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Providing learning through confidential reports – an international cooperative scheme for improving safety

MARS 201162
Open ballast tank causes internal flooding

A cargo vessel berthed during the evening and began discharging steel cargo alongside a wharf. According to the discharging plan, it was intended to discharge cargo from hold nos. 2, 4 and 6 initially. During this sequence, sea water ballast was to be pumped into Nos. 1, 4 and 6 (port and starboard) wing tanks. At times, due to the uneven distribution of cargo in the holds, the vessel took a list to one side, and the ballast tank valves were appropriately controlled to keep the ship close to upright. Soon after midnight, the valves of Nos 1 and 4 wing tanks were shut and ballasting of No 6 wing tanks commenced. Tank soundings were not monitored during the ballasting operations, and the quantity of sea water in the tanks was not estimated either. At about 0130 hrs, a '440 V Insulation Fail' alarm activated at No. 1 deck crane power distribution panel on the main switchboard. The power cables to the deck cranes passed through the port side passageway. Suspecting moisture in the junction boxes, the electrician opened the access to the passageway, and was shocked to find that it was flooded with ballast water. Portable pumps were used to discharge this water. When the space was sufficiently dry by early afternoon, it was observed that No. 1 P wing tank manhole cover had not been closed, and water was continuing to pour out into the passageway. The tank was deballasted to bring the water level below the manhole opening and the lid was secured tightly. After the electrical junction boxes in the passageway had been cleaned and dried, the insulation readings returned to normal and power supply was restored to the deck machinery. During a precautionary check, it was noticed that two more wing tank manholes were open and these were properly secured.

Investigations revealed that after internal inspection by the Chief Officer on the previous day, the fitter who was assigned the task of securing the manhole lids had forgotten to carry out the work. The Chief Officer had also failed to verify that the job had been properly completed.

Root cause/contributory factors

1. Failure to follow basic seamanship in securing tank lids after completion of inspection;

2. Failure to closely monitor progress of ballasting operations and tank soundings;

3. Inadequate work planning and execution;

4. Defective high level bilge alarm in the passageway (fault known to crew);

5. No risk assessment carried out and appropriate control measures not taken;

6. Inadequate leadership and supervision;

7. Inadequate maintenance.

Corrective and preventative actions

1. A Safety Meeting was immediately held by the attending superintendent and the serious lapses and failures on the part of the crew were discussed;

2. Instructions issued to ship's staff to ensure careful planning and continuous monitoring and recording of all ballasting operations, including regular appraisal of quantities in each tank based on tank and pump capacities.

■ **Editor's note:** This incident is of concern on many counts, and points to possible serious deficiencies in the safety management system (SMS), operational and maintenance procedures and crew's observance of basic seamanship. Where such bilge wells are fitted, the onboard procedures and planned maintenance systems (PMS) should incorporate the regular testing and recording of the functioning of the bilge alarm and the draining/pumping arrangements and also ensure a reasonable stock of spare parts.

MARS 201163
Sudden release of load causes injury

A crewmember engaged in fabrication work went to the pipe storage rack to select and remove a length of pipe. Having selected the pipe, he grabbed it by the partially projecting end and pulled with all his strength. As it was held in place between other pipes in the rack by compressive and frictional forces, his initial effort failed to dislodge it. In a fresh attempt to move the pipe, the crewmember pulled on it with a violent jerk, causing the pipe to suddenly slide out freely. The worker lost his balance and fell backwards, hitting his back on the bulkhead behind him, resulting in a contusion injury.

Root cause/contributory factors

1. Lack of proper risk assessment and work planning;

2. Failure to seek assistance from co-worker when in difficulty.

Corrective/preventative actions

Incident report circulated to all vessels in the fleet with instructions to:

1. Discuss the incident at their next safety meeting and refer to Section 3 Chapter 19.4 of The Code of Safe Working Practice (COSWP) – Manual Handling – Advice to seafarers;

2. Carefully assess any load that is to be lifted or moved and plan for the best way to apply the effort;

3. Request assistance from other crew in case of difficulty;

4. Consider the task and assess injury risks before commencing the operation or task;

5. Remember that statistics have consistently shown that improper muscular effort and/or posture is a leading cause of strain injuries, and proper techniques can prevent them.

View of pipe storage rack showing pipes tightly bunched together ▶

MARS 201164
Cargo leaked into ballast tank

A double-hulled oil tanker with segregated ballast tanks (SBT) was standing by off-limits at a loading port in good weather. In accordance with the pre-arrival schedule and loading plan, extra ballast was being pumped out. When 2S Water Ballast Tank (WBT) was discharged, an oily sheen was observed on the sea surface. Deballasting was immediately stopped and investigations detected an oil layer (innage) of about 15 cm on top of the ballast water in the tank. Shore management was informed, the oily mixture from tank 2S WBT was skimmed off with a portable salvage pump and transferred to 3S cargo oil tank (COT) and from there, to the slop tank. Thereafter, No. 2S WBT was superficially washed and gas freed to make the tank safe for human entry. After complying with all safety procedures, the inspection team entered the tank. They discovered that during the previous loaded voyage, oil from the adjacent cargo tank had leaked into the ballast tank through a crack on a weld seam approximately 3.5 metres below the deckhead, at the intersection of the longitudinal bulkhead and first stringer flat.

Corrective actions

1. With approval from shore management and under close monitoring of tank atmosphere, temporary repairs were carried out by drilling crack-arrestor holes, jamming a retaining steel plate between adjacent brackets and casting a cement box over the crack;

2. Risk assessment was carried out for a revised loading condition with reduced quantity of oil in the adjacent cargo tank so as to load to a level below the crack in the weld seam;

3. On the loaded passage, regular atmosphere and content checks were carried out on all ballast tanks. No leakage or ingress of hydrocarbon vapours was observed in any tank;

4. Thorough cleaning of the contaminated ballast tank was considered impractical, so environmentally-friendly tank cleaning chemicals were added to the remaining ballast in the tank to aid in dispersing the traces of oil and in cleaning the tank internally;

5. The remaining ballast was carefully decanted out at sea in compliance with MARPOL regulations and the final residue was transferred to the slop tank;

6. On completion of discharging operations in North Europe, the vessel proceeded to a reputable ship repair yard for permanent repairs which were executed safely and without any incidents.

Root cause

Poor standards and improper workmanship / quality control on the part of the shipbuilder.

Preventative actions

Fleet circular issued to all vessels with instructions to:

1. Discuss this incident at their next safety meeting;

2. Ensure that on ballast voyages the atmosphere of all ballast tanks is regularly monitored at intervals as per company SMS using fixed or portable gas detection equipment;

3. Ensure that the water in ballast tanks is uncontaminated prior to discharge, by sighting of the surface and sample drawn from each tank;

4. Maintain continuous visual check overside while ballast is being discharged overboard;

5. Carry out regular ballast tank inspections in accordance with company Planned Maintenance System (PMS), informing the technical superintendent of any abnormality;

6. In consultation with shore management, confirm the thickness measurement of plating at any suspect location using the onboard ultrasonic gauging instrument and compare the readings with the original scantlings / records from the previous close-up survey.

■ **Editor's note:** Whilst this defect may not be considered to directly affect the water-tight integrity of the vessel, an internal leak from a COT into SBT has serious environmental implications. Though the report does not mention it, the discovery of the internal crack was presumably communicated to the classification society, port state and flag state by the Master or by the management (Ref. MARPOL Annex 1 Regulation 6.4.3). Classification society rules also require that even temporary repairs to such defects are carried out only with prior approval, and often under a surveyor's supervision. For any hull defect, crew must firmly

◀ View of temporary repairs showing cement box within retainer plate wedged between stiffener brackets

desist from carrying out any hasty and impulsive hot work (eg gouging and welding) under real or perceived commercial or office pressure. In this incident, such action could have caused a catastrophic explosion/fire with loss of life.

MARS 201165

Lifeboat damaged by ruptured air cylinders

An oil tanker's totally enclosed fibreglass lifeboats were equipped with high-pressure air cylinders stowed beside the keel. One day at sea – shortly after the lifeboats had undergone a 5-yearly inspection by an accredited contractor – one of the compressed air cylinders suddenly and spontaneously burst, resulting in extensive damage to the lifeboat's keel and hull. Fortunately, no-one was injured. Once the vessel arrived in port, a local lifeboat service company was contracted to investigate the incident and assess the damage with a view to carrying out repairs. In the absence of supporting documents (certificates/ work reports etc.) and from the dates punched on the cylinders, it appeared that it was more than six years since the last hydraulic test of the air cylinders. (IACS Recommendation No.88: Air bottles for air supply in totally enclosed lifeboats should be hydraulic pressure tested by a competent service station recognised by a Recognised Organisation at intervals not exceeding 5 years and the hydrostatic test date must be permanently marked on the bottles.) The substantial corrosion of the cylinders' exteriors suggested that routine inspections and maintenance had also been seriously neglected. After the air cylinders were removed and closely examined, it was ascertained that the cylinder shells had suffered a 50% diminution in thickness in the corroded patches.

▲ View of localised corrosion on the exterior of air cylinders

▲ View of damaged hull and ruptured air cylinder

▲ Close-up view of damaged hull and ruptured air cylinder

After assessing the damage, the lifeboat was deemed to be beyond economical repair. It had to be scrapped and a replacement lifeboat obtained.

The investigation report was forwarded to the fleet Head Office in order to instigate legal action against the original equipment manufacturer (OEM) for potential breach of code(s) in the material, design and construction of the cylinders, and against the authorised contractor who last serviced the lifeboats and equipment for negligence.

■ **Editor's note:** As a consequence of this incident, it is presumed that all air cylinders in the other lifeboat were also renewed. This incident highlights the need for compressed air or gas cylinders, fire extinguishers and hydraulic systems to be regularly inspected, maintained and hydraulically tested at recommended intervals. They must be renewed if there are any signs of wastage or corrosion, which may be particularly serious in locations that are exposed or enclosed.

MARS 201166

Foot trapped and injured in windlass gear

In preparation for arrival in port, two seamen were assigned to bring out mooring ropes from the forward rope store and coil them on the forecastle deck. The OS was operating the windlass/mooring winch control lever, which was at about chest-level for a person of average height, and the AB was handling the rope on the warping barrel, situated about 4 metres outboard. Presumably in order to adopt a more ergonomically efficient stance for holding the control lever in its operating position, the OS placed his right foot on a welded pad eye on the supporting bracket for winch shaft bearing. Inadvertently, he pushed his foot into the gap between this bracket and the circumferential guard of the main driven gear wheel and into the path of the rotating spokes. Instantly, his foot was trapped and crushed. He was given first aid and was hospitalised soon after arrival in port the following day.

Lessons learnt

1. While operating the mooring winch/windlass, the operator must concentrate on what he is doing and must not be distracted;

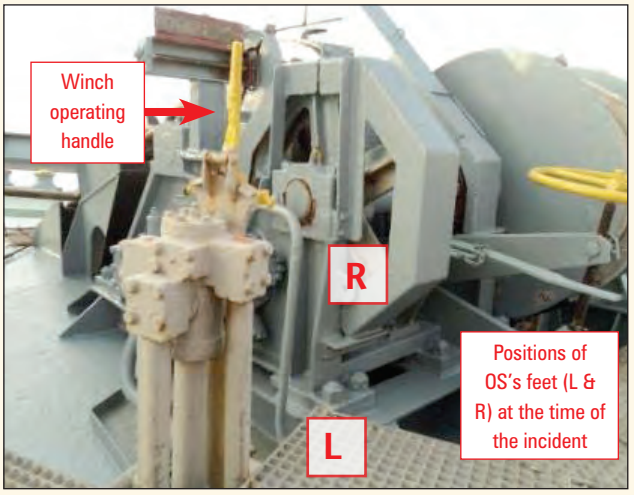
2. A winch operator must stand only on the designated area for a safe and effective operating position;

3. All body parts (hands, feet, etc.) must be kept at a safe distance from the moving parts of the winch;

4. Regular training sessions must be carried out for ship's staff for familiarisation with the mooring equipment and safe working practices.

Corrective/preventative action

A steel guard plate was fabricated and fitted over the gap existing between winch shaft bearing support bracket and peripheral gear wheel guard.



▲ View of accident site

▲ Reconstruction of accident showing how OS's right foot was trapped between a rotating spoke, gear wheel guard and winch shaft bearing support bracket

◀ Preventative action completed – steel plate guard made and bolted over gap between gear wheel guard and winch shaft bearing support bracket

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You can save a life, prevent injury and contribute to a more effective shipping community.

Everyone makes mistakes or has – or sees – near misses. By contributing reports to MARS, you can help others learn from your experiences. Reports concerning navigation, cargo, engineering, ISM management, mooring, leadership, design, training or any other aspect of operations are welcome, as are alerts and reports even when there has been no incident. The freely accessible database (http://www.nautinst.org/mars/) is fully searchable and can be used by the entire shipping community as a very effective risk assessment and loss-prevention work planning tool and as a training aid.

Reports will be carefully edited to preserve confidentiality or will remain unpublished if this is not possible.

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