The Nautical Institute
Mariners' Alerting and Reporting Scheme
MARS Report No 225 July 2011

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

MARS 201141
Crew fatality caused by parting of rescue boat wire fall

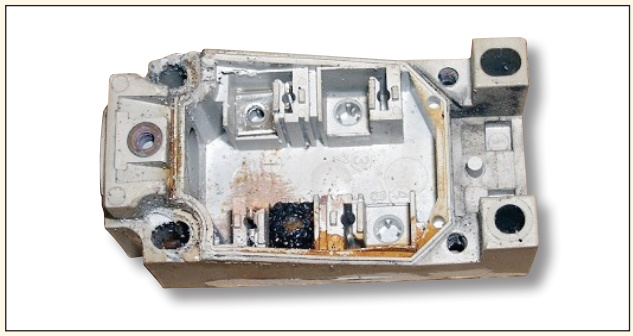
Edited from MAIB Safety Bulletins 1 and 2 2011

The crew of a large vehicle carrier was concluding a routine launching drill of the rescue boat in port. As the craft was coming up to its normal stowage position, a proximity sensor/limit or cut-off switch arrangement (Figure 1) that was designed to cut electrical power to the winch motor failed to operate correctly. With the davit having come up hard against its stops, the hoisting motor continued to wind in the fall wire, causing it to part. The rescue boat and its four crew fell nearly 29 metres into the water. One of the boat's crew died and two were hospitalised.

▲ Figure 1: View of proximity sensor/limit switch arrangement on davit (Note cable entry gland position raised above horizontal, potentially permitting ingress of water)

The parted fall wire was observed to be in good condition and when tested after the accident, it achieved a breaking load of 137kN. Although the winch motor was rated with a nominal pull of 50kN, the maximum pull that it was capable of exerting when trying to overcome the increased resistance in the system during the final stages of hoisting would have rapidly exceeded the breaking load of the wire.

The proximity sensor/limit switch was tested in situ and was found to be defective. It had been installed in 2006, and during the ill-fated drill, was not tested before hoisting was commenced. Inspection revealed evidence of water ingress (Figure 2), although subsequent tests showed that the switch malfunctioned due to an unrelated electronic fault.



▲ Figure 2: Evidence of water ingress within proximity sensor/switch body

During the investigations, it was also unexpectedly discovered that water had entered the foam-filled buoyancy spaces between the inner and outer fibreglass skins of the rescue boat's hull (Figures 3 & 4). The craft was found to be approximately 450 kg overweight. Although the additional weight of water caused the davit's SWL to be exceeded, it was established that this would not have caused the wire to fail.

◀ Figure 3: Water seen in buoyancy space between inner and outer fiberglass skins of rescue boat

Figure 4: Accumulated water being drained through hole made in outer hull of rescue boat ▶

Lessons learnt

1. The maximum pull of a hoist winch can exceed its nominal pull several-fold, and therefore is likely to exceed the breaking loads of other system components unless this is prevented by a properly functioning 'final stop' or safety device;

2. The proximity sensor/limit switch fitted to the davit was considered by its manufacturer to be inappropriate for use as a 'final stop' or safety device. Operators of all vessels fitted with similar davits and safety devices must understand the potential limitations of the switches and take immediate and appropriate corrective actions;

3. The proximity switch was incorrectly fitted with its cable entry gland higher than the switch body thereby increasing the possibility of water ingress.

Corrective/preventative actions by davit makers

A notification was issued to customers advising them to:

1. Test all proximity switches on each occasion before hoisting operations commence;

2. Replace all proximity switches every two years;

3. Exercise caution when using pressure washers in the vicinity of these sensors/switches.

Main recommendations for ship operators

1. Ensure that all devices (inductive or mechanical) fitted to boat davit systems to prevent overload are tested on each occasion before a boat is hoisted and that sole reliance is not placed on such devices;

2. Follow manufacturers' recommendations regarding the maintenance and periodic testing, examination and replacement of safety devices, seeking clarification from manufacturers where ambiguity exists;

3. Verify the effectiveness of watertight seals on electrical equipment fitted to boat davit systems on weather decks.

MARS 201142

Rescue boat lifting sling failure causes injuries

This is a large yacht where the rescue boat is stowed inside the hull via a shell door. After a routine launch, the rescue boat was lifted by its dedicated three-legged sling and was being slewed into the tender bay. Suddenly, the snap shackle (Figures 5 & 6) connecting the port aft leg of the sling failed. The rescue boat tilted substantially, being held only by the forward and starboard legs of the sling. Two deckhands who had been seated in the rescue boat for hoisting fell into the water, suffering minor injuries. Both were wearing inflatable lifejackets, remained conscious throughout, and were recovered by other crew members.

Observations

1. The hinged hook of the snap shackle had sheared off at the hinge pin;

2. The yacht and its fittings were about two years old;

3. The lifting gear and sling were duly certified for the load and had not been subjected to any severe loads since new;

4. Regular inspections of the sling were carried out as part of routine maintenance.

Corrective/preventative actions

1. All snap shackles replaced with conventional shackles of appropriate SWL;

2. Inspection routines have since been amended and risk assessments reviewed.

▲ Figure 5: View of normal snap shackle in open position

▲ Figure 6: View of broken snap shackle

MARS 201143

Safety in ship's gymnasiums

Case 1

A crewmember was exercising with heavy weights in the ship's gymnasium, when he heard a clicking sound from his right shoulder and felt acute pain. He became semi-conscious and as he fell to the deck, the heavy weight which he was lifting landed on the over-strained shoulder. Subsequently, even after treatment on board, he continued to feel soreness and pain in the affected muscles and there was discoloration in the region of the right triceps.

Case 2

While the vessel was rolling heavily in rough weather and heavy seas, a lone crewmember was observed training in the ship's gymnasium using heavy weights. He was immediately prevented from continuing with the weight training as there was an unacceptably high risk of injuring himself.

Case 3

It was observed that the barbells in the ship's gymnasium were not properly stowed and secured in their designated locations. If they had broken loose in adverse sea conditions, their movement could potentially have injured personnel and caused damage to the surrounding equipment.

Recommendations

1. Select weights as per your capacity and use with correct technique, otherwise you may not be in proper control;

2. Choose safe exercises suited to your body's build and abilities; past and existing injuries/deformities can lead to debilitating permanent damage to the body – if an exercise overstrains a joint, causing pain, do not persist with it;

3. Avoid high-risk lifting – ensure that you follow proper methods when lifting weights to avoid putting a strain on the parts of the body not capable of bearing abnormal loads;

4. Do not succumb to peer pressure and try to emulate other crewmembers or professional bodybuilders, if possible take the support and advice of trainers;

5. When using machines, ensure you thoroughly understand and follow the manufacturer's instructions – for example, adjusting your position even slightly can make a difference in the comfort or safety of a given exercise;

6. To properly set up a machine, ask someone to assist you and once you have obtained the right settings, record them in your training log so they can be easily duplicated in the future;

7. If, despite using the equipment in the manner prescribed by the manufacturer, the workout irritates or results in painful joints, seek an alternative exercise;

8. Do not grip machine handles more tightly than necessary as intensive gripping increases blood pressure;

9. Never begin an exercise without first checking that all bolts are tight, cables are not frayed, cable connections are secure, rack pins are securely in position, adjustable weight saddles are fixed in place, locking pin(s) for adjustable benches and seats are secure and benches are stable and strong;

10. Never use dumbbells without checking that the weights are securely fixed;

11. Attempt exercise repeat cycles with caution and begin with low counts – let your body adjust itself to the regime before you start to push yourself hard;

12. Increasing repetitions with reduced weights cannot be assumed to be safe. If your technique is poor the risk of injury is high no matter what repetition count or load you are using;

13. Do not train if you feel tired, unwell or your muscles are sore and tight – alternatively opt for a lighter exercise routine, with more rest periods;

14. Low-intensity aerobic workout and/or massage may help, as may a hot bath before exercise;

15. Be sure to properly stow and secure training equipment in the gymnasium after use.

◀ Figure 7: Hazard: Barbell left on stand and weights left loose on deck can cause injury and damage

MARS 201144

Improper shipment of project cargo

On many vessels arriving with imported project cargo consignments, I have regularly encountered the following problems:

1. Individual lifts too tightly stowed, with very little space for slinging at the discharge port;

2. Insufficient or complete absence of dunnage;

3. Improper consolidation of varied items into a single unit – often using tack-welded retaining angle bars that can easily detach during sea passage or handling with potential loss/damage/risk of injury to personnel;

4. In case of heavy lifts, the centre of gravity and lifting points are not marked and the vessel is not provided with important data for safe stowage, securing and carriage;

5. Failure on the part of the vessel to observe best practices for handling heavy lifts – in some cases there was no document or checklist, indicating a weak Safety Management System (SMS).

It is suggested that in addition to the ship's Master, cargo interests and authorities should also oversee shipments and ensure the fitness of both cargo and vessel before loading, and proper stowage and securing and adequate stability before departure, enforcing all applicable regulations and observance of best industry practices.

MARS 201145

Ineffective mooring configuration causes shift at berth

A large crude carrier berthed at a loading terminal, deploying two headlines, four breastlines, two backsprings forward and two sternlines, four breastlines, two backsprings aft, as recommended by the pilot. After loading commenced, moorings were regularly tended to by ship's staff.

However, the following evening, the terminal suspended loading, stating that the vessel had moved position forward by 2.5 metres. The vessel contested this claim, estimating that the movement did not exceed a metre. Nevertheless, the crew immediately repositioned the vessel to the satisfaction of the terminal and loading was resumed.

Root cause/contributory factors

1. Inappropriate advice on moorings configuration by berthing pilot that was not in accordance with published guidelines which recommended a 3-2-2 configuration of mooring lines fore and aft;

2. Location of the shore fittings (quick-release hooks) was such that the after breastlines led ahead, acting like additional after backsprings;

3. Uneven distribution of forces caused the vessel to move ahead during loading.

Corrective actions

1. Vessel was repositioned immediately by ship's staff to the terminal's satisfaction;

2. A prominent reference mark was secured on the ship's rail and the correct position of the ship at the berth was closely and continuously monitored;

3. Master and chief officer held a meeting with all deck officers and crew to discuss the near-miss incidents.

Preventative actions/recommendations:

Fleet has been advised to:

1. Fully discuss proposed mooring arrangements with the terminal or Mooring Master; notify them of concerns about any unacceptable mooring pattern and promptly advise shore management of the problem;

2. Affix a reference mark on the hose rail in consultation with the terminal once the ship is safely moored;

3. Closely monitor ship's position and prevent lateral movement of ship by continuously noting the position of this mark in relation to Chiksans (hoists) and shore equipment;

4. Conduct additional training sessions onboard in correct mooring practices with the aid of audio-visual training programs, reference to SMS Manual and OCIMF publications;

5. Note and discuss this near miss report and implement the preventative actions with a view to preventing recurrence.

MARS 201146

Main engine starting failure

While in port, the engineers renewed the plungers and barrels of three units of the main engine fuel pump, but neglected to try out the engine after completion of the task. When controls were tested an hour prior to pilot boarding, the main engine could not be started. As the problem could not be immediately detected and rectified, the scheduled departure arrangements had to be postponed resulting in off hire and commercial loss.

Root cause/contributory factors

1. Non-compliance with standard operating procedures that require that the engines be tried out for satisfactory operation immediately after any repairs or maintenance;

2. Fuel system was not primed after completion of maintenance;

3. Control air system filters were badly choked with dirt and excess oil;

4. Routine draining of control air bottles was not carried out properly by the ship's staff. (The practice onboard was only to 'crack open' the drain valve of the air receiver for short periods. This procedure is not enough to drain out or to check for oil or water accumulated in the bottles. Drain valve must be kept fully open for the duration as per maker's specifications to confirm that accumulated water or oil in the air bottles is fully removed);

5. Lack of proper watch organisation in engine room in port.

Corrective/preventative actions

Fleet notice sent to all vessels, reminding them to follow documented procedures after carrying out main engine maintenance, proper water draining methods from control air systems and stressing the need for assigning appropriate watch keeping responsibilities in port to engineers.

MARS: You can make a difference.

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 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.

Editor: Captain Shridhar Nivas FNI

Email: mars@nautinst.org or MARS, c/o The Nautical Institute, 202 Lambeth Road, London SE1 7LQ, UK

The Nautical Institute gratefully acknowledges sponsorship provided by:

American Bureau of Shipping, AR Brink & Associates, Britannia P&I Club, Cargill, Class NK, Consult ISM, DNV, Gard, IHS Fairplay *Safety at Sea International*, International Institute of Marine Surveying, Lairdside Maritime Centre, London Offshore Consultants, MOL Tankship Management (Europe) Ltd, Noble Denton, North of England P&I Club, Port of Tyne, Sail Training International, Shipowners Club, The Marine Society and Sea Cadets, The Swedish Club, UK Hydrographic Office, UK P&I Club