The Nautical Institute
Mariners' Alerting and Reporting Scheme
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Providing learning through confidential reports – an international cooperative scheme for improving safety

MARS 201046
Empty thinner drum explosion

On one of our vessels the fitter was involved in making a spoon blank for a pipeline by cutting out an empty thinner drum in the engine room workshop. When he applied an oxyacetylene cutting torch to the drum, a violent explosion occurred and he sustained serious burn injuries.

Root cause

No risk assessment was conducted. Despite senior engineers being present in the workshop, no one paid attention to the job or cautioned the fitter about the potential danger in applying a flame to an empty drum that had previously contained a flammable liquid.

Corrective/preventative actions

All personnel told to conduct a proper risk assessment each time before a gas torch is lit, even in a designated hot-work place like the engine room workshop.

■ **Editor's note:** Although ships' stores are exempt from its requirements, under the IMDG Code empty packaging that has not been effectively cleaned must be considered still to contain the dangerous substance that it previously contained and must be labelled/placarded, handled and stowed accordingly.

MARS 201047
Embarkation ladder rope parted

On one of our vessels, the lifeboat embarkation ladder rope parted during an abandon ship drill conducted in the presence of the US Coast Guard. The entire ladder had to be renewed before departure from port.

Corrective/preventative actions

Revised safety management procedures:

1. Embarkation ladders to be opened / laid out and carefully inspected during drills. Sections of rope to be twisted in the opposite direction from its lay and the inner core to be inspected to detect deterioration;

2. Embarkation ladder ropes to be renewed at intervals of not more than three years with renewal date stencilled in its vicinity.

MARS 201048
Pilot fell overboard due to ladder ropes parting

After unberthing a bulk carrier, the pilot disembarked via a Solas-approved pilot ladder that was supplied about 30 months earlier and appeared to be in good condition. The master reported that this was the ship's newest pilot ladder. Earlier, the duty officer confirmed its safe rigging to the bridge and stood by at the location to supervise the pilot transfer.

As soon as the pilot had climbed down the first few steps, the right side ropes parted without any warning and an instant later, the left side ropes parted as well. The pilot and the lower section of the ladder fell into the water between

▲ Figure 1: The 23.2 mm side twin ropes parted below the first upper spreader

▲ Figure 2: Side ropes could be easily torn out by hand

the ship, which was moving ahead at about five knots, and the pilot boat. The master immediately stopped the engine. Fortunately, despite being struck lightly by the pilot boat and scratched by the ship's hull, the pilot did not sustain any serious injury and was quickly rescued from the water by the pilot boat's crew. The main ladder section was recovered from the water and examined by a laboratory ashore.

During investigations, it was established that the ladder was manufactured in 2004, as stated in the Solas type-approval certificate, and it was supplied to the vessel in a US port in early 2008. The ladder was normally stowed in the bosun's store, on a pallet close to hydraulic pumps; but it was not contaminated either with oil or chemicals.

The ladder's side ropes consisted of twin 23.2 mm diameter continuous ropes passing through holes drilled into the steps and whipped together above and below each step. The side ropes, the tails and the whipping ropes were of uncovered natural fibre. The steps looked new; only one face was scratched. The side ropes below the break showed strong traces of rubbing on almost all step intervals and the side ropes, as well as tails and whipping ropes, could be easily torn out by hand. The breaking test revealed that the strength of the side ropes had reduced to about 160 kilogram force (kgf) instead of the normal 3,500 kgf for a new manila rope of that size.

Microscopic examination showed that the ropes used were sisal, a fibre about 10 per cent weaker than manila, and infested with micro-organisms, which had steadily weakened the fibre after the ladder's manufacture and during storage, either on board or ashore.

■ **Editor's note**: To ensure safety, the deck crew must be trained to detect and report faults in pilot ladders. Additionally, the ship's officer attending pilot transfer on the deck should put on a suitable fall-arresting device and test the strength of the ladder by standing on the steps. In many ports, such as Singapore, the pilot will only board after witnessing this ladder test by a ship's crew member.

MARS 201049

Grounding during shifting of berth

A partly laden tanker was shifting from the lightering berth to the main discharge berth, with a harbour pilot on board and with two tugs fast. A warship was fast to the berth immediately to seaward of the vessel's intended berth. As the vessel was approaching the main berth, abreast of the warship, the tanker stopped in the water although the main engine was still going ahead. Evidently, the vessel had grounded despite chart and pilot-provided data indicating sufficient water.

After a number of astern movements, the vessel refloated and was safely berthed a few hours later, once the warship had cleared its berth. The grounding was at very slow speed and because the chart showed a 'soft' sea bed, the master assumed that no structural damage could have occurred. However several months later, during a routine ballast tank inspection, structural damage was observed in ballast tanks, attributable to this grounding incident.

Results of investigation

1. The passage plan for the port call was properly prepared berth to berth but specified a direct route to the berth;

2. Despite the fact that the direct safe route to the berth was obstructed, the pilot convinced the master that it was safe to take a diversion and pass to the side of the warship that was obstructing the direct passage;

3. The pilot was evidently anxious to avoid any incident with the warship and so in order to allow additional safety margin, deviated too far out of the berth approach channel;

4. The agents put commercial pressure on the pilot and master to berth the vessel without delay, despite knowing that the berth approach was obstructed by the warship.

Root cause/contributory factors

Lack of planning:

1. It was apparent from the call at the lightering berth that the depth data in the port was unreliable. This should have given the master sufficient cause to exercise extra caution in passage planning and vessel movement;

2. The vessel was close to the safe UKC limit even after lightering, and this was her first visit to this port. Under the circumstances, deviating from the direct approach to pass clear of the obstructing warship was risky;

3. The pressure and demands of a stressful sea passage preceding the berthing had placed a heavy burden on the master and the officers and may have affected their judgement.

Corrective and preventative actions

All fleet vessels instructed to ensure that:

1. The incident is discussed at the next safety meeting;

2. Proper passage planning is done using the best available information, including the latest berth and port information from the local agents;

3. Critical operations to be planned properly with additional contingency plans;

4. All key personnel are well rested, in compliance with STCW regulations;

5. Any alteration to the passage plan should be done only after close consultation and assessment by the bridge team;

6. Commercial considerations should never outweigh the requirements for safe navigation;

7. Due diligence must be exercised, particularly when calling at an unfamiliar port or when operating within tight parameters.

MARS 201050

Hull damaged by own anchor and fire during repairs

Official report: Edited and condensed from: MAIB Safety Digest 03-2009, Case 1: www.maib.gov.uk/cms_resources.cfm?file=/Part1_MerchantVessels_3-09.pdf

A panamax container vessel sailed just after midnight, with approaching gale warning in force. After dropping off the pilot, the master instructed the bosun to fully secure the

anchors. The chain lashing was fitted and the Senhouse slip tapered pin pushed in by hand, the guillotine blocks were lowered and it was said that the brake was fully tightened. After the bosun reported the anchors secured, the master increased speed. However no heavy weather checks were carried out and at 08:00, due to the worsening sea state, the chief officer decided it was unsafe for the crew to go out on the main deck.

At about 12:15, alarms sounded in the engine control room. There was a smell of burning around the electrical supply breaker panels, and a number of earths were detected, as well as a high temperature bow thruster motor alarm – although the motor was not running. The symptoms were somewhat confusing. A short time later the bow thruster room fire alarm sounded.

The master altered course to provide safe access on the deck. On entering the bow thruster room, the cause of the confusion quickly became apparent. A number of holes were found on the port side of the bow thruster room shell plating, through which water was pouring in. The crew blocked the holes with wedges and neoprene rubber, and this stemmed the water ingress. It was then found that the port anchor chain lashing had released and the anchor had lowered itself against the windlass brake tension, into the water. As the ship moved in the rough seas, the swinging anchor had repeatedly struck the hull, causing numerous indentations and holes, resulting in the flooding of several compartments.

After securing the anchor once again, the passage was resumed to the next port, three days' passage away, where repairs had been arranged by the shore management. Despite the crew's damage control efforts and continuous bilge pump operation, the water level in the bow thruster room eventually reached the outside sea level because of undetected holes in the bilge area. On arrival at the destination, a survey identified the need for 23 insert plates.

The port authority approved the hot work, which was conditional upon the contractor complying with the ship's safety management system (SMS). However, the instruction was in a foreign language which the crew did not understand, and they did not query it.

The repair contractors loaded their repair equipment on the forecastle deck, including 15 acetylene and 16 oxygen bottles, and at the lay-by berth, began to burn out the damaged sections of the hull plating inside the forepeak and bow thruster room at night without informing the crew. At about 01:00, the safety watchman on the fo'c'sle left the area and went to the accommodation area without telling the foreman. At 01:10, the repair squad discovered that there was a large fire on the port polypropylene mooring rope and from the acetylene bottles.

An attempt was made to rig fire hoses, but the fire line was not pressurised. An attempt to close off the bottle valves was also made, but the fire was too fierce. The missing safety watchman returned to the scene and after the alarm was raised, the ship's crew mustered and made an attack on the fires with two fire hoses. They successfully extinguished the fire on the mooring rope, but could not prevent two acetylene and one oxygen bottles from exploding before the local fire brigade arrived to assist. By 04:00 the fire had reduced and at 05:46: it was confirmed extinguished. Fortunately there were no casualties. All the acetylene and oxygen bottles were badly damaged, the deck plating was distorted and the mooring winch and its power supplies were burnt.

Heavy weather damage

Root cause/contributory factors

1. The chain lashing the Senhouse slip tapered securing pin was not fully secured;

2. The hawse pipes covers had not been fitted, allowing heavy seas to wash on to the forecastle deck. This caused the tapered pin to fall out and release both the Senhouse slip and the anchor cable chain lashing;

3. The anchor cable progressively dropped as the acceleration forces overcame the winch brake, which was not fully tightened.

Lessons learned

1. Take due account of the weather forecasts when deciding to carry out heavy weather checks – do it early, because when the weather turns it may be too late;

2. Ensure the heavy weather checklist is sufficiently detailed and adapted to be ship-specific. Many are not, and this can lead to important checks being missed;

3. Make sure that the crew is familiar with the anchor chain securing arrangements. Bottle screws should be tightened after the Senhouse slip is connected to ensure the system is fully secured. All too often, the bottle screw is considered to be in the right position as long as the slip can be connected. The acceleration forces are high, and will find any slackness in the system;

4. The Senhouse slip holding the anchor chain lashing was fitted with a tapered pin. Mousing the pin or changing it for a 'drop nosed' pin would have made it more secure;

5. Winch brakes need to be applied tightly, and using a wheel spanner or extension bar to get added purchase may be necessary.

Fire

Root cause/contributory factors

1. The fire was likely to have been caused by a discarded cigarette, which had ignited clothing found in the vicinity of the mooring rope and acetylene hoses;

2. The acetylene ignited because the gas bottle valves were open. Because the 'in use' bottles were co-located with the storage bottles, the fire spread to the other bottles and so escalated;

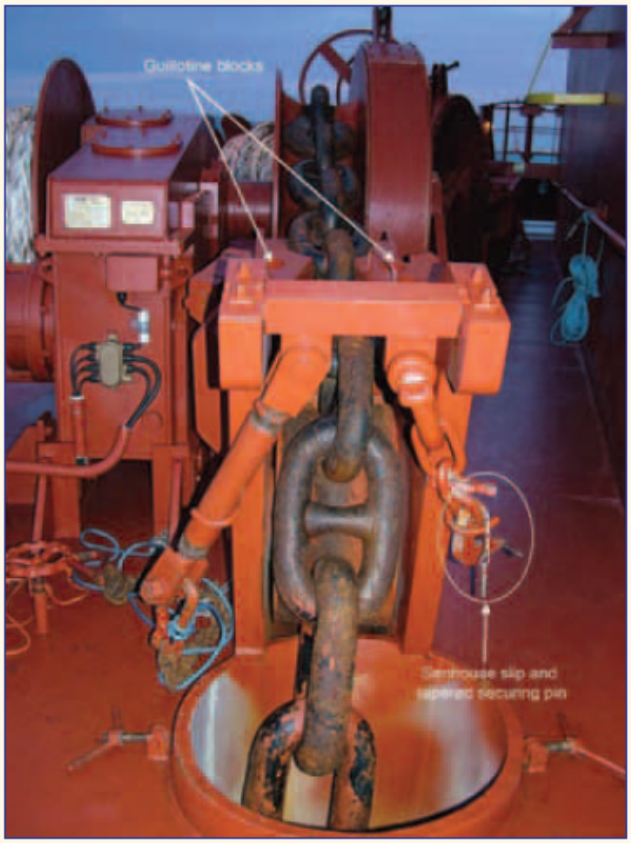
3. Poor communications: none of the hot work permit to work (PTW) control measures were in place, and the contractors were not briefed on safety procedures because the crew were unaware of the intention to carry out hot work.

Lessons learned

1. Ship's staff must become fully engaged with contractors and understand their scope of work;

2. Even if shore management undertakes the oversight responsibility, the safety of the ship and her crew remains with the master;

3. Where there is high-risk work being undertaken it may be appropriate to keep fire hoses rigged and pressurised – a risk assessment will help in making the decision;



▲ Figure 3: View of anchor cable securing arrangement

▲ Figure 4: Fire-damaged acetylene bottles

4. Where a port authority gives work approval in a foreign language, arrange for it to be translated so that the ship's responsibilities are fully understood;

5. Where the contractors provide the safety watchman, insist on him/her always being on station;

6. Conduct regular rounds of the work site, and do not hesitate to order work to stop if you believe safety is being compromised;

7. It is good practice to segregate the 'in use' gas bottles from the storage bottles to reduce the risk of a fire spreading.

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