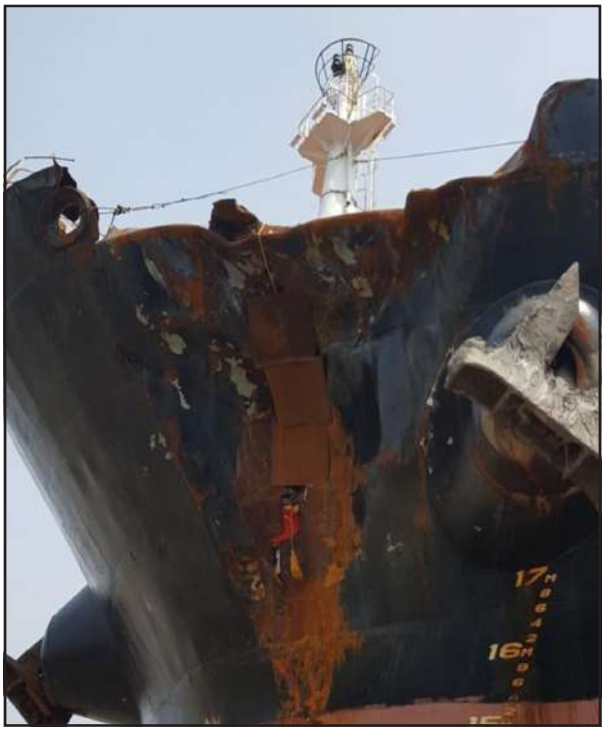
At 01:00 a.m., the tanker vessel was proceeding on a course of 214 degrees True at a speed of 12.1 Knots. At this time the general cargo vessel was at a range of 11.0 nautical miles and a bearing of 247 degrees True and now showing a CPA of 1.0 nautical miles. The 2nd officer decided to maintain vessel's course and speed.

Between 01:00 a.m. and 01:23 a.m., the CPA of the general cargo vessel got further reduced from 1.0 nautical miles to 0.7 nautical miles with a Time to Closest Point of Approach (TCPA) of 8 minutes. The crude oil tanker altered course to starboard, on autopilot, to 220 degrees True. At 01:26 a.m., hand steering was engaged and altered to starboard 20. 2nd officer then instructed helmsman to go hard over to starboard. CPA with the general cargo vessel was now 0.4 nautical miles and TCPA was 4 minutes. The crude oil tanker started swinging to starboard slowly at first and then quite rapidly as the 'Rate of Turn' increased to a maximum of 30 degrees to starboard.

At about 01:29 a.m., the crude oil tanker was heading about 265 degrees True, with the general cargo vessel now lying dead ahead and showing a CPA of less than 0.1 nautical miles

and a TCPA of 1 minute. 2nd officer ordered helmsman to go hard over to port. However, even though the rudder showed hard over to port, the Rate of Turn indicator still showed 28 to 30 degrees to starboard with no subsequent change of heading. At about 01:30 a.m. the crude oil tanker collided with the general cargo vessel.

Initial impact was with forward part of tanker vessel. The general cargo vessel swung to its port due to the impact, came starboard side along-side on the port side of crude oil tanker and made contact on the manifold rail of crude oil tanker with its starboard quarter. Both vessels then moved apart due to the resultant momentum. There were no injuries and no pollution as a result of the collision, however both vessels suffered structural damages.



Why it happened?

3.1 Most proximate cause

The crude oil tanker did not comply with COLREGs. The general cargo vessel had been detected at an initial range of 11.6 nautical miles and 34 minutes prior to collision. It had been evident right from this time that this was a crossing situation and that the crude oil tanker was the give way vessel. If actions had been taken as per the collision regulations in ample time and to a degree that was clearly evident to the stand on vessel, this incident would never have occurred.

3.2 Contributory factors.

(i) Inadequate navigation skills deployed by the bridge team on the crude oil tanker.

(ii) 2nd officer was not familiar with the maneuvering characteristics of his vessel. He kept relying on indications from Rate of Turn Indicator and not visually observing that the vessel's swing had stopped.

(iii) 2ndOfficer did not call master and/or other assistance.

(iv) Lack of situational awareness especially with respect to the gradual, but steady reduction in the CPA and TCPA of cargo vessel.

4. Lessons Learnt:

(i) Before assigning independent watch it shall be ensured that the concerned level has adequate confidence in the use of all equipment associated with safe watch keeping.

(ii) Explicit understanding of the maneuvering characteristics of the vessel by the navigating officers be confirmed by the master of the vessel.

Casualty Summary 03

Collision between two vessels, while one lay at anchorage.

1. What happened?

An Indian 'handymax' bulk carrier ('Vessel 1') was hit by a foreign oil/chemical tanker ('Vessel 2'), when the bulk carrier was at anchor.

2. How it happened?

One early morning, 'Vessel 1' was preparing to sail out from the anchorage of an Indian port. The vessel had been at anchor for some time, undergoing repairs which it had just completed successfully.

At around 03:00 a.m. 'Vessel 2', an oil/chemical tanker, which was proceeding to embark its pilot landed being very close to 'Vessel 1' which was still at anchor. 'Vessel 2' had arrived as close as 0.52 nautical mile to 'Vessel 1'.

Officer of watch on 'Vessel 1' called 'Vessel 2' on VHF requesting wider berth, but 'Vessel 2' did not reply. It rather kept approaching closer. 'Vessel 2', at this moment was doing a speed of approx. 04 knots. Officer of watch on 'Vessel 1' called the port control and informed about the situation. The port control also called up 'Vessel 2', however no response was received. Eventually 'Vessel 2' made contact with 'Vessel 1' on its port bow. In the process, anchor cable of 'Vessel 1' got entangled with flukes of port anchor of 'Vessel 2'.

Bent link of the anchor chain

'Vessel 1' further paid out its port anchor cable up to 10 shackles. In order to hold its position, 'Vessel 2' also lowered its starboard anchor upto 9 shackles in water. Attempts were made to clear anchor chain from port anchor's flukes of 'Vessel 2'. After about two hours 'Vessel 2' informed 'Vessel 1' that the anchor chain was now clear and that they are heaving up anchor to move away.

After clearing anchor chain from the flukes, it was observed that starboard anchor cable of 'Vessel 2' was leading stern while port anchor cable of 'Vessel 1' has started leading ahead. This indicated possible fouling of anchor cables of both the vessels. At this moment 'Vessel 2' was lying just 15-20 meters ahead of 'Vessel 2', on nearly same heading. Heaving up anchor on any of the two vessels would have resulted in them coming closer again. Therefore both vessels suspended heaving their anchors and maintained distance for each other, using engine while waiting for tug boats' assistance.

Within one hour tug arrived on scene and heaving up of anchors was commenced. At approx. 07:00 a.m. the vessels were cleared.

3. Why it happened?

3.1 Most proximate cause

Inadequate navigation skills deployed by the bridge team on 'Vessel 2'. The effects of current and tidal stream, which are very strong in the area, were inaccurately estimated and less effectively dealt with.

3.2 Contributory factors.

(i) Environmental conditions - Strong tidal stream and current in the area.

(ii) Ineffective monitoring and delayed warning by VTMS.

4. Lessons Learnt:

(i) Passage planning and execution shall be comprehensive and realistic, taking into account all topographical and environmental influences on ship's maneuverability.

(ii) VTMS/ VTS to assume greater roles.

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Casualty Summary 04

Amputation of wrist of first assistant engineer while carrying out inspection of main engine's scavenge space.

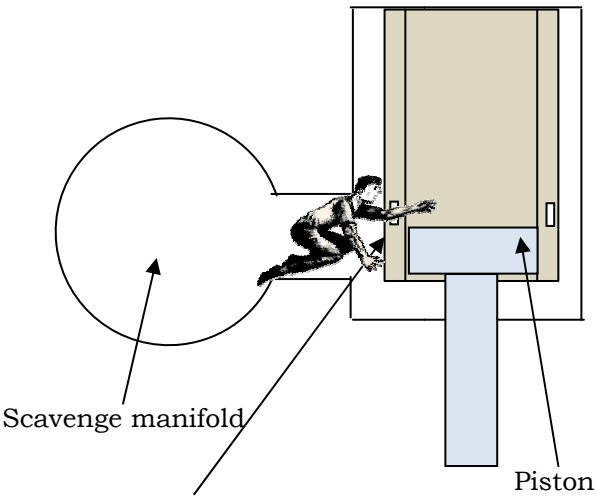
1. What happened?

An Indian first assistant engineer (1st A/E) suffered injury to his right hand due to it getting trapped between scavenge port and piston, during routine inspection of main engine's (M/E) scavenge space.

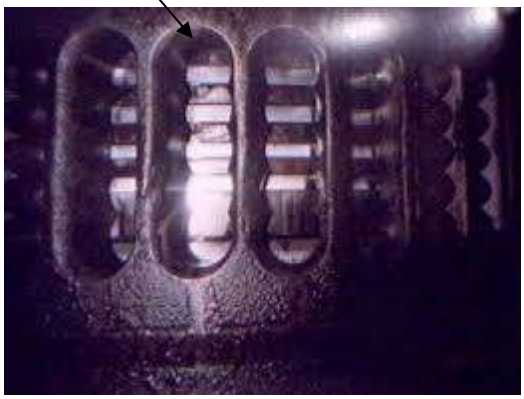
2. How it happened?

Inspection of scavenge space of main engine was being carried out by 1st A/E. He was being assisted by two engine cadets in the job.

Simultaneously, 1st A/E was also checking and photographing M/E's piston rings and liner. He was clicking photographs of the inner sides of cylinder liners by holding camera through the scavenge ports.



Scavenge ports through which hands were put inside liner



Such inspection of liner required engine to be turned so that the piston can be moved up and down. Same was being carried out in a controlled manner using turning gear.

The 'turning gear's remote controller', was being handled by one of the engine cadets. 1st A/E was in constant communication with the engine cadet, who was operating the turning gear. However, due to one miss communication, the cadet continued to turn the turning gear while piston was moving upwards. Somehow 1st A/E did not sense this upwards movement of the piston and his right hand got trapped between the scavenge port and the piston. Eventually his hand had to be amputated from wrist onwards.

3. Why it happened?

3.1 Most proximate cause

1st Asst. Engineer's hand getting trapped by the upwards moving piston in between the scavenging port.

3.2. Contributory factors.

(i) Improper risk assessment.

(ii) Incorrect resource management. Trainees were assigned the critical task of controlling turning gear. No responsible person was deployed to supervise or for safety look out.

(iii) There was a lack of situational awareness.

4. Lessons Learnt:

(i) Training to be imparted in effective resource management. Jobs shall be assigned to team members according to their competency and experience.

(ii) Use of tools such as selfie sticks to be considered for photographing such locations.

Casualty Summary 05

Injury to the left leg of deck cadet

1. What happened?

A deck cadet suffered serious injury to his leg due to shifting of an inadequately secured heavy steel plate in heavy weather condition while the vessel was at anchor.

2. How it happened?

The Indian bulk carrier was at anchor, off an Indian port, and was experiencing rough weather.

The vessel had received high thickness (25 mm) steel plates at its previous port for carrying out certain repairs.

These heavy steel plates had been temporarily stowed on the main deck, in crossing area between two cargo holds. This stowage area was near the steps of a raised platform which was fitted to facilitate safely crossing over the pipelines in the area.

On the day of the incident, two seamen were working on a damaged cargo handling grab, which was stowed in the same cross deck area between the two holds.

The vessel was rolling slightly due to the prevalent rough seas.

Deck cadet, meanwhile, happened to proceed to the same cross deck area in order to assist fitters in another task.

In order to arrive into the cross deck area, the cadet had to climb over the small platform of two steps, built to cross over the pipes on deck.

The moment deck cadet had stepped off the walkway, when his left foot had just landed on the main deck, the plates which were lying flat on the deck suddenly shifted due to vessel's roll, pushing his left foot underneath the step. The cadet's leg was trapped under the walkway by heavy plates.

Cadet's leg could be freed with great difficulty using man power. Later cadet was transferred ashore for medical treatment.

3. Why it happened?

3.1 Most proximate cause:

Improper securing and lack of basic seamanship. While the hazard of shifting of plates was ever present, no timely mitigating action was taken for the same.

3.2 Contributory factor

i) Lack of Situational Awareness: None of the ships personnel, who had been in or around the cross deck area, noticed the imminent threat posed by the steel plate lying unsecured on the deck.

4. Lessons learnt:

i) Good house keeping, appropriate stowage and adequate securing of all loose items form key elements of safety at sea.

ii) Crew shall be motivated to report any situation or practice that may form a possible hazard. This may be in the form of 'Stop action' card.

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Casualty Summary 05

Contact damage between vessel and lock gate

1. What happened?

An Indian bulk carrier made contact with the lock gate while entering the lock gates at one of the canals, thereby sustaining hull damage.

2. How it happened?

An Indian flagged bulk carrier was entering lock gates at a canal during transit of the canal. The vessel had pilot on board.

While entering the first lock, vessel was maintaining itself in the centre of the canal and its speed at that instant was approx. 0.8 knots.

Suddenly, as the vessel arrived near to the lock gate there was a sudden outflow of water which caused the ship's bow to swing sharply on to its port side. This resulted in vessel's port bow coming into contact with the locks.

Vessel sustained damages to ship side on the port side, due to this contact.

3. Why it happened?

3.1 Most proximate cause:

Sudden outflow of water current causing the ship's bow to swing sharply onto her port side resulting in contact with the lock.

3.2 Contributory factor:

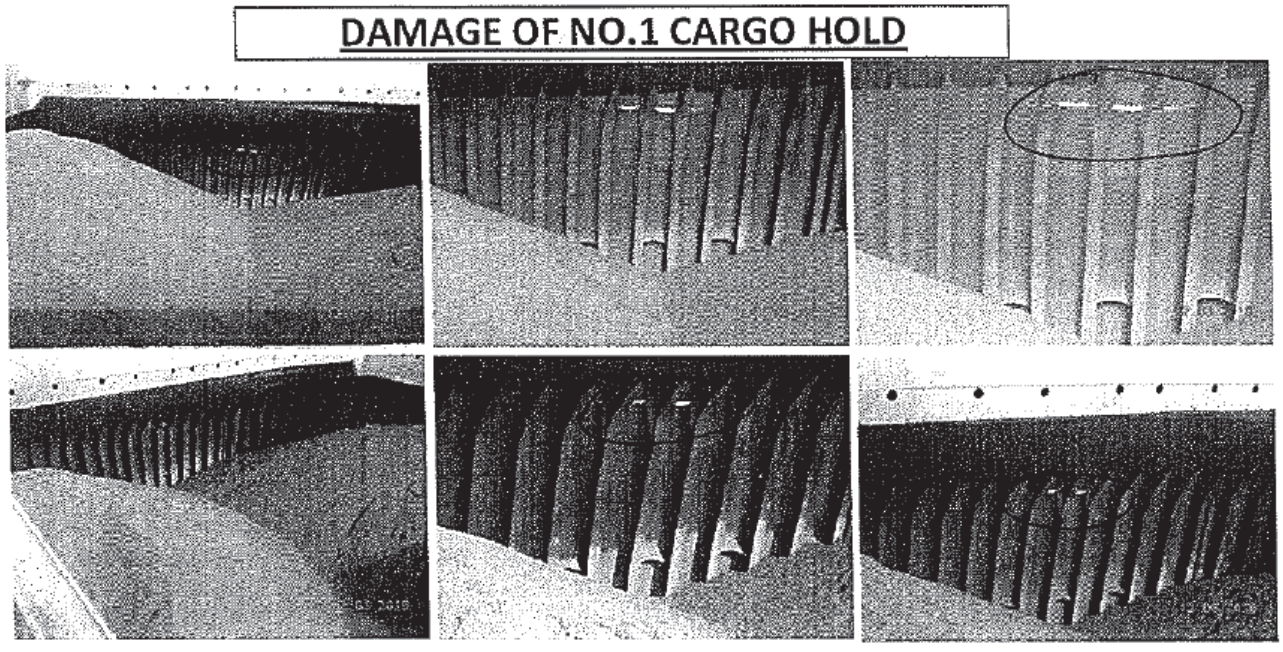
(i) Inadequate ship-shore interface. The vessel had not been made aware that such sudden development may occur.

(ii) As there was no precedence of such sort of contingency it could not be foreseen by the vessel's staff and be prepared for.

4. Lessons learnt:

i) Passage planning to be more elaborate and take into account all possible exigencies, including if any from past experiences and history.

ii) Ship shore interface shall be more detailed.



Mechanised Sailing Vessels (MSVs)

Casualty Summary 01

Sinking of MSV due to flooding in heavy weather

1. What happened?

An Indian mechanised sailing vessel (MSV) sank at sea, while carrying a cargo of construction material, due to bad weather.

2. How it happened?

A 42 years old Indian MSV was on a voyage from a foreign port in Indian ocean to an Indian port. The vessel was carrying cargo of construction material. The MSV sailed out from its loading port at around 10:00 p.m. At the time of its departure weather conditions were normal. However, no weather forecast was obtained for the passage by the vessel's crew. The MSV was also not fitted with any equipment for receiving such information while at sea. Besides, when the vessel's owner had communicated with the vessel's staff through phone, a day before the vessel's departure from its load port, he also did not apprise the crew about expected weather during the forthcoming voyage

Right from early in the morning, the very next day after its departure from the loadport, the MSV starting experiencing rough weather. Even though the vessel had an option of turning back to safety of its departure port, tindal of the vessel opted to continue on the passage. Soon weather worsened, and vessel started rolling and pitching heavily.

Later around, 03:00 p.m., ingress of water was observed in forward part of the MSV from bottom side of its hull. Crew started removing this water using mechanical pumps. Location of water ingress however could not be ascertained. As water ingress did not appear to be excessive, the vessel continued on its voyage through the prevalent adverse weather condition. Meanwhile, MSV's crew could not seek assistance from coastal authorities as the MSV was also not fitted with communication equipment for the same.

By next day noon water ingress increased substantially submerging MSV's main engine. Main engine's cooling water pump stopped, causing the main engine to trip shut. The MSV consequently lost propulsion and started sinking.

At around 05:00 p.m., the crew were rescued by a fishing vessel, passing close by while the vessel is assumed to have sank to bottom of the sea.

3. Why it happened?

3.1 Most proximate cause:

Heavy weather caused hull failure which lead to water ingress and loss of stability

3.2 Contributory factors

i) Vessel's age, as the MSV was 42 years old.

ii) No weather reports considered prior commencement of the sea passage. Even the vessel's owner did not inform vessel about weather forecast.

iii) The vessel continued on its voyage despite having started experiencing adverse weather.

iv) The vessel could not seek assistance from coastal authorities as it was not fitted with radio based communication equipment.

v) MSV's crew could not identify the location of ingress of water and therefore could not take any corrective action for same.

4. Lessons learnt:

i) MSVs should be provided with minimum equipment and/or arrangement to receive weather forecasts prior commencement and during the course of voyage.

ii) MSV crew should ensure that Maritime safety information, including weather forecasts, is obtained prior to commencement of voyage and be duly acted upon.

Casualty Summary 02

Fire on MSV leading to its sinking

1. What happened?

An Indian mechanised sailing vessel (MSV) of about 850 GT caught fire, when alongside at a foreign port. As the fire could not be controlled, the vessel was towed out of the port. While being towed out of the port, the MSV grounded and eventually sank.

2. How it happened?

An Indian MSV of approx. 850 Gross Tonnage, had loaded miscellaneous general cargoes and was preparing to sail out from a foreign port. This MSV was being manned by 15 crew members.

In the morning at around 07:30 a.m., while the MSV was still alongside jetty, smoke was noticed coming out from top of its engine room opening. Crew members immediately rushed to the engine room and found that there was smoke concentrated near forward part of the engine room. Nearby fire extinguisher was used in an attempt to extinguish fire, but fire could not be extinguished. Rather the smoke continued to rise and started spreading towards the vessel's cargo compartment. Crew used all portable fire extinguishers, fitted on board, in an attempt to extinguish fire but no favourable results could be achieved.

At around 10:00 a.m., nearly two and a half hours after onset of the fire, port's fire service was called in by the port's authority. Crew members were asked to evacuate the vessel, while port's fire service commenced fighting fire from top of the vessel's engine room. The crew, however, also continued their efforts by unloading cargo so that fire could also be dealt with from top of the vessel's cargo hold.

Despite fighting of fire for next couple of hours by port's fire fighting service, the situation appeared to be only getting worse. Fire was now getting beyond control and appeared endangering safety of nearby jetties and infrastructure. The port authority therefore decided to tow the vessel out of the port to its outside anchorage.

During being towed, at around 01:00 p.m., the MSV ran aground and sank about 10 nautical miles from the port leading to total loss of the MSV.

3. Why it happened?

3.1 Most proximate cause:

Probable cause could be a short circuit in electrical wiring in MSV's engine room.

3.2 Contributory factor

i) MSV not being maintained as required by statutes. Its certificate of annual inspection had already expired.

ii) Non fitment of fire detection and fixed fire fighting system in the MSV. MSVs are non conventional vessels and not required to be equipped with such equipment. Also structural fire protection not available to restrict the spread of fire within engine room only.

iv) No mention of use of water initially by MSV's crew in fighting fire.

4. Lessons learnt:

More effective use shall be made of fire extinguishing equipment.

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Casualty Summary 03

Sinking of mechanized sailing cargo vessel due to hull failure in heavy weather

1. What happened?

An Indian MSV suffered hull failure due to heavy weather and subsequently sank.

2. How it happened?

An Indian MSV had sailed out from a port in Gulf of Aden to another, after having loaded 450 metric tonnes of cargo such as wheat flour and pasta. The vessel had sailed out at 06:00 a.m. and weather conditions at that time were fine, with slight sea. The MSV had on board multi national crew, including 04 Indians.

Approximately 09 hours into the voyage, at about 03:00 p.m., the MSV's engine room crew observed ingress of water in its engine room bilges. Both engine driven bilge pumps were started to pump out water. In the mean time, sea outside grew choppy coupled with high swell of around 5 to 6 feet height. The sea and swell were breaking on MSV's deck. Wind was growing stronger.

In next few hours, when the MSV was nearly 100 nautical miles from the nearest coast, weather worsened causing the MSV to roll, pitch and its bow to pound heavily. Tindal of the MSV tried to steer the vessel so as to reduce effects of weather but did not succeed.

Meanwhile, water ingress in MSV's engine room had increased. All 4 standby bilge pumps were also put into use to pump out the water.

Soon, it was realised that water was ingressing from forward part of the engine room i.e. from cargo hold of the MSV. This could have been due to breach of hull in way of cargo hold but the exact location could not be identified due to presence of cargo in the hold.

By around 09:00 p.m., even the 06 bilge pumps were not being able to cope up with the ingress of water and water level continued to increase in engine room. Soon there was power failure (black out) on the MSV, probably when sea water touched electrical wiring terminal in the engine room.

At approx. 11:30 p.m. crew abandoned the ill fated MSV on a fibre glass rescue boat, while the MSV sank to bottom of the sea in darkness of the night.

3. Why it happened?

3.1 Most proximate cause:

Breach in MSV's hull due to heavy weather.

3.2 Contributory factor

i) As MSVs are non conventional vessels, the MSV may not have been built to the strength, and stability (both intact and damage) requirements.

ii) Weather forecast was not considered prior to departure from port.

iii) Even though the MSV's certificate of inspection was valid, however the annual inspection and endorsement period for the same had got expired 6 months prior to the incident.

iv) Precious time was wasted by MSV's crew before it was identified that water was entering into the ship from cargo hold area.

v) Effective efforts were not to restrict ingress of water into the cargo hold.

4. Lessons learnt:

i) Maritime safety information, including weather forecasts, should be obtained prior to commencement of voyage and be duly acted upon.

ii) The MSV's should undergo inspections and surveys at stipulated times and intervals.

Casualty Summary 04

Sailing cargo vessel running aground due to cyclone

1. What happened?

There was a total loss of an Indian MSV, due to it running aground because of heavy weather conditions.

2. How it happened?

An Indian mechanized sailing vessel (MSV) had sailed out from a foreign port with approx. 750 metric tonnes of coal cargo. The MSV was being manned by 15 (fifteen) crew members.

On departure from its load port, the MSV received a cyclone warning on its passage. As a safety measure, MSV was anchored in the shelter of a nearby island.

However, as the weather worsened there was an ingress of water in engine room of the MSV. The crew tried to pump out the water. The crew also tried to heave up the anchor however the anchor rope parted and the MSV, under the influence of prevailing weather conditions, drifted on to run aground on nearby coast

While the crew was rescued, the MSV could not be salvaged and went on to be a total loss.

3. Why it happened?

3.1 Most proximate cause:

Vessel running aground due to heavy weather.

3.2 Contributory factor

i) Ingress of water in engine room of the MSV

ii) The MSV being non conventional vessel may not have been strengthened and equipped to bear cyclonic weather conditions.

iii) Weather forecast was not considered prior to departure from load port.

4. Lessons learnt:

Maritime Safety Information, including weather forecasts, should be obtained prior to commencement of voyage and be duly acted upon.

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Casualty Summary 05

Total loss of mechanized sailing vessel (MSV) due to steering failure

1. What happened?

An Indian mechanised sailing vessel (MSV), on a voyage from an Indian island port to the Indian mainland, sank 6 miles off its destination due to failure in its steering gear.

2. How it happened?

The MSV was on its way back from a port on an Indian island, to a port on main land of India. It had unloaded some general cargo at the island's port. During this return passage, the MSV was being manned by seven crew members, including a certified Tindal. Vessel had valid certificates on board including certificate of inspection. It is reported that the vessel's engines, communication system and other equipment had been checked by the Tindal and crew, prior to commencement of this return voyage, and same had been found to be in good working order.

After about 22 hours of sea passage, when the vessel was just 6 miles short of its destination port, a noise was heard by vessel's staff which had emanated from gear box of the vessel's steering system. Inspection of gear box revealed a broken chain, rendering the steering system unavailable.

The crew lost situational awareness and somehow all of them got involved in repair of the steering chain. Nobody was left to watch the vessel, despite the fact that its engines were still running at slow speed. The MSV continued to drift unwatched, unattended and uncontrolled under the combined effects of slowly running engine, sea current, rough sea condition and an off shore wind, all of which reportedly, the vessel was experiencing at that time.

It got too late before the vessel's staff could realize their oversight and initiate actions to check drift of the MSV, which, in absence of any check or control, as per the crew, drifted on to hit an unknown and unnoticed wreck. The MSV's hull got breached. At least three planks were seen separated from the vessel and sea water started gushing into the vessel. Crew tried to pump out the sea water but in vain. The MSV took a list due to flooding of its cargo space and started sinking.

Crew reportedly, called Coast Guard on VHF channel 16, however no response was received from anyone in the vicinity.

Sensing danger to their personal safety, crew abandoned the stricken vessel. Within minutes of abandoning the vessel, at around 10:30 p.m., the crew witnessed sinking of the vessel.

All seven crew members survived by holding on to the wooden planks till morning when they were noticed by a small fishing boat, which picked them up and safely transported to their port of destination.

3. Why it happened?

3.1 Most proximate cause

Poor situational awareness and failure of teamwork and contingency management. Just one exigency and there was a total failure of organizational setup. All simultaneously got involved in repairing the steering gear chain with nobody left to monitor the vessel's position which continued drifting unattended, proceeding on to hit the reportedly unnoticed and unknown wreck.

3.2 Contributory factors

i) Loss of control due to machinery failure i.e. failure of the steering gear system.

ii) Lack of seamanship as anchors were not used to check or stop the drift of the vessel.

iii) The MSV being non conventional vessel may not be equipped with charts and publications, as required. Therefore they may not be aware of navigational hazards which may lie outside its conventional route as was in this case as the vessel drifted off its intended path.

4. Lessons learnt:

i) Vessel should not be left, at any time without proper watch-keeping, even when not under command.

ii) Use anchors / engines to check uncontrolled drifting of vessel.

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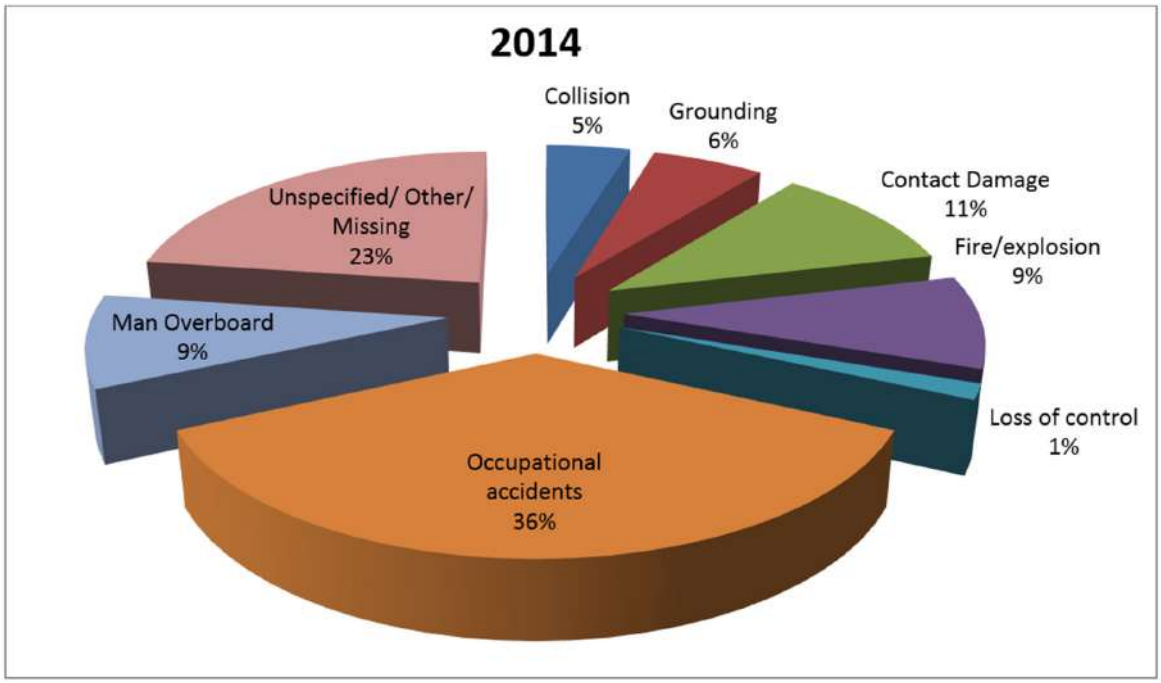
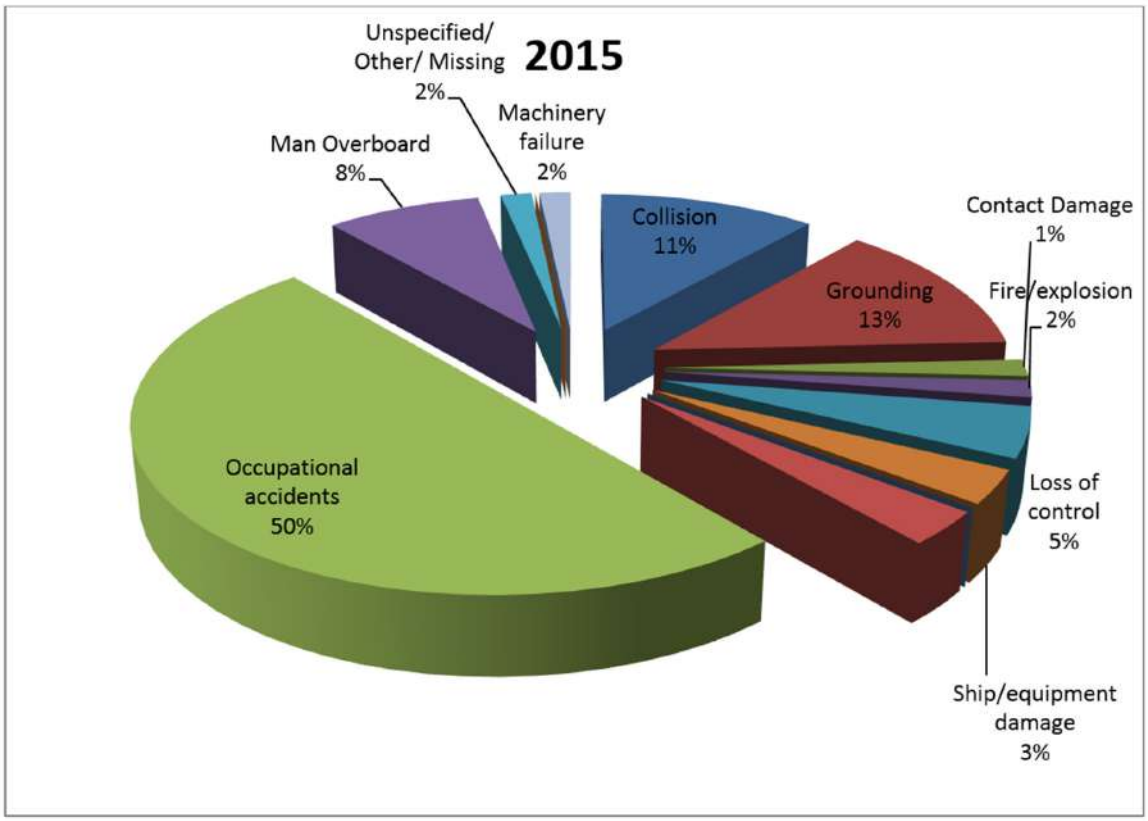
III - STATISTICS

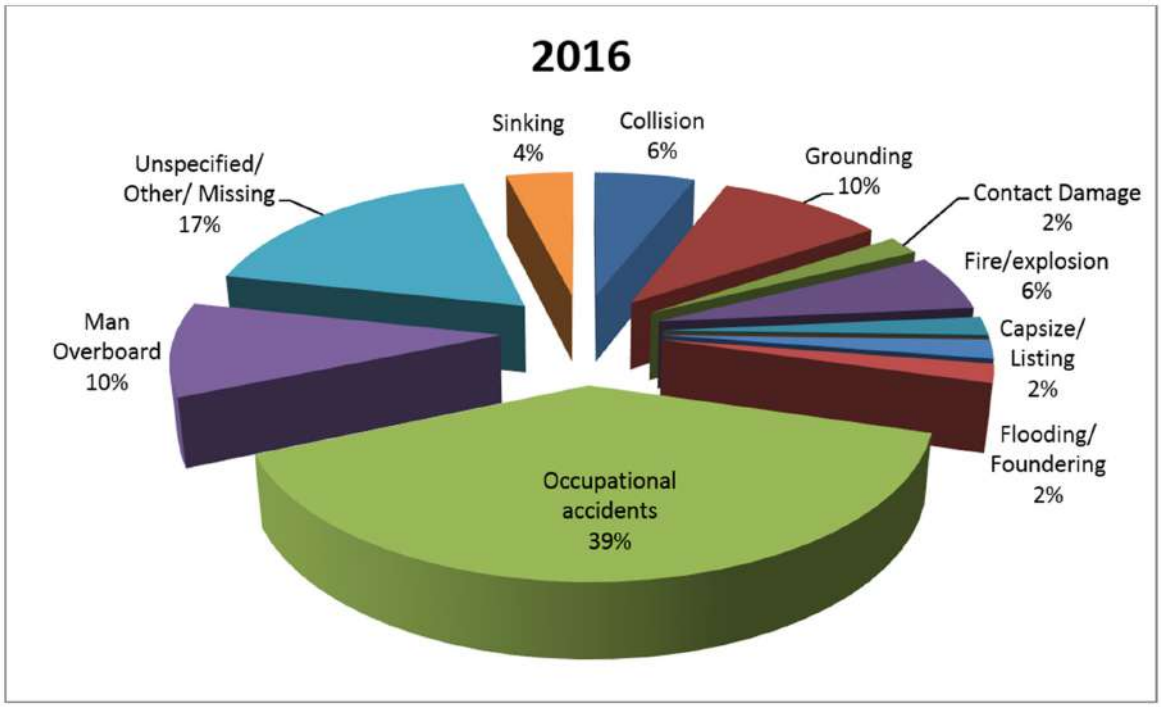
Statistics 1

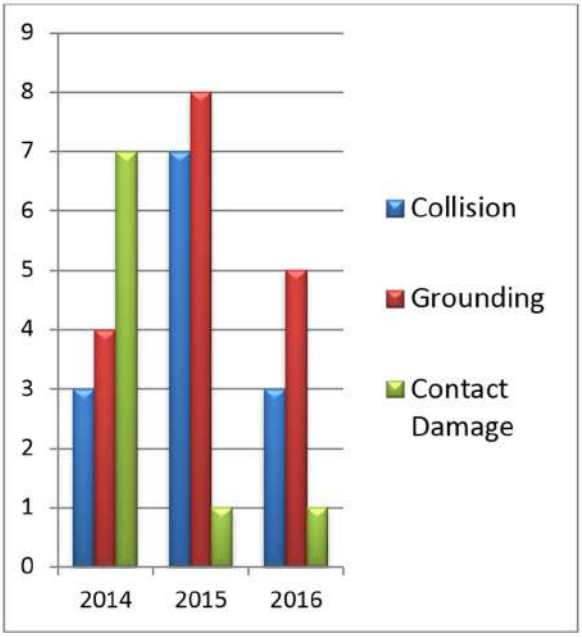
Casualty Event (Nature of Casualty)

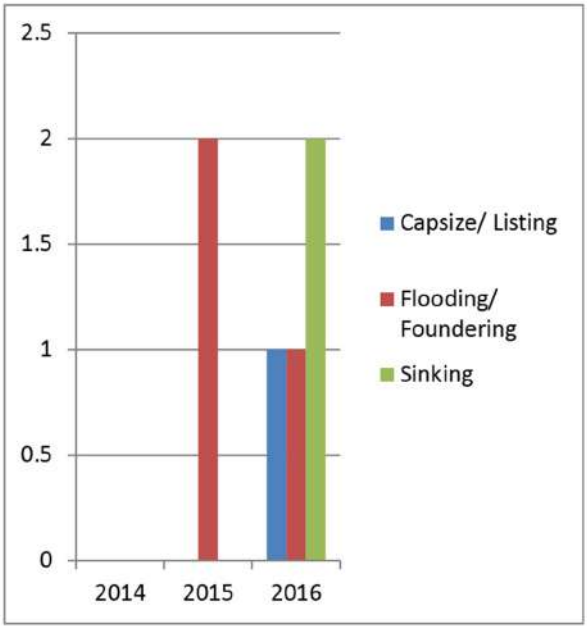
		Year			
Sr. No.	**Casualty event**	**2014**	**2015**	**2016**	**Total**
1	Collision	3	7	3	13
2	Grounding	4	8	5	17
3	Contact Damage	7	1	1	9
4	Fire/explosion	6	1	3	10
5	Loss of control	1	3	1	5
6	Ship/equipment damage	0	2	0	2
7	Capsize/Listing	0	0	1	1
8	Flooding/ Foundering	0	2	1	3
9	Occupational accidents	24	31	20	75
10	Man Overboard	6	5	5	16
11	Unspecified/ Other/ Missing	15	1	9	25
12	Sinking	0	0	2	2
13	Machinery failure	0	1	0	1
	Total	**66**	**62**	**51**	**179**

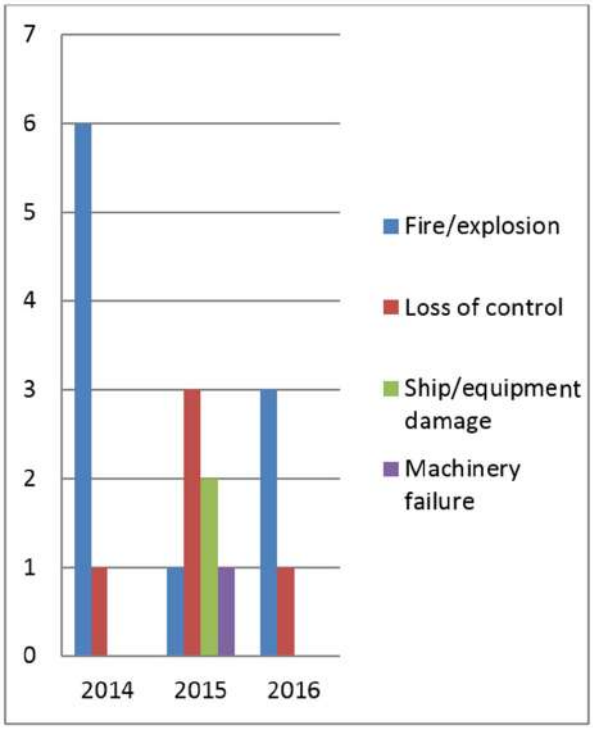


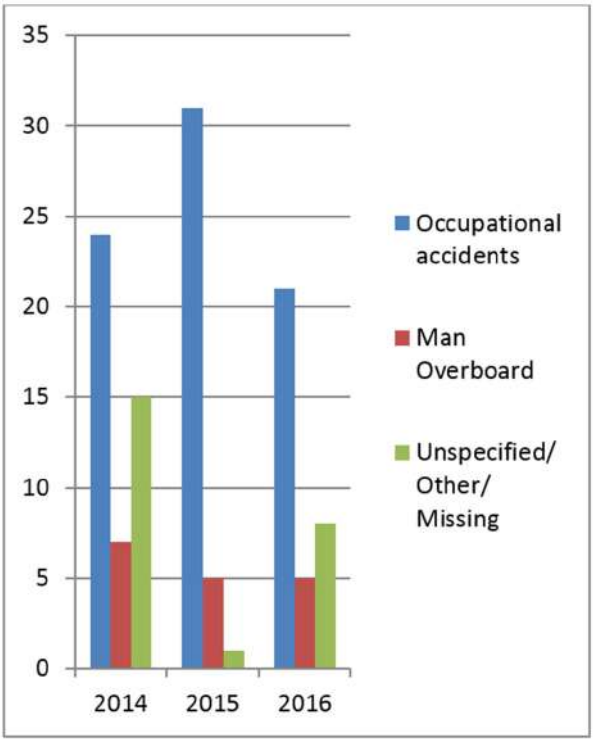

2015
Unspecified/ Other/ Missing 2%
Machinery failure 2%
Man Overboard 8%
Collision 11%
Contact Damage 1%
Grounding 13%
Fire/explosion 2%
Occupational accidents 50%
Loss of control 5%
Ship/equipment damage 3%


2016
Sinking 4%
Collision 6%
Unspecified/ Other/ Missing 17%
Grounding 10%
Contact Damage 2%
Fire/explosion 6%
Man Overboard 10%
Capsize/ Listing 2%
Flooding/ Foundering 2%
Occupational accidents 39%


9
8
7
6
5
4
3
2
1
0
2014
2015
2016
Collision
Grounding
Contact Damage


2.5
2
1.5
1
0.5
0
2014
2015
2016
Capsize/ Listing
Flooding/ Foundering
Sinking

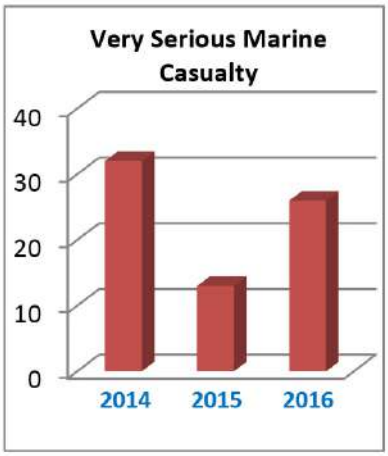

7
6
5
4
3
2
1
0
2014
2015
2016
Fire/explosion
Loss of control
Ship/equipment damage
Machinery failure

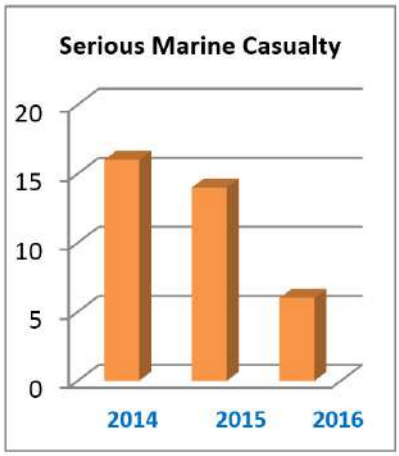

35
30
25
20
15
10
5
0
2014
2015
2016
Occupational accidents
Man Overboard
Unspecified/ Other/ Missing

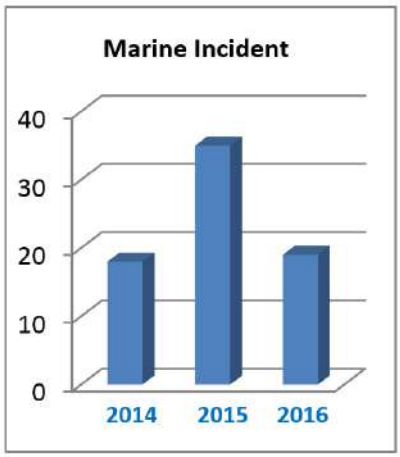
Statistics 2

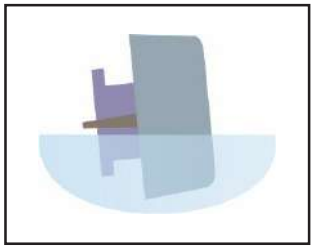
Severity of Casualty

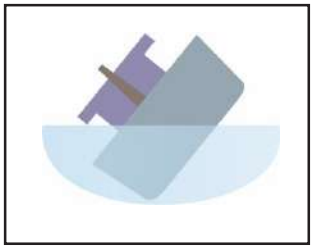
Sr. No.	Severity of Casualty		Year			Total
			2014	2015	2016	
1	Very Serious Marine Casualty		32	13	26	71
2	Serious Marine Casualty		16	14	6	36
3	Marine Incident		18	35	19	72
	Total		**66**	**62**	**51**	**179**

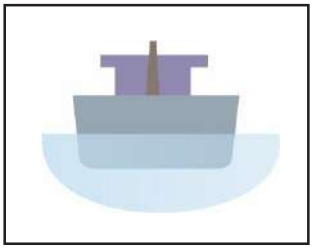






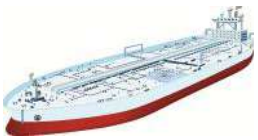


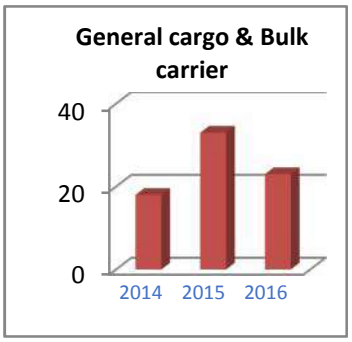


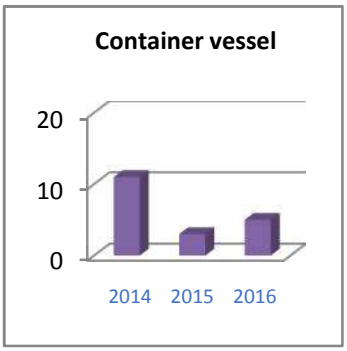


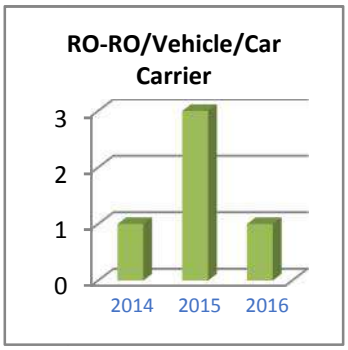
Statistics 3

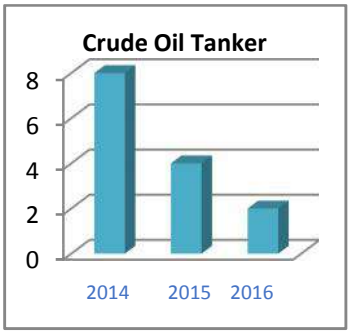
Type of vessels involved

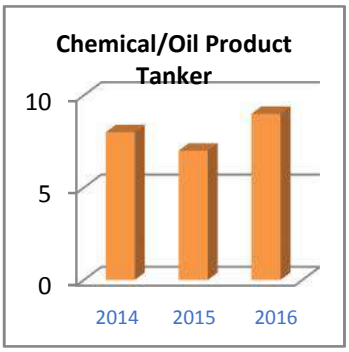
Sr. No.	Type of vessels		Year			
			2014	2015	2016	Total
1	General cargo & Bulk carrier		18	33	23	74
2	Container vessel		11	3	5	19
3	RO-RO/Vehicle/Car Carrier		1	3	1	5
4	Crude Oil Tanker		8	4	2	14
5	Chemical/Oil Product Tanker		8	7	9	24
6	Liquefied Gas Carrier		3	4	1	8
7	Passenger vessel		4	1	2	7
8	Other vessels (AHTS, OSV, Tugs, Tows, Barges, drillship, Survey and research vessel, dredger)		13	7	8	28
	Total		**66**	**62**	**51**	**179**

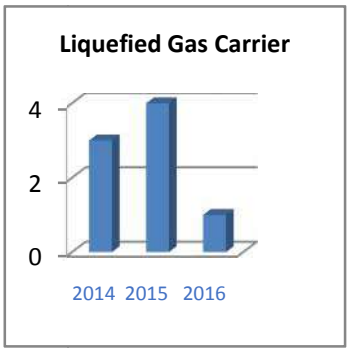

General cargo & Bulk carrier
40
20
0
2014 2015 2016

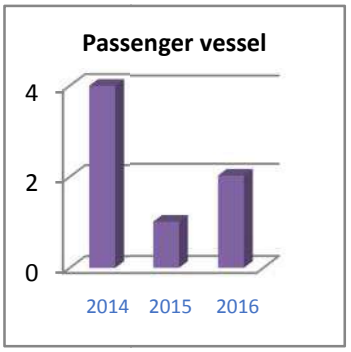

Container vessel
20
10
0
2014 2015 2016

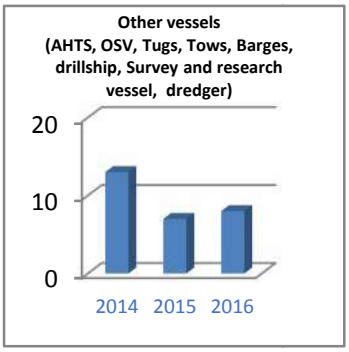

RO-RO/Vehicle/Car Carrier
3
2
1
0
2014 2015 2016


Crude Oil Tanker
8
6
4
2
0
2014 2015 2016


Chemical/Oil Product Tanker
10
5
0
2014 2015 2016


Liquefied Gas Carrier
4
2
0
2014 2015 2016

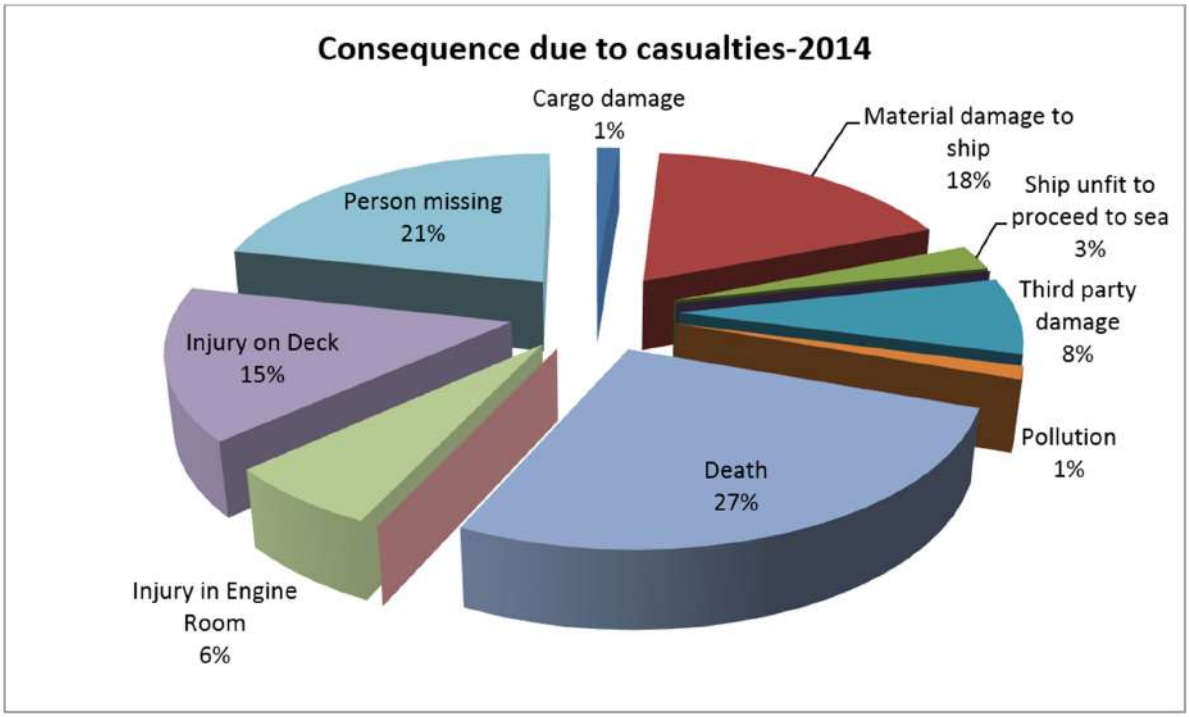

Passenger vessel
4
2
0
2014 2015 2016

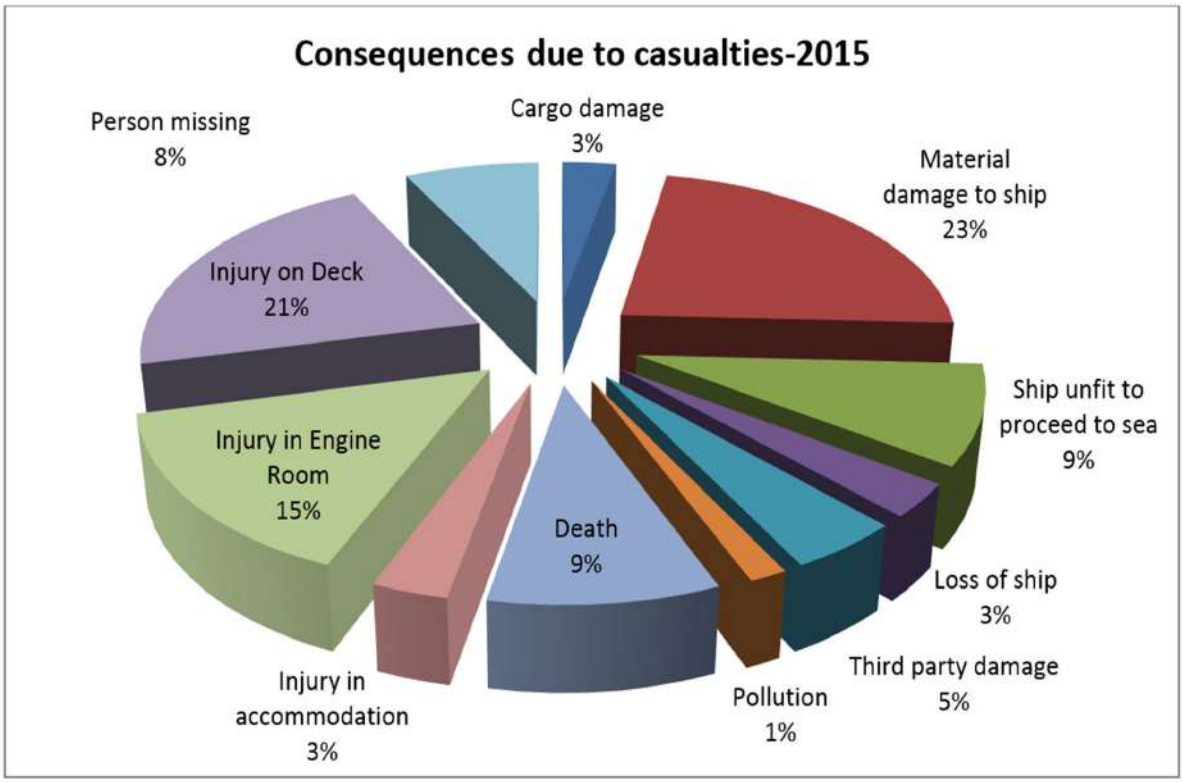

Other vessels (AHTS, OSV, Tugs, Tows, Barges, drillship, Survey and research vessel, dredger)
20
10
0
2014 2015 2016

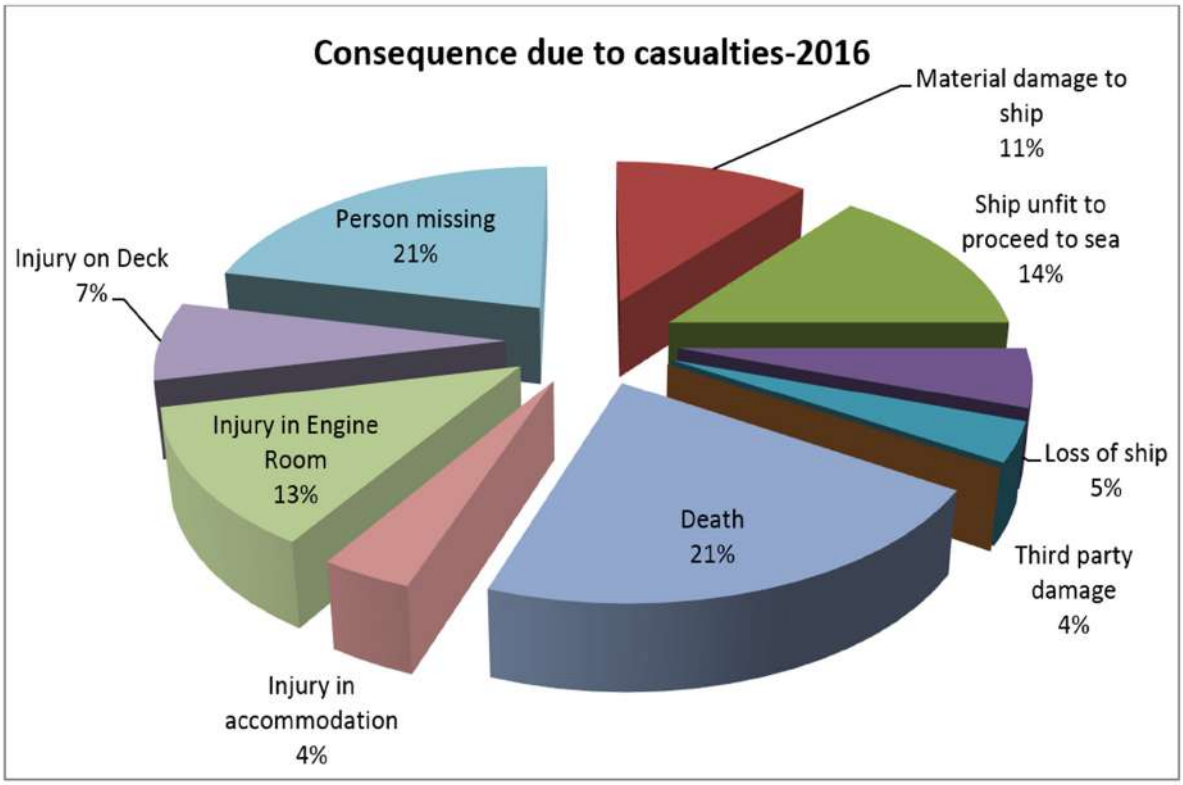
Statistics 4

Consequences due to casualties

S/No	Nature of consequence	2014	2015	2016	Total
1	Cargo damage	1	2	0	**3**
2	Material damage to ship	14	15	6	**35**
3	Ship unfit to proceed to sea	2	6	8	**16**
4	Loss of ship	0	2	3	**5**
5	Third party damage	6	3	2	**11**
6	Pollution	1	1	0	**2**
7	Death	21	6	12	**39**
8	Injury in accommodation	0	2	2	**4**
9	Injury in Engine Room	5	10	7	**22**
10	Injury on Deck	12	14	4	**30**
11	Person missing	17	5	12	**34**
	Total	**79**	**66**	**56**	**201**




Consequences due to casualties-2015
Person missing 8%
Cargo damage 3%
Material damage to ship 23%
Injury on Deck 21%
Ship unfit to proceed to sea 9%
Injury in Engine Room 15%
Death 9%
Loss of ship 3%
Third party damage 5%
Pollution 1%
Injury in accommodation 3%

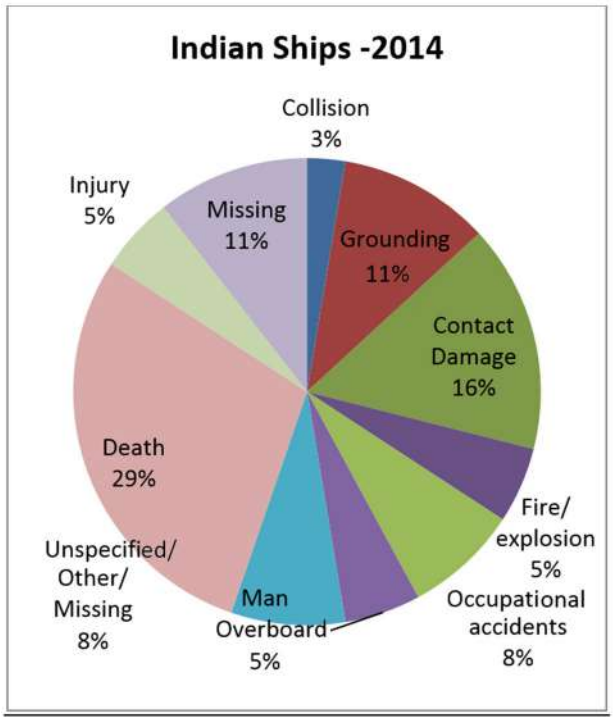

Consequence due to casualties-2016
Material damage to ship 11%
Ship unfit to proceed to sea 14%
Person missing 21%
Injury on Deck 7%
Injury in Engine Room 13%
Loss of ship 5%
Death 21%
Third party damage 4%
Injury in accommodation 4%

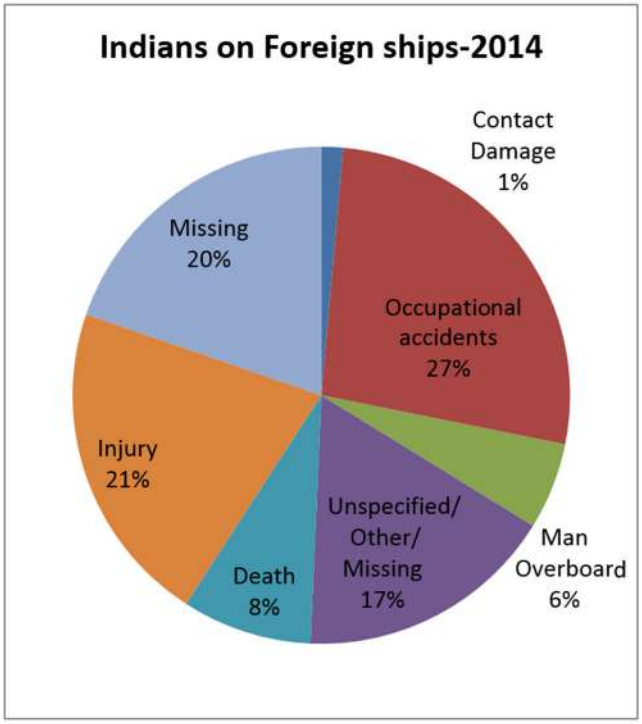
Statistics 5

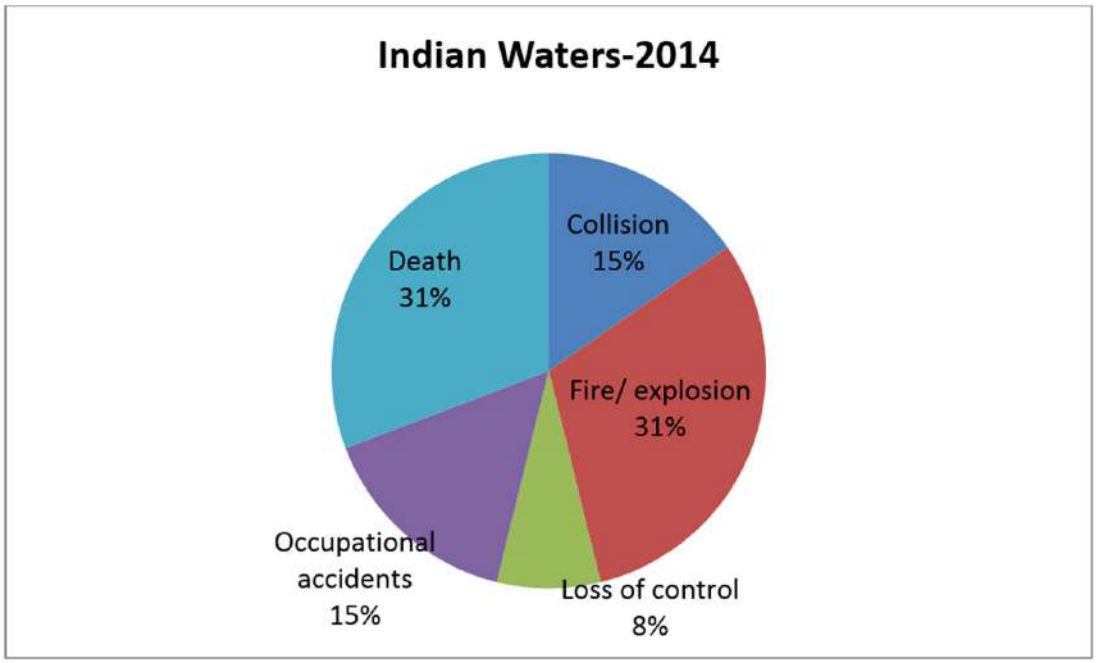
Comparison of casualty events and consequences involving (a) Indian seafarers on Indian ships, (b) Indian seafarers on foreign ships and (c) casualties occurring in Indian waters, other than those involving Indian ships or Indian seafarers.

		2014				2015				2016				Grand Total
	Casualty Event	(a) Indians on Indian ships	(b) Indians on foreign ships	(c) Casualties in Indian waters, however no Indian seafarers involved	Total	(a) Indians on Indiar ships	(b) Indians on foreign ships	(c) Casualties in Indian waters, however no Indian seafarers involved	Total	(a) Indians on Indian ships	(b) Indians on foreign ships	(c) Casualties in Indian waters, however no Indian seafarers involved	Total	
1	Collision	1	0	2	3	4	1	2	7	3	0	0	3	**13**
2	Grounding	4	0	0	4	5	0	3	8	5	0	0	5	**17**
3	Contact Damage	6	1	0	7	1	0	0	1	1	0	0	1	**9**
4	Fire/ explosion	2	0	4	6	0	1	0	1	1	1	1	3	**10**
5	Loss of control	0	0	1	1	2	0	1	3	1	0	0	1	**5**
6	Ship/ Equipment damage	0	0	0	0	2	0	0	2	0	0	0	0	**2**
7	Capsize/ Listing	0	0	0	0	0	0	0	0	0	1	0	1	**1**
8	Flooding/ Foundering	0	0	0	0	0	1	1	2	1	0	0	1	**3**
9	Occupational accidents	3	19	2	24	9	22	0	31	4	16	0	20	**75**
10	Man Overboard	2	4	0	6	3	2	0	5	3	2	0	5	**16**
11	Unspecified/ Other/ Missing	3	12	0	15	1	0	0	1	1	8	0	9	**25**
12	Sinking	0	0	0	0	0	0	0	0	1	0	1	2	**2**
13	Machinery failure	0	0	0	0	0	1	0	1	0	0	0	0	**1**
	Casualty consequence													
14	Death	11	6	4	21	2	4	0	6	2	10	0	12	**39**
15	Injury	2	15	0	17	7	19	0	26	3	10	0	13	**56**
16	Missing	4	13	0	17	3	2	0	5	4	8	0	12	**34**

Comparison of casualty events and consequences involving (a) Indian seafarers on Indian ships, (b) Indian seafarers on foreign ships and (c) casualties occurring in Indian waters, other than those involving Indian ships or Indian seafarers







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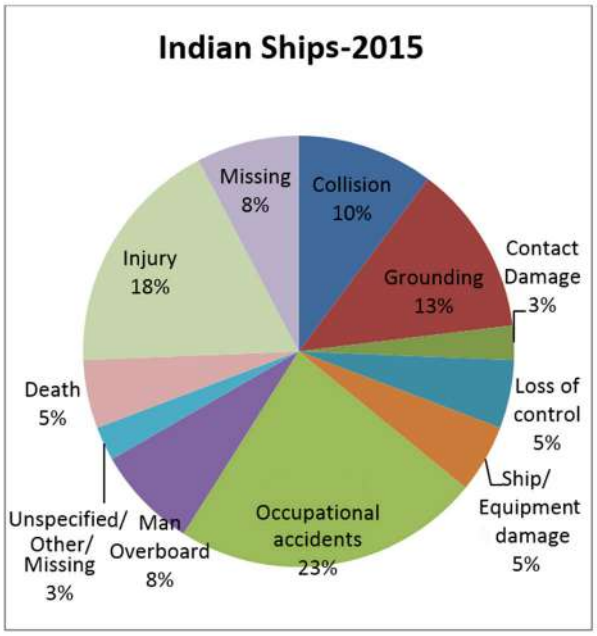

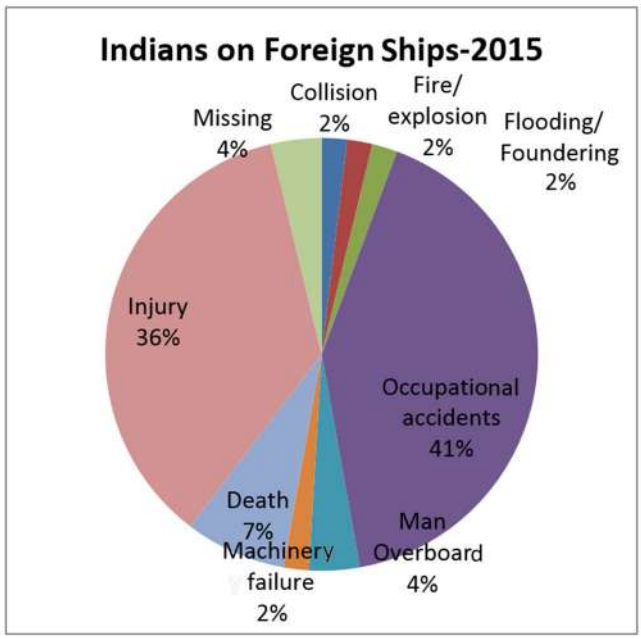

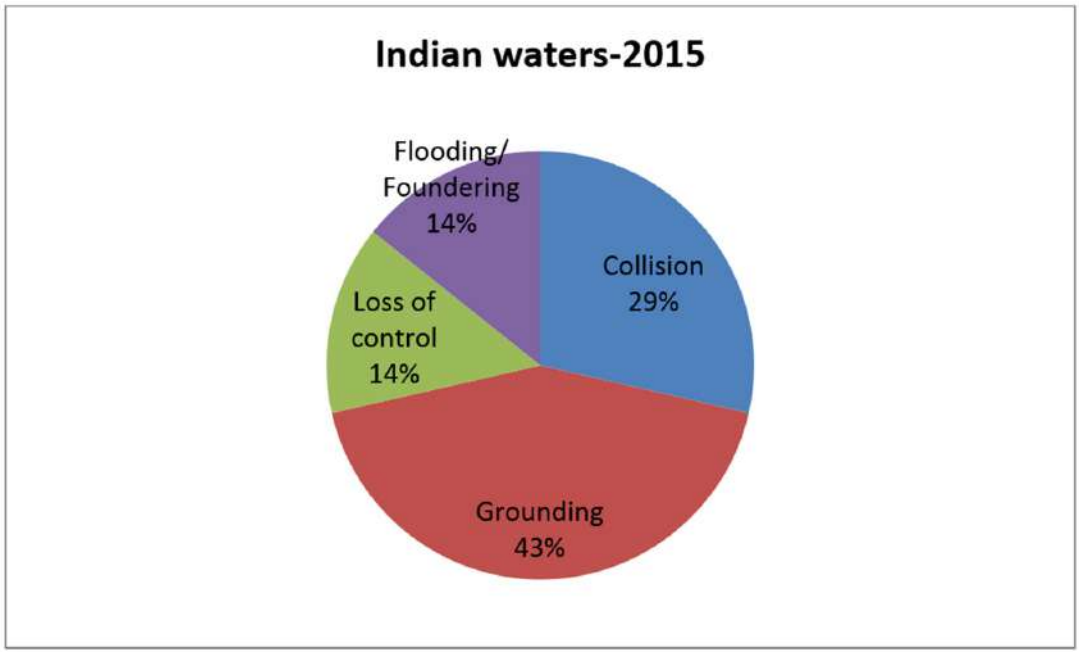

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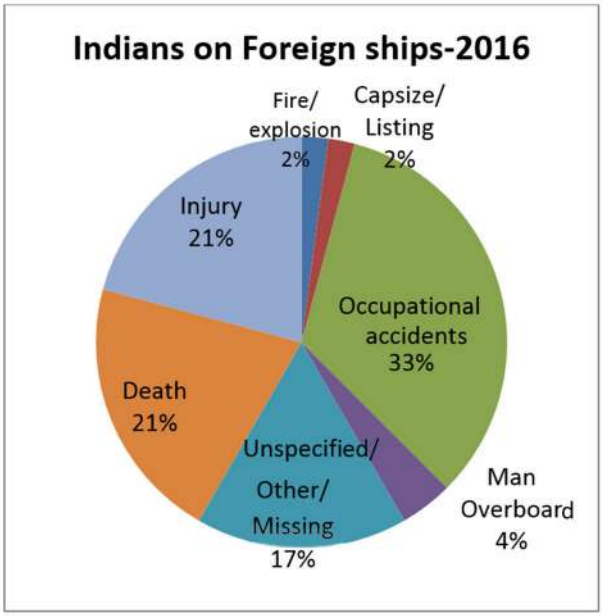
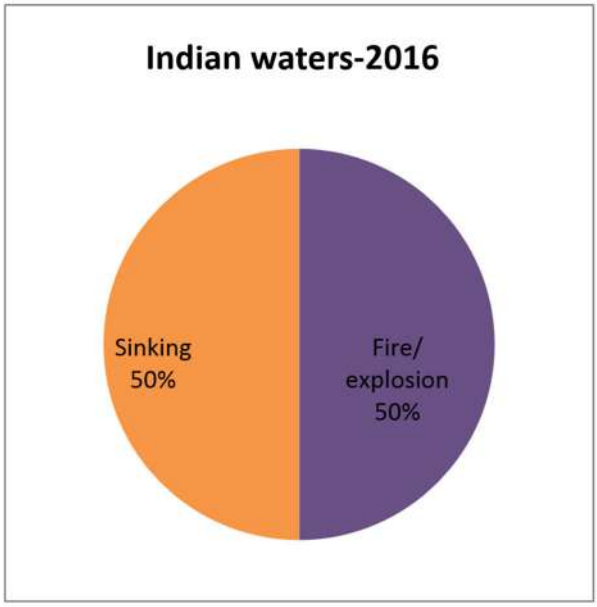
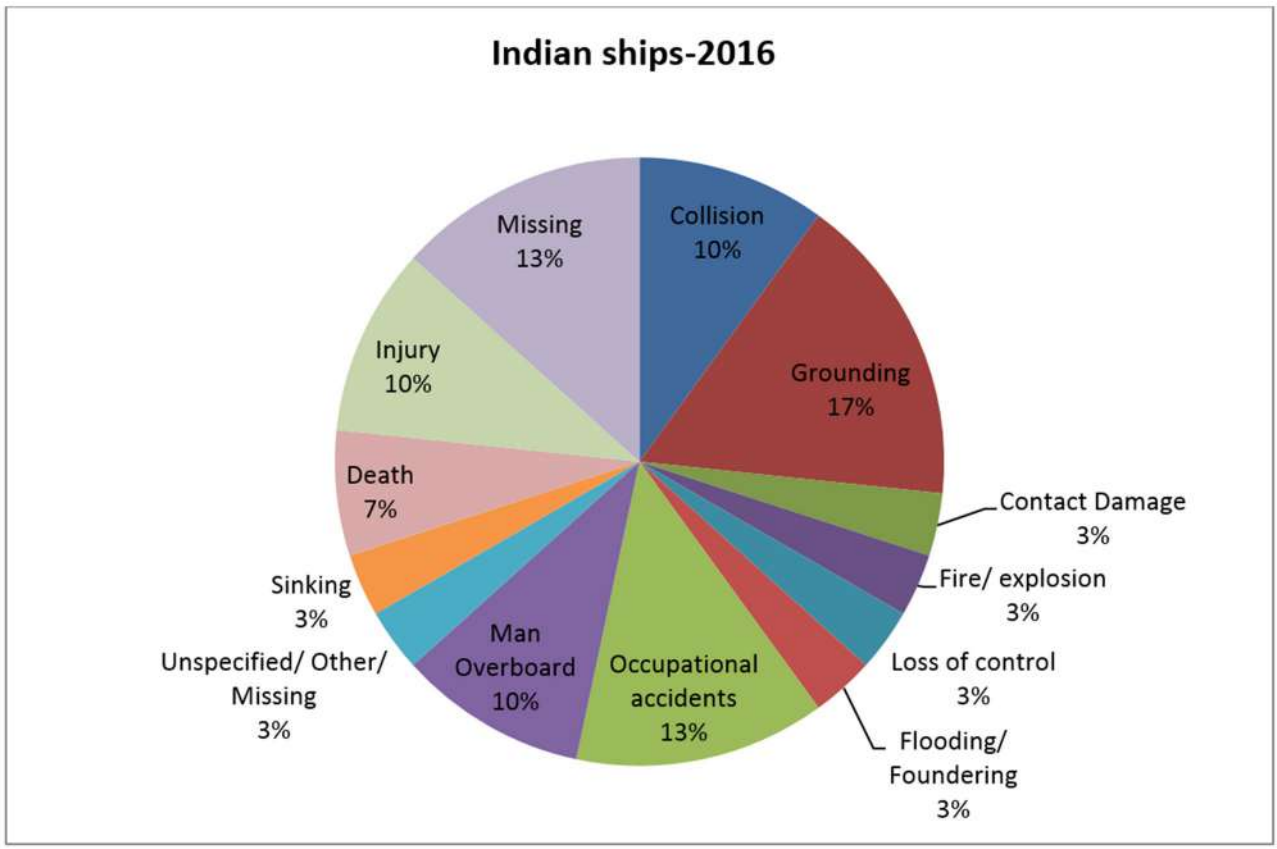


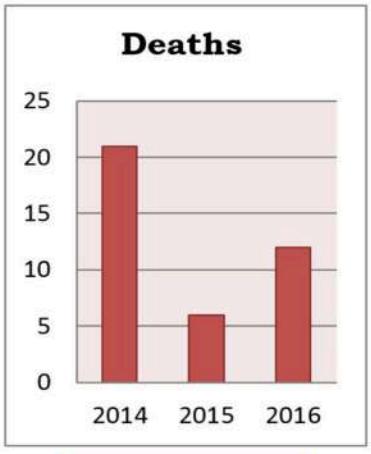


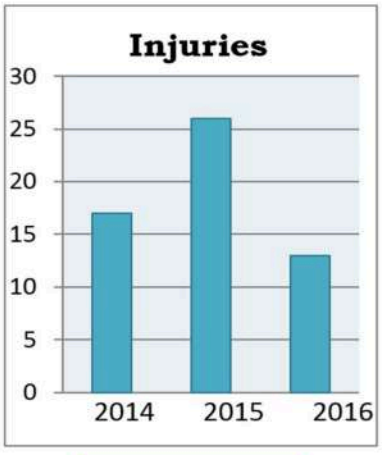


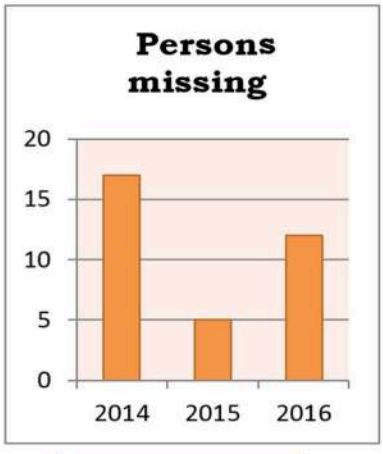
Statistics 6

Deaths, Injuries and persons gone missing

S/No.	Nature of human casualty	Year			Total
		2014	2015	2016	
1	Death	21	6	12	39
2	Injury to head, face and upper torso	5	7	5	17
3	Injury to hands, palms and fingers	7	13	5	25
4	Injury to foot and leg	5	6	3	14
5	Injury to abdominal area	0	0	0	0
6	Person gone missing	17	5	12	34
		55	**37**	**37**	**129**



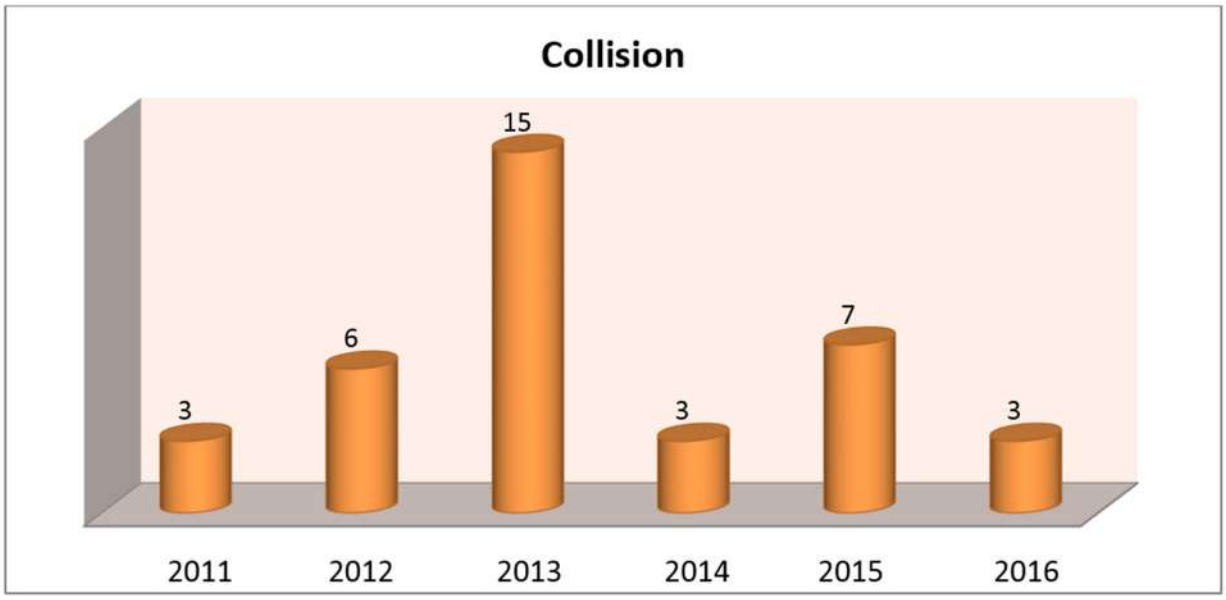




IV – TRENDS' ANALYSIS

Sr. No.	Casualty	2011	2012	2013	2014	2015	2016	Total
1	Collision	3	6	15	3	7	3	37
2	Grounding	15	6	7	4	8	5	45
3	Contact Damage	5	5	6	7	1	1	25
4	Fire/explosion	9	9	9	6	1	3	37
5	Missing	6	5	14	17	5	12	59
6	Pollution	4	2	1	1	1	0	9
7	Injuries	5	15	12	17	26	13	88
8	Death due to accidents	49	32	20	21	6	12	140
	Total	**96**	**80**	**84**	**76**	**55**	**49**	**440**

1. Trend Analysis - collision



1.1 After a brief decline in collision incidents in 2014 there was a noticeable increase in 2015.

1.2 Non-adherence to COLREGs, delay in taking appropriate actions and lack of situational awareness remained major causes behind collisions, which involved junior navigating officers. Collisions have also occurred when the vessels were under the direct con of master or senior officers. Such collisions took place during berthing, STS operation or when vessels were approaching / leaving ports. These trends indicate towards inadequate familiarity of the navigating staff with ship's manoeuvring characteristics and effect of weather, environmental, topographical and other conditions, including interaction, on manoeuvring of the vessel.

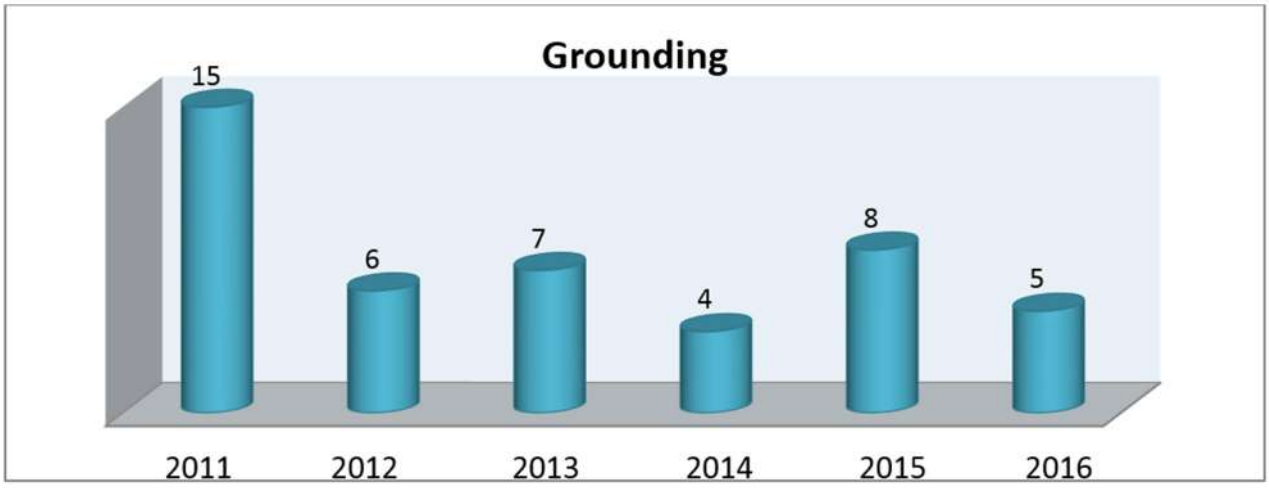
1.3 Inadequate passage planning has also contributed to collision incidents.

1.3 A vessel's turning behaviour may vary considerably due to factors such as wind, available depth etc. Understanding this limitation is critical for every navigating officer, as in a few cases it has been observed that actions to avoid close quarters situation with small crafts, such as fishing boat, were delayed significantly. By the time actions were initiated, there was left insufficient time for the vessels to act as desired.

1.4 Inadequate and inappropriate bridge watch levels have also contributed to such accidents. Reduction in the number of persons deployed on bridge as well as deploying watch keepers in duties other than watch keeping have acted as prime factors in certain cases. This calls for greater impetus behind effective bridge resource management.

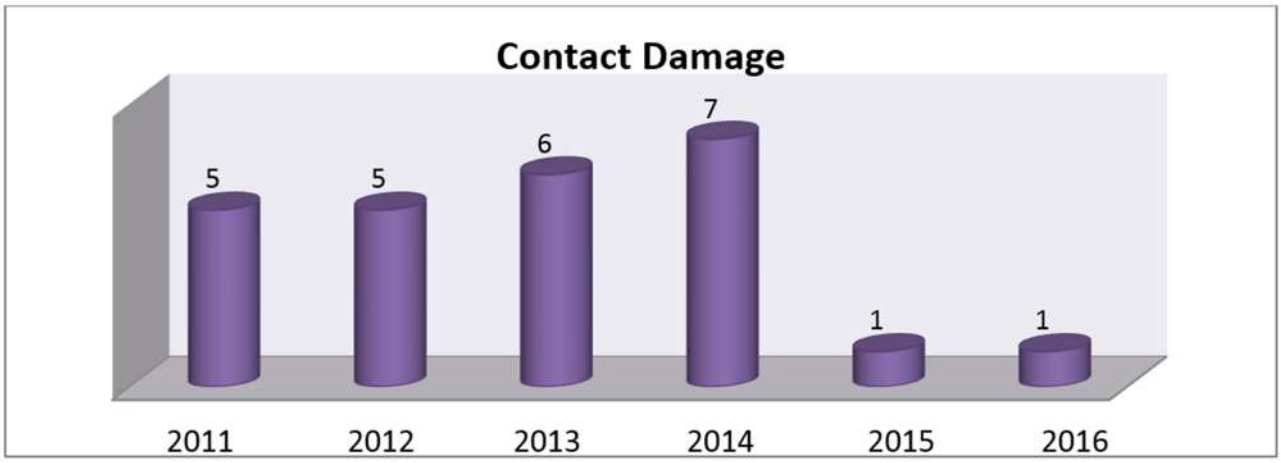
1.5 VTS/ VTMS could have assumed greater role in the avoidance of a couple of collision incidents. Strengthening of such services may be considered.

2. Trend Analysis - Grounding



2.1 While improper manoeuvring and underestimation of the effects of weather and currents by the bridge team remained prime causes behind various grounding incidents, there has been an incident where correct depths were not available with the vessel. Maritime safety information in this regards had not been timely promulgated. The Directorate is strengthening inspections of ports under NSPC, to avoid any such recurrence.

3. Trend Analysis -Contact Damage

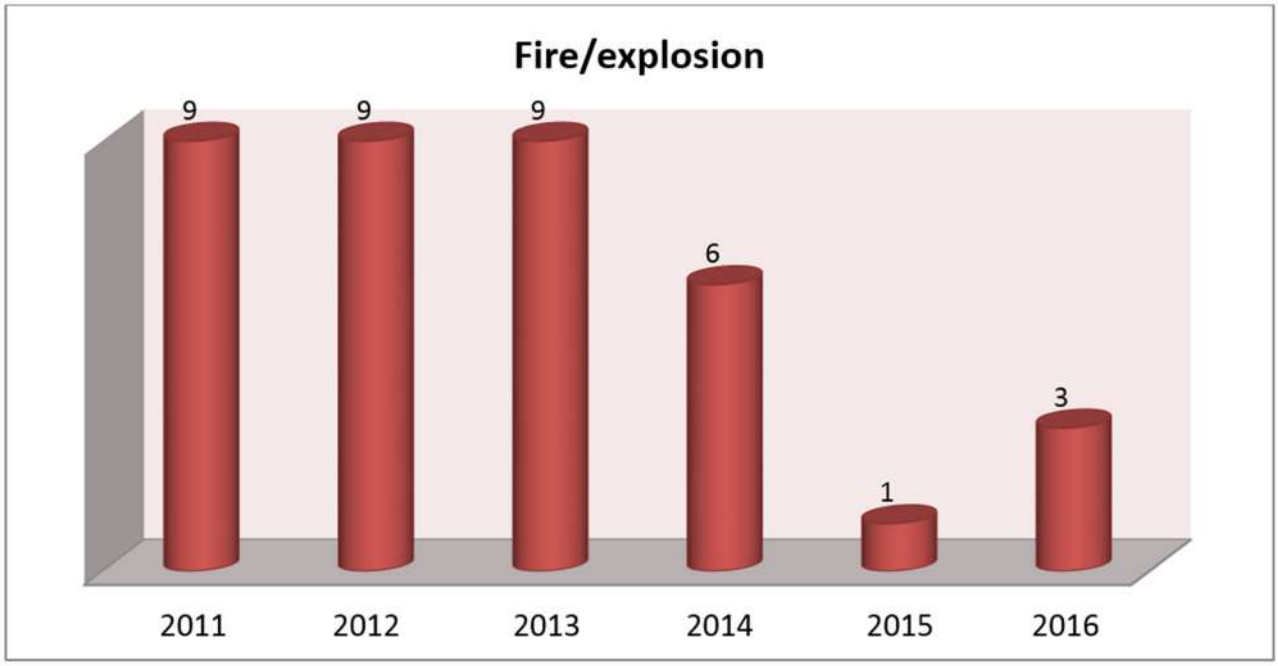


3.1 Errors in navigation again appeared as prime factors in contact damages.

3.2 However other than navigational errors, contact damages also occurred due to hardware failures such as parting of tug's lines etc.

3.3 Not keeping safety margins and not having ready a back up plan in case of failure of any equipment also contributed in a few incidents.

4. Trend Analysis -Fire/ Explosion



4.1 There was a reduction in the number of fire accidents, in particular those involving Indian seafarers, in the past three years however the incidents continued to happen.

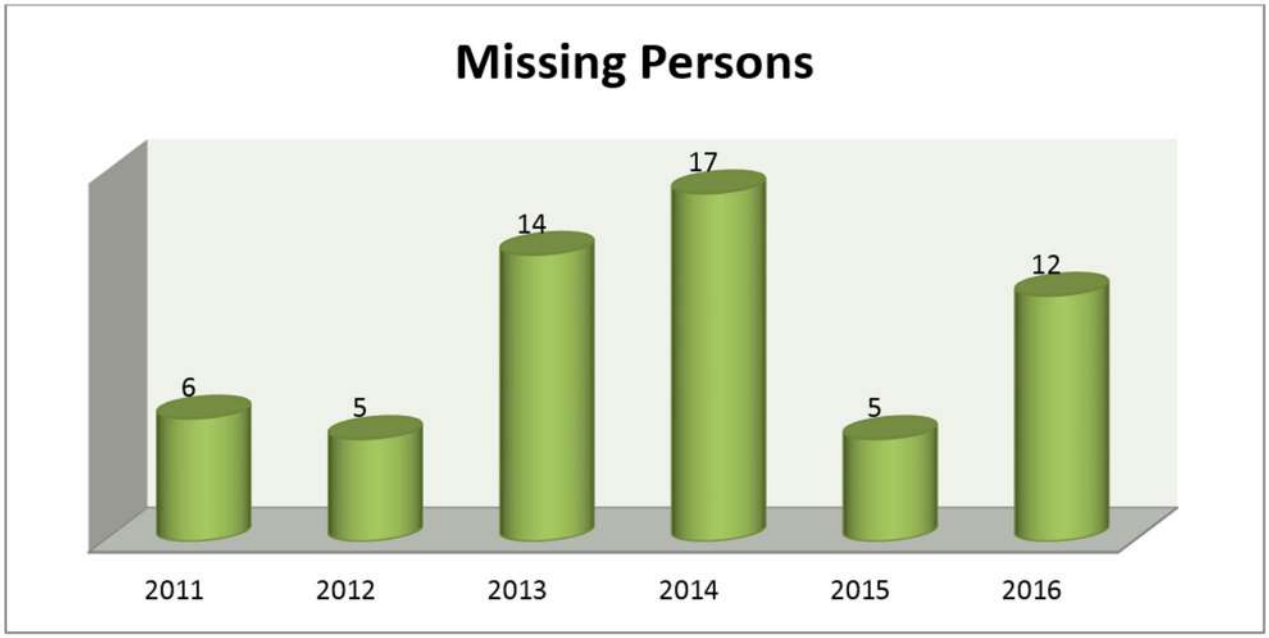
4.2 Such fire incidents were spread through different locations on ships, varying from deck to engine room to accommodation. The causes behind such fires were also varied, varying from basic negligence, wherein an iron used for ironing clothes was supposedly left unattended on the bed to major failures in safety procedures such as explosion in a cargo tank during dry docking.

4.3 Fire incidents in engine room continue to raise concerns

4.4 There was an explosion in cargo hold of a container vessel reportedly due to incorrect declaration of cargo stowed in containers. Appropriate stowage and carriage requirements therefore could not be followed. Also due to lack of correct information about the cargo, correct contingency measures could not be deployed. Stricter implementation of regulations in regards to declaration of cargoes may therefore be considered.

4.5 While the number of fire incidents was reduced, a worrisome factor that has emerged is the way in which some of these fires, in particular on coastal vessels and MSVs, were dealt with. The fire fighting techniques deployed by vessel's staff in such cases, were not in accordance with the established contingency plans.

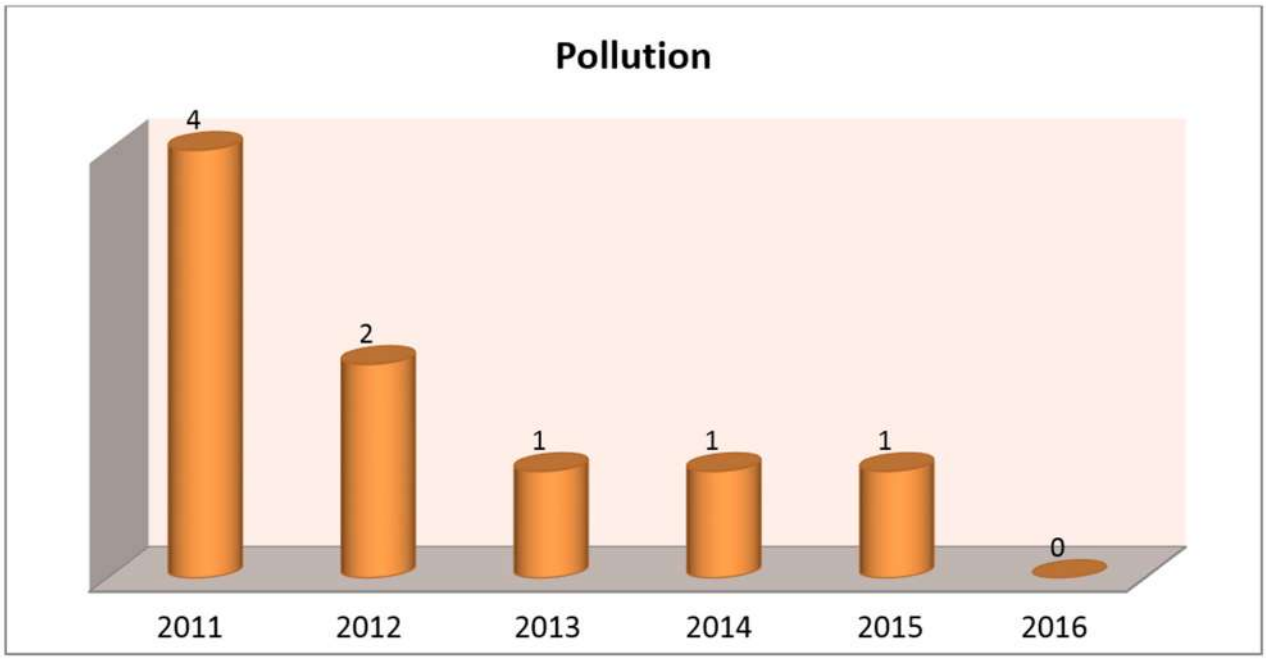
5. Trend Analysis -Missing Persons



5.1 There is an increase in the number of Indian seafarers and passengers who went missing from ships In between 2014 to 2016. While accidentally falling overboard remained prime cause, the reasons remained unspecified/ unknown in many other missing persons' cases.

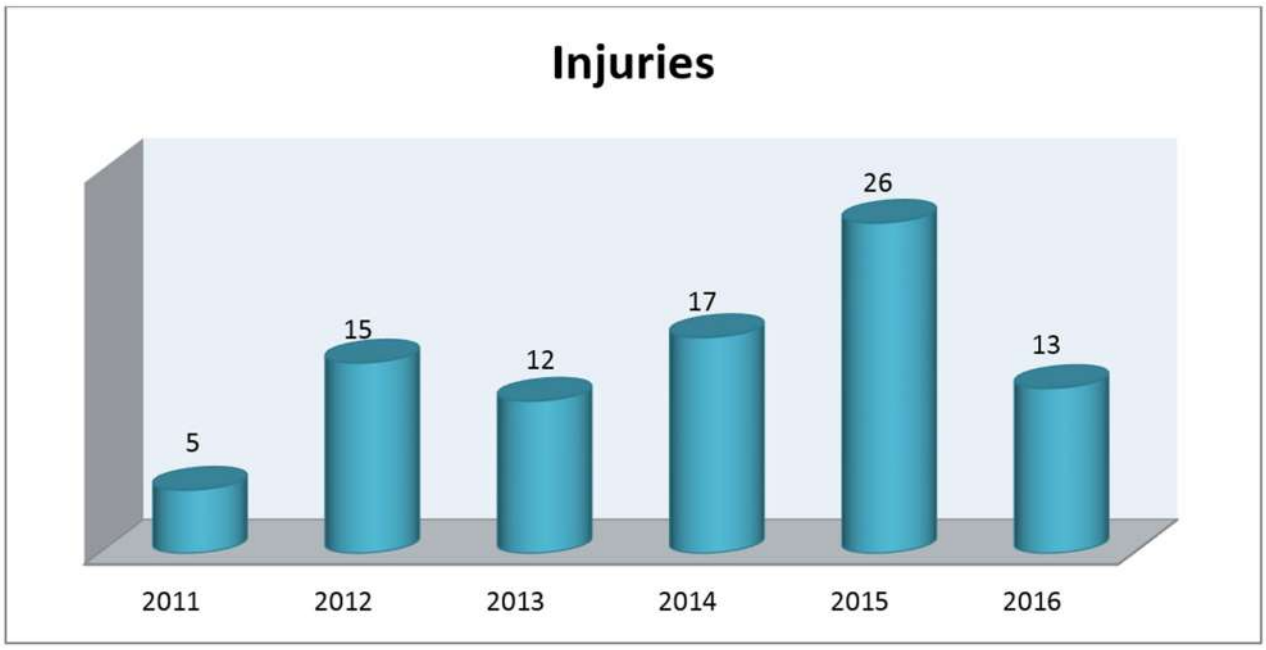
5.2 Psychological distress can be one of such unknown factors wherein the missing person may have taken suicidal steps.

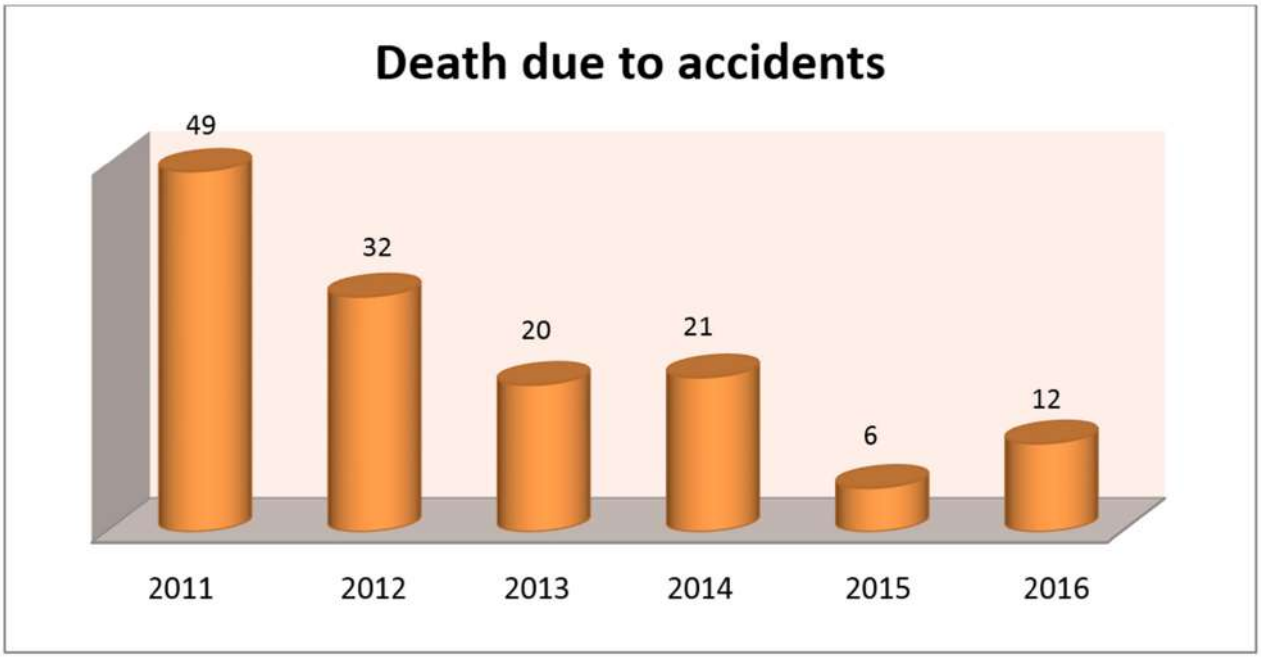
6. Trend Analysis -Pollution Incidents



6.1 Other than keeping a check on sub standard ships from plying in Indian waters through PSC and FSI, the Directorate is taking strong measures in coordination with various stakeholders to eliminate operational and deliberate pollution. Reception facilities at various ports are being reviewed and strengthened.

7. Trend Analysis -Injuries and Accidental deaths





7.1 There is a noticeable increase in the number of injuries, which is worrisome. Although the number of accidental deaths declined, still it remains unacceptable.

7.2 Various casualties could have been easily averted by application of basic competencies, proficiencies, skills and/or seamanship which a seafarer is expected to acquire during various pre and post sea competency and modular trainings.

7.3 Majority of injuries and deaths involved young seafarers with lesser on job experience. This indicates lack of guidance, mentorship and friendly dialogue from seniors. These have remained strong elements of on board training.

7.4 Lack of situational awareness and haste have been major factors. It is observed that safety measures were circumvented in cases in hurry to complete a job or to achieve commercial deadlines.

7.5 Ineffective resource management remained a major cause as personnel deployed for a particular task may not have been competent and sufficiently experienced for such job. Besides nobody was deployed for supervision and safety monitoring in many critical operations. In some cases, crew were left to work alone in isolated and high risk areas. Poor resource management also led to fatigued seafarers getting assigned for jobs when their alertness and decision making is already adversely affected.

7.6 Assigning lesser crew than what may have been required for safe conduct of a job also acted as a major contributing factor, in particular in mooring related incidents.

7.7 Any form of formal risk assessment was observed missing in various cases. Basic safety measures such as arranging temporary guard rails, display of warning notices etc. is also observed missing.

7.8 Casualties have continued to happen with persons falling from height be it in tanks, in engine room or overboard, into water. Other than training seafarers in working aloft and over side procedures this also calls for ensuring quality of access ladders as well as availability of personal protective equipment and floatation devices for working aloft and over side.

7.9 Casualties in enclosed spaces continued unabated during the three years. This despite the fact that IMO had come out with circular in this regards and most of the PSCs ran a concentrated campaign on the issue. The casualties indicate that efforts cannot be relented in this direction.

7.10 Injuries while working with incinerator and while trying to take photographs of inner liner surface from scavenge space have emerged prime from those in engine room.

7.11 Injuries, in particular burn injuries, have been sustained while working on equipment which were not cleaned free of combustible material, ventilated and isolated again indicating inadequate risk analysis.

7.12 Slips, trips, incorrect lifting postures, use of improper tools, incorrect use of pneumatic and hydraulic high pressure equipment, tripping body parts in moving machinery etc. have all led to various injuries. A majority of such casualties could have been avoided by good housekeeping, proper securing of loose gear, effective guarding of moving parts of machinery and application of basic seamanship.

7.13 A few fatalities could have been avoided, had timely medical assistance from ship or from shore been provided to the deceased. In view of the above augmentation of medical evacuation arrangements may be considered.

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