OUTCOME OF THE THIRTEENTH SESSION OF THE SUB-COMMITTEE ON FLAG STATE IMPLEMENTATION

LESSONS LEARNED FOR PRESENTATION TO SEAFARERS

1 MACHINERY DAMAGE

1.1 What happened?

Whilst trawling, the engineer on watch noticed the main engine surging with smoky exhaust. Further investigation revealed a flooded engine room and the main engine three-quarters submerged. The bilge alarm had not activated. Flooding was progressive and the crew had to abandon the trawler.

Why did it happen?

The exact cause of the flooding could not be determined but failure of an expansion coupling due to excessive stress or a hole/crack due to fatigue failure, erosion, corrosion and galvanic corrosion are pragmatic possibilities. Furthermore, the bilge alarm failed to activate and the seawater suction valves were immediately submerged and hence inaccessible.

What can we learn?

Bilge alarms should be tested at least on a daily basis. Fitting of extended spindles on seawater suction valves may avoid inaccessibility of valves and loss of control of seawater ingress.

2 DAMAGE TO SHIP OR EQUIPMENT

2.1 What happened?

The freezer trawler suffered a major failure in the factory freezer equipment, resulting in the entire release of the refrigerant into the engine room, displacing the oxygen and shutting down the main and auxiliary engines. Hours later, the trawler developed a list of about 8° to 10°, increasing to approximately 29° due to an accumulation of seawater on the starboard side. Subsequently, the crew called for assistance and abandoned the trawler. Twenty-five minutes later, she downflooded and sank stern first.

Why did it happen?

The shutdown of all equipment prevented the operation of the seawater discharge pumps. Screw down non-return valves were partially obstructed by waste debris and the unavailability of anti-syphon loops assisted in the ingress of seawater. Furthermore, weathertight and watertight closures were not effectively sealed against downflooding.

What can we learn?

The importance of ensuring that are closures are tight against downflooding. Shore Authorities should be alerted during the early stages of the occurrence to ensure timely search and rescue.

2.2 What happened?

During a lifeboat drill in port, the crew of a container ship had some problems hoisting the boat using the davit winch motor controls at the boat deck. The drill was abandoned but as the lifeboat was swinging clear of the boat deck it was thought to be too risky to disembark the crew. After some time manually hoisting the boat using the winch handle and making several attempts to diagnose the winch motor electrical fault, the decision was made to run the winch motor by manually operating the motor contactor from the remote starter panel.

The electrician, who was to operate the motor, was in radio contact with the mate on deck. The lifeboat was raised using this method and just before it reached the head of the davit the mate told the electrician to 'stop', however the winch motor continued to run and the fall wires parted after the davit cradles reached their stops. The boat fell to the boat deck initially where it stopped until the falling davit cables impacted the inboard side causing the lifeboat to fall approximately 16 m to the water. There were seven crew aboard the lifeboat, one was killed and three others were seriously injured.

Why did it happen?

- The crew should have been disembarked from the lifeboat when the local winch controls were found to be inoperable.
- They did not have sufficient knowledge of the lifeboat winches' motor control system.
- The operation of the winch motor by manually operating the motor contactor by-passed the motor's safety cut-outs.
- The crew did not operate the local emergency stop button when the lifeboat reached the davit head which would have stopped the winch motor.

What can we learn?

Never hoist a lifeboat by manually operating the winch motor contactor to by-pass the normal safety cut-outs.

2.3 What happened?

During a lifeboat drill the crew had difficulty resetting the lifeboat's on-load release hooks. The forward hook opened spontaneously when the lifeboat had been hoisted just clear of the water. The forward end of the lifeboat fell to the water but it was undamaged and there were no injuries to the crew. The boat was eventually recovered after it had been lowered back to the water and the hooks correctly reset.

Why did it happen?

- The forward hook had not been correctly reset.
- The design of the on-load release system allowed the operating handles to be moved to the reset position and locked when the hook locking mechanisms were not fully engaged.
- The crew could not clearly observe when the hook locking mechanisms were fully and correctly reset.
- The crew did not have an adequate understanding of the operation of the on-load release system.
- There had been similar incidents in the past which had not been fully investigated or led to appropriate safety actions.

What can we learn?

The operation and maintenance of lifeboat on-load release systems presents a significant danger to ships' crews. Every ship should have thorough, type-specific, crew training and detailed operation and maintenance instructions for these systems.

2.4 What happened?

A ship had undergone a port state control inspection and a number of deficiencies were noted, in particular, that the on-load release hooks on the starboard lifeboat were seized. The next day the starboard lifeboat was lowered to the water so two seamen could free up and grease the hooks. When they had completed their work, the lifeboat was hoisted back to the embarkation deck and the mate boarded the lifeboat to inspect the work. Approximately 30 seconds to a minute later, the forward hook opened spontaneously and the lifeboat was left hanging vertically from the after fall. The two seamen and the mate fell into the water. The two seamen, who were wearing lifejackets, managed to bring the mate to the surface and were picked up a short time later by a pilot launch. The seamen had both sustained minor injuries and the mate was hospitalized with more serious injuries.

Why did it happen?

- The release mechanism was poorly maintained and in an unsafe condition.
- The safety pin securing the release lever was missing.
- It is possible that the forward hook was either not fully reset or that the crew in the lifeboat accidentally tripped the release lever.
- The crew did not have sufficient training or instructions to safely maintain the system.
- The on-load release manufacturer's operating and maintenance instructions were not in the language of the crew.
- The ship had no system in place to ensure that the repair and testing of the on-load release system was carried out safely and effectively.
- An ISM Code audit carried out on behalf of the flag Authority did not ensure that the instructions for the maintenance of the lifeboat release system were appropriate, comprehensive and easily understood by the crew.

What can we learn?

Operations involving the maintenance and operation of lifeboat on-load release systems are inherently risky. Every ship should have safe procedures and detailed instructions, easily understood by the crew, for the maintenance and operation of these systems.

2.5 What happened?

A ship was undergoing a survey and audit during a change of ownership. The surveyor requested that the port lifeboat be lowered to the water and the on-load release hooks operated. When the crew had reset the on-load release hooks and reconnected the falls the boat was hoisted to the embarkation level where two of the five crew exited the boat. The mate and two others were left to complete stowing the boat. When the mate was stowing the operating handle for the on-load release system, both on-load release hooks opened and the lifeboat fell 19 metres to the water below. One crew member suffered serious head injuries and required hospitalization, the mate and the other crew member sustained minor injuries and shock.

Why did it happen?

- The crew had not placed a critical locking pin in the on-load release operating mechanism when resetting the system prior to the lifeboat being recovered.
- None of the crew had an adequate knowledge of operation of the on-load release system.
- The ship was in the process of being handed over to new owners and so there was limited time for the new crew to familiarize themselves with the operation of the on-load release system.
- The instructions for resetting the on-load release system inside the lifeboat were inadequate.
- Warning plates and advice issued by the lifeboat manufacturer after a similar incident on another ship had not been supplied to the vessel.

What can we learn?

Crew must have a thorough knowledge of the operation of their lifeboat's on-load release system before drills are conducted. On-load release system manufacturers should make sure that ships fitted with their equipment receive safety notices relating to the prevention of accidents involving their equipment.

2.6 What happened?

A lifeboat had been sent ashore for some repairs. While the lifeboat was ashore contractors had partly disassembled the davit winch to check the brakes in preparation for a load test. When the lifeboat was returned to the ship, two crew members boarded to connect the davit falls to the hooks and remained in the boat as it was hoisted. The boat was hoisted normally using the davit winch motor and when it reached the head of the davit hoisting was stopped. At this point the lifeboat began to fall under gravity and continued to descend despite the crew's efforts to stop it using the davit winch brake. After striking the edge of the quay, the lifeboat landed in the water between the ship and the quay. Both crew in the boat were slightly injured and the lifeboat sustained damage.

Why did it happen?

- The lifeboat ran away because the davit winch brake had been incorrectly assembled.
- The vessel carried no instructions or diagrams showing the correct method of assembling the winch brake.
- The work on the davit winch brake was performed by contractors having limited knowledge of the system.
- The hazards associated with the lifeboat operation were not fully recognized, thus a safe plan for the work was not put in place.

What can we learn?

Maintenance of load bearing equipment on lifeboats and davits may be risky and should be carefully planned and performed by well trained personnel. An unmanned test of the equipment should be conducted after such maintenance has been performed.

2.7 What happened?

During the recovery of the nets on a fishing vessel two deckhands were passing a heaving line forward in preparation for bringing the catch aboard. One of the deckhands was standing on the top deck under the starboard main warp waiting to receive the heaving line from the deckhand standing out of sight on the poop below. The deckhand on the poop heard a loud bang and looked up to see that the starboard main warp block had failed. The warp block had released the loaded warp wire, which had fallen on the other deckhand. The skipper in the wheelhouse looked out and saw the deckhand on the top deck lying limp over the hand rail. The crew carried the injured deckhand to the wheelhouse where they found that he had died.

Why did it happen?

- The warp block had failed because a thin sleeve fitted in the bearing housing of the sheave had worked outward and cut a hole in the adjacent cheek plate.
- Maintenance on the warp block was insufficient to detect the impending failure.
- There was no requirement for hauling equipment to be tested and examined at regular intervals.
- The operation of passing the heaving line forward was risky as it meant that a deckhand had to regularly work under the loaded warp.

What can we learn?

Fishing vessels and their operations should be designed so that crews do not have to work in near fishing gear under load. Fishing vessel hauling equipment should be designed and maintained in the same way as lifting equipment.

2.8 What happened?

The crew of a passenger vessel were conducting a training evolution on the vessel's fast rescue boat (FRB) while the ship was underway. The boat was lowered with three crew aboard. When it took the water, the engine was running and the boat was being towed by the painter with the suspension hook still connected. At this point the painter was inadvertently released and as the suspension hook was still connected, the boat broached and threw one crewman into the sea. The master quickly stopped the ship and a second boat was launched to recover the FRB's crew. The FRB and its davit had sustained some damage and the crewman who had been immersed in the sea suffered some effects from his time in the cold water.

Why did it happen?

- The boat's painter was disconnected before the suspension hook.
- The boat's crew made assumptions about procedures, which resulted in confusion among the crew.
- The crew's incorrect assumptions were the result of a lack of adequate preparation and briefing for the drill.

What can we learn?

Launching lifeboats or fast rescue craft when the ship is underway is risky and so the crew must be thoroughly prepared and work as a team.

2.9 What happened?

During his engine room rounds on a passenger ship an engineer attempted to pass through a closed watertight door. He operated the local controls to start opening the door, and, when it had opened sufficiently to allow him to pass through, he set the door to close. As the door was closing he began to step through. Then either his boiler suit became snagged, or something else caused him to hesitate, which delayed his progress through the door. Despite his frantic attempts to reverse the movement of the door, it closed on his upper left arm crushing it. He was able to free his arm from the door and seek help. Three hours later he was landed, but efforts to save his crushed arm failed and it had to be amputated.

Why did it happen?

- The third engineer did not open the watertight door fully, in accordance with the operating instructions, before attempting to pass through.
- The high number of door operations and time taken to operate the doors each time may have led to the third engineer taking a 'short cut'.
- There was a lack of clear, consistent and practical operating instructions for the watertight doors.
- There were many previous instances where the crew were found to be taking 'short cuts' when operating the watertight doors. These incidents had been dealt with as disciplinary matters, so the safety issues were not properly recognized.

What can we learn?

Operations involving watertight doors are risky and so every ship must have clear, consistent and practical operating instructions, which are followed by all crew.

2.10 What happened?

A scallop fishing vessel was working in rough seas. As the fishing gear was being raised in preparation for being lowered into the water, the vessel rolled to starboard. The roll caused a heavy steel towing bar to swing inboard and strike a deckhand's head. A short time later the skipper noticed the deckhand lying on the deck. Despite the efforts of the crew and the emergency services the deckhand died of his head injury.

Why did it happen?

- Although he was an experienced fisherman, the deckhand was new to the vessel and was not experienced in some of the vessel's procedures for shooting the fishing gear.
- The induction training given to the deckhand was minimal.
- The skipper was unable to monitor the safety of all of the crew when the fishing gear was being shot.
- There had been no formal assessment of risks associated with the fishing vessel's operations.

What can we learn?

Handling heavy items of equipment which are suspended on a vessel subject to the motions of the sea is dangerous. The risks of these operations must be carefully considered and minimized by having safe procedures and good crew training.

3 WORK RELATED ACCIDENTS

3.1 What happened?

Two engine-room crew engaging on maintenance work on the port boiler main steam stop valve of a passenger cruise ship were badly scalded when boiling water suddenly discharged from a pipeline. One of the two crew subsequently died and the other was seriously injured.

Why did it happen?

- The valve isolating the port boiler from the engine-room steam ring main was leaking but the leakage was not detected by the ship's senior engineer.
- Steam leaked across the isolating valve condensed and accumulated in a vertical section of the steam pipe above the valve and the condensate could not be effectively drained due to inadequate drainage facility.
- When the port boiler main steam stop valve located further upstream of the steam pipe was opened up for maintenance, depressurization of the pipeline increased the leakage rate across the insolating valve. This lead to sudden eruption of steam under the condensate layer, discharging boiling water through the opened main stop valve.
- The ship's engineers were aware of the difficulty in draining the steam pipelines during their normal operation. However the difficulty was regarded as a technical rather than a safety issue.
- This resulted in the problem not being reported to senior management for rectification.

What can we learn?

Adequate drainage facility must be provided to different sections of steam pipelines to avoid any possible accumulation of condensate within the pipelines.

When part of a steam plant is to be isolated and opened up for maintenance, care must be taken to ensure that there is no leakage from the other part of the plant containing live steam.

It is important to ensure that safety issues that may arise from technical operational matters are properly assessed and reported to higher management level under the shipboard safety management system.

3.2 What happened?

During the operation to hang off the outhaul wire for the port drag scraper cargo bucket on to the port coaming, the bosun of a aggregate suction dredger was trapped between the rotating aft loading tower reject chute and the port coaming and was fatally injured.

Why did it happen?

- The method of hanging-off the outhaul wire using the forward loading tower was proposed by the crew without given consideration to the safety implications of operating the loading tower while crewmembers stood in hazardous positions.
- The second mate, who was relatively new to the vessel and had not been properly instructed on the operation, mistakenly believed that both fore and aft loading towers were required for the operation.
- When he was asked to operate the loading tower from the bridge loading console, he operated the aft loading tower without noticing that the bosun was then standing on a platform between the aft tower and the port coaming.
- The bosun was trapped between the rotating aft loading tower reject chute and the coaming and sustained fatal injury.

What can we learn?

- It is important to assess the risks associated with ship-specific shipboard operations and to include the operational procedures in the ISM documentation.
- Crewmembers responsible for particular operations should be suitably instructed or trained.
- Any hazardous incidents should be reported and reviewed under the shipboard Safety Management System.
- When operating hazardous equipment, it is important to ensure that communication is perfectly clear such that no misunderstanding can occur, and that all personnel are staying clear of hazardous positions.

3.3 What happened?

A cargo ship was docking in severe weather conditions. During the operation to connect the forward tug, considerable tension was applied to the towing hawser before it was made fast. The towing hawser came over the lip of the bits on which it was to be made fast with tremendous force, striking a crew member who was standing in a vulnerable position. The crew member died from the injury he sustained.

Why did it happen?

- The ship's mooring line was used as the towing hawser which had not been made fast before it was passed to the tug.
- The tug was probably going ahead to clear the rope in the water near its propellers while the cargo ship was going astern to close its berth, thus exerting tension on the line suddenly.
- The crew member was standing in a danger zone and had no time to react.

What can we learn?

- All personnel should stand clear of ropes under tension and those that may come under tension.
- The risks associated with working with tugs, including using ship's mooring line as towing hawser, should be adequately assessed.
- If a ship's line is to be used as a towing hawser it should be slacked away to the deck of the tug in a controlled manner, and be capable of turned up on the bits to be made fast without requiring personnel to enter into a danger zone.
- Masters should assess the risk of berthing under extreme weather conditions and consider the postponement of entry into port as appropriate.

3.4 What happened?

A young and inexperienced fisherman who had just joined a scallop dredger as a deckhand disappeared while the vessel was engaging in scallop dredging operation. At the time of the incident he was sorting out scallops from the dredges on the port side near the bulwark, which was not directly in the sight of the skipper in the wheelhouse or the other deckhand working on the starboard side. His work involved sorting out scallops from the dredges dumped on deck before pushing/kicking the residue back overboard through the scuppers. The scuppers were fitted with removable centre-hinged flaps usually wedged about three-quarters open. Subsequent to the incident, one scupper flap on the port bulwark was found to have been deliberately removed and stowed in the adjacent frame space of the bulwark.

Why did it happen?

- The cause of the loss of the fisherman overboard cannot be established with certainty.
- He might have removed the scupper flat to facilitate pushing large piece of residue overboard, but in doing so inadvertently slid through the scupper opening.
- The lack of experience of the fisherman might have been a factor of his loss overboard.

What can we learn?

The importance for young persons seeking to join the fishing industry to undergo appropriate pre-sea safety training.

4 FIRE

4.1 What happened?

A fire broke out in the aft engine room of a passenger ro-ro ferry. The watchkeeping engineer tried to extinguish the fire using portable fire extinguisher but was not successful. Further attempt by the engineers to extinguish the fire from within the engine room was aborted due to dense smoke. The fire was eventually extinguished by closing down the aft engine room and injecting CO_2 into it. The ferry then resumed her passage under own power. Subsequent inspection on the CO_2 fire smothering system revealed that a total of 86 CO_2 bottles had been discharged into the aft engine room instead of 34 as per design of the system for the engine room.

Why did it happen?

- The fire was caused by leakage of fuel from the fretting failure of a low-pressure fuel pipe on the aft diesel driven generator because of incomplete securing arrangements.
- Ignition of the associated vapour was probably from contact with the diesel engine's exhaust manifold.
- The fretting failure was not detected as the routine inspection for the engine did not include a check on low pressure fuel pipe securing arrangements.
- The over-discharge of number of CO_2 bottles was probably caused by leakage of manifold in-line check valves due to presence of dirt and water in the manifold.

What can we learn?

- The hazards associated with low-pressure fuel system of diesel engines should not be under-estimated. Low-pressure fuel pipes should be adequately secured to avoid fretting and the fuel pipes regularly checked to verify their conditions.
- Over-discharge of number of CO_2 bottles would exhaust the CO_2 reserve of the fire extinguishing system such that a second injection would not be possible.
- When compressed air is used to test CO_2 system, clean and dry air should be used as dirt and water entering the system may lead to system malfunction.

4.2 What happened?

A general cargo ship carrying a cargo of cocoa beans suffered a fire in her No. 2 cargo hold. The ship's crew attempted to smother the fire by CO_2 flooding but the process was interrupted due to leakage in the manifold. Subsequently all the CO_2 bottles of the ship's fixed fire extinguishing system were discharged into the cargo hold in a sequential manner but it failed to extinguish the fire. The ship was diverted to a port of refuge and additional bulk CO_2 was delivered and injected into the cargo hold. However the fire still could not be extinguished completely. Finally, after the hatch covers were opened and the flames doused by local fire brigade, all the cocoa bean cargo in No. 2 cargo hold were discharged into sand bungs on the wharf and the ship sailed to her next port.

Why did it happen?

The exact cause of the fire could not be ascertained, however four possibilities were identified:

- self-heating of the cocoa beans promoted by the growth of fungus initiated by the presence of water, which was exacerbated by poor ventilation;
- combustion initiated by decomposition of aluminium phosphide into phosphine gas used for fumigation of the cargo;
- smoking material discarded in the hold during loading cargo; and/or
- a cargo light left in the hold after the completion of cargo loading.

What can we learn?

- For the carriage of organic cargo, ship's staff should be provided with adequate information on the shipping, stowage, ventilation, fumigation and associated hazards.
- No smoking policy around cargo holds should be strictly enforced.
- All electrical equipment used in holds for cargo works should be appropriately isolated and stowed upon completion of loading cargo.
- To ensure effectiveness of CO_2 fixed firefighting system in extinguishing cargo hold fire, sufficient number of CO_2 bottles in accordance with manufacturer's instructions must be released to provide the required concentration of gas in the hold.

4.3 What happened?

While approaching port, a container ship suffered a fire that started in an above deck container on the foredeck. The container was carrying a cargo of activated carbon pellets. As shore-based fire fighting resources were not able to board the ship due to high winds and seas, the crew fought the fire. The fire was eventually extinguished and the damaged containers off-loaded.

Why did it happen?

The exact source of ignition could not be determined. However, since activated carbon pellets are self-heating, any increase in heat might have contributed to the likelihood of the fire.

What can we learn?

Activated carbon pellets are self-heating. Although in small packages they are not required to be classified as dangerous goods under the IMDG Code, they may still pose a fire risk.

5 CONTACT AND COLLISIONS

5.1 What happened?

The refrigerated cargo ship collided with the general cargo ship, off the Varne in the SW bound lane of the Dover Strait traffic separation scheme. The accident resulted in the damage to the starboard side of stand-on vessel and the slight injuries of one seaman, and bow damage of the overtaking vessel.

Why did it happen?

The major cause of the collision was that the overtaking vessel failed to observe the presence of the stand-on vessel which failed to take avoiding action.

Further contributing factors of the collision have been identified as follows:

- The deck officer and master of the overtaking vessel overlooked the blind area ahead of the bow due to possibly spending a large proportion of their time at a particular position obscuring other vessels because of own deck cranes.
- The master and deck officer of the refrigerated cargo ship might have been less vigilant because the vessel had passed through the busiest and narrowest part of the Dover Strait, and also because the traffic around him was travelling in the same direction.
- The radar clutter controls had been turned up to an extent where a small vessel at close range could be detected.
- The overall condition of the radars might have been below that required to enable a satisfactory radar watch to be maintained.
- The stand-on vessel maintained the course line precisely by use of the cross-track-error on the GPS which increased the risk of a close quarters situation with overtaking vessels using the same course line.
- The chief officer who was the sole watchkeeper of the stand-on vessel failed to appreciate that there was available sea room to port, probably because of his reliance on the GPS for passage monitoring rather than reference to the working chart.

What can we learn?

- The best way to prevent marine accidents is a good lookout and sharp radar watch.
- Identified deficiencies of navigational equipment on vessels must be promptly and effectively rectified and sufficient bridge watchkeepers must be maintained at all times on board.
- Over reliance of masters and deck officers on GPS for passage monitoring might bring about serious dangers, without due reference to the working charts.
- All masters and deck officers must at all times comply with COLREG.

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