The Nautical Institute
Mariners' Alerting and Reporting Scheme
MARS Report No 230 December 2011

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

MARS 201169
Unplanned deviation led to grounding

Just after sunset on a calm evening, a large inbound container ship was approaching the pilot boarding position about a mile NE of the harbour's breakwater entrance. As the pilot was to transfer from an outbound coastal tanker, he instructed the container ship to move to the starboard side (west) of the recommended track to avoid the tanker and maintain minimum speed, which, for this vessel was 7 knots. As soon as the tanker had exited the breakwater, the pilot's launch transferred him to the container ship. This operation lasted nearly eight minutes, by which time the vessel was very close to the breakwater and nearly parallel with it. Immediately on reaching the bridge, the pilot realised the unfavourable situation but instead of consulting the master or aborting the approach, he ordered half ahead and hard-a-starboard, with the intention of steering the ship around the breakwater head. The intended track now involved a very sharp starboard turn of almost 130° at minimum steerage way, keeping close to the breakwater head. The bridge team did not appreciate that this manoeuvre was beyond the ship's turning ability.

The bridge team's vision was blinded by the bright city lights to the south, which were virtually doubled in intensity by the reflection from the calm water. This affected their situational awareness and they failed to sight the red lightbuoy marking the southern limit of the approach channel into the basin.

The ship started picking up speed but the head responded very slowly. The pilot ordered the bow thruster full to starboard, but at the prevailing speed this had no effect. Realising that the ship had strayed well off the desired safe track and heading, he then ordered the two tugs (700 BHP forward and 1800 BHP aft), to push with maximum power from the port bow and port quarter respectively. This manoeuvre only served to cancel the rudder's action, as the larger after tug's force was enhanced due to the very long lever between the ship's pivot point and tug's push point. Under the circumstances, the smaller bow tug had no effect at all. Belatedly realising the dangerous position, the master rang emergency full astern, but this did not prevent the ship from overshooting the red buoy on the wrong side and she grounded on a charted underwater rock. The ship almost rebounded with the impact. With the engine still going astern, she floated off on her own. Immediately, the bow thruster motor low insulation alarm was triggered and the breaker tripped. The officer on the forward mooring station was ordered to check the bow thruster space. He reported that it was flooding and the motor was already submerged.

Once back in the channel, the engine was stopped and the tugs came around and made fast their tow lines on the starboard bow and quarter. The ship was berthed port side to the container berth. A class surveyor with divers attended before midnight and after an underwater survey, issued a conditional certificate of class to sail to the nearest major port (16 hours' sailing time at reduced speed) and carry out a docking survey.

Extent of damage

1. Bottom plating on port side of keel buckled extensively for a length of about 15 metres from stem and holed in fore peak tank and bow thruster space;

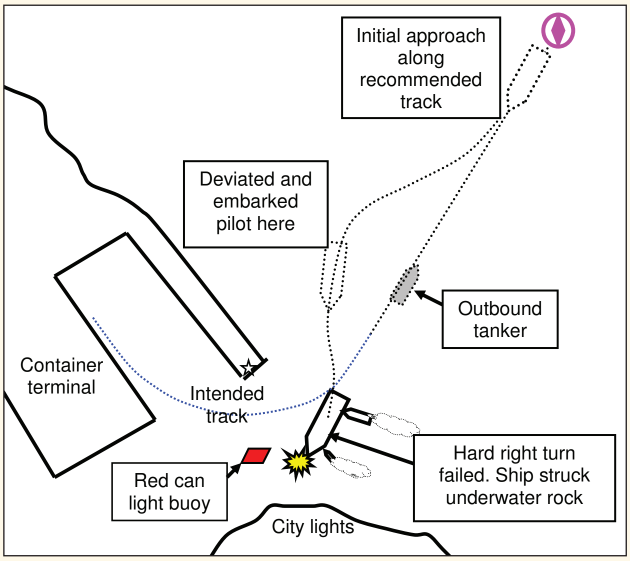
2. Bow thruster motor windings and wiring damaged by sea water;

3. Forepeak tank vent heads burst and detached from base due to the shock pressure wave generated by the water inside the fully-ballasted forepeak tank.

Root cause/contributory factors

1. Unplanned deviation from planned track during the critical final stage of the passage;

2. Pilot wrongly gave navigational priority to smaller outbound vessel;



3. Bridge team lost situational awareness and continued to navigate along wrong track;

4. Pilot boarded too close to harbour entrance and failed to recover from a dangerous navigational situation, and compounded the error by ordering half ahead;

5. Failure to understand ship's manoeuvring characteristics;

6. Poorly considered deployment of tugs, which ideally should have made fast on the starboard side before passing the breakwater;

7. Failure to let go anchors in good time;

8. Bright shore lights and reflection on the water affected the efficiency of lookout.

MARS 201170
Fracture injury to nose

Two crewmembers were preparing a securing arrangement for an empty drum that was to be used as a cleaning bath for a portable pump. A 50 mm x 3 mm mild steel (MS) flat bar was being bent using long-handled tongs to shape it into a hoop to fit tightly around the drum. During this operation, one of the tongs suddenly slipped off the flat bar, which uncoiled and hit one of the workers in the face, fracturing his nose. The injured crewmember was given first aid and was later repatriated after hospital treatment ashore, the incident fortunately having occurred in port.

Root cause/contributory factors

1. Lack of planning – no risk assessment was conducted before commencing the task;

2. Unsuitable equipment used for the task.

Corrective/preventative actions

Fleet circular sent to all vessels instructing them to:

1. Discuss the incident at their next safety meeting;

2. Always conduct a tool box meeting prior to assigning any tasks involving potential injury hazards;

3. Observe the concept of 'Take 5' to assess suitability of the tools and work methods that are to be used for the task;

4. Ask for assistance from others if unsure of safe and efficient working practices.

■ **Editor's note:** The proposed design for the securing arrangement (forming a steel flat bar into a round hoop) is beyond the capabilities of ship's crew with general hand tools. Senior officers and experienced crewmembers should always be consulted, especially when an unusual or non-routine operation is being planned. In this case, a simple rack, fabricated from straight sections of steel angle and flat bars could have been safely and easily made on board.

MARS 201171
Overloaded windlass motor failed

A deep draught tanker arrived at a port to discharge her oil cargo and temporarily anchored in the exposed roadstead in order to await her turn. Expecting to berth the following day, the Master paid out a scope of 6 shackles of chain on the port anchor in gale conditions. The next morning, the weather was unchanged and the vessel received instructions to proceed to the pilot boarding ground to embark pilot. The engine was readied and the vessel began weighing anchor. When 4 shackles had been heaved in, the windlass hydraulic motor suddenly failed and the entire 11 shackles of chain ran out at such speed that the brake was damaged as the crew tried desperately to check the cable. Fortunately, there was no injury and the bitter end securing of the cable in the chain locker did not part. Ship's staff temporarily exchanged the damaged port windlass hydraulic motor with the operational starboard unit, and after a short delay, the ship weighed anchor and proceeded to her designated berth. The managers arranged for a classification society surveyor to attend the ship at berth and survey the damage, after which a condition of class was imposed.

Root cause/contributory factors

1. Lack of proper risk assessment, including special consideration for adverse weather conditions, as required by SMS procedures;

2. Master did not consider high loads on chain and windlass;

3. Ineffective use of main engine to ease stress on cable while heaving up anchor in rough weather;

4. Ineffective use of manpower - Master had delegated the inexperienced third officer to heave up the anchor in bad weather and retained the experienced chief officer in the wheelhouse.

Corrective/preventative actions

1. A new hydraulic motor was ordered to replace the damaged one;

2. The incident was reviewed by the management office, and shared with all vessels in the fleet;

3. The incident was discussed with the windlass maker's technical representative, whose report was circulated to the fleet;

4. Master and bridge team members have been advised to review the anchoring procedures in the SMS and ensure full compliance;

5. The marine superintendent visited the ship soon after the incident and offered further guidance on safe anchoring procedures;

6. The Master will undergo a de-briefing at the end of his tenure in the office to establish useful lessons from the incident. These will become part of pre-boarding briefing for all Masters as they sign on, and will form part of future company seminars and workshops;

7. Managers will include a safety DVD / CBT module on anchoring in the onboard training library kit;

8. A copy of OCIMF's publication *Estimating the Environmental Loads on Anchoring Systems* has been sent to all vessels under management with instructions for the bridge teams to estimate forces when weighing anchor, especially in rough sea and weather conditions.

MARS 201172

Anchor cable ran out due to misleading instruction

The crew had only recently taken delivery of a very modern anchor handling, towing and supply ship (AHTS). The hydraulic power pack unit on this vessel, comprising five electric motor-driven hydraulic pumps that powered the windlass and multiple winches, was equipped with a touch screen control panel located on the navigating bridge. A notice pasted on top of the panel stated 'For windlass or tugger winches, use No 3 or No 4 pump'.

The deck officer was instructed by the Master to start the pumps for the windlass in preparation for anchoring. After reading the notice on the panel, the officer duly started only pump no. 3. In view of the charted and measured depth in excess of 40 metres below the keel, the Master decided to walk out the anchor under power to 6 shackles. As the 4th shackle was passing through the hawse pipe, with the ship making slight sternway, the cable suddenly began to run freely, despite the dog clutch being fully engaged and the windlass control lever being held in the full hoist position. Fortunately, the crew quickly tightened the brake and the cable, which had run out to 8 shackles, was checked and prevented from running out entirely.

On investigation, it was established that for mooring with ropes and for light hauling work, one pump was sufficient. However, for weighing anchor in deeper water and for heavy tugger loads **both** pumps must be run in conjunction. Clearly, the pressure developed by a single pump was inadequate to handle the load of the anchor and 4 shackles. Later observations of the pressure gauge located at the windlass control showed that while a single pump generated about 50 bar, two pumps in tandem raised this to 130 bar under load. The pressure gauge itself was graduated to a maximum of 150 bar.

Corrective/preventative action

A permanent notice was affixed on the control panel clearly stating that pumps no. 3 **and** 4 should be used when using the windlass for weighing anchor.

MARS 201173

Grounded when trying to avoid fishing vessel

Official report edited from MAIB Safety Digest 2-2010, Case 12

A large container ship was on a coastal passage in the South China Sea, an area well known for dense concentrations of fishing vessels. In the evening, in order to adjust the ETA at the destination port the following morning, the Master decided to stop and drift for an hour in open water before resuming passage at full speed. When the chief officer came on watch at 0400, accompanied by a lookout, he reviewed the charts to be used and noted the potential danger areas, including an isolated, unmarked reef, and highlighted it on the paper chart. The planned track avoided the reef by means of two sharp course alterations. By 0600, about an hour before these waypoints, a large concentration of randomly-moving fishing vessels was encountered, causing the chief officer to make a number of course alterations over the next hour. By this time, the vessel was approaching the most navigationally constrained part of the passage, in the vicinity of the off-lying islands and reef. The ship was making 21 knots and she was well off her intended track. The vessel's position had been plotted only twice between 0600 and 0700, each plot based on a single radar range and distance. An electronic chart system was fitted, but was only monitored occasionally. Suddenly, a fishing vessel separated from the fleet and accelerated towards the container ship's starboard bow. Constrained by other fishing vessels on the starboard side, the chief officer altered course to port, directly towards the reef, which he had forgotten about. At about 0708, the ship ran aground at full speed on the reef, resulting in the breaching of five of her ballast tanks.

Lessons learnt

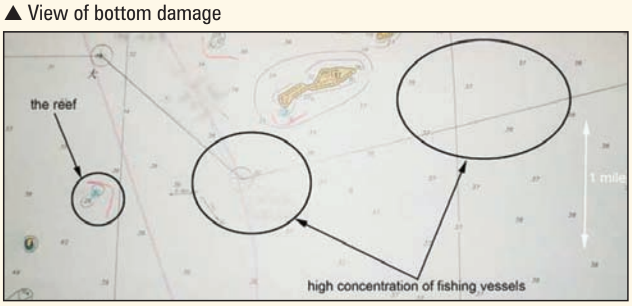
1. There are occasions when traffic is so dense that the officer of the watch has very little time to do anything but concentrate on collision avoidance. In such situations, asking the Master for help, or reducing speed, can usually make things more manageable. Such actions are not a sign of weakness or incompetence, but are sensible precautions which help to keep vessels safe and need to be encouraged.

2. When constantly altering course to avoid other vessels in restricted waters, things can happen quickly, and it can be very difficult to accurately monitor a vessel's position unless radar parallel indexing and/or ECS/ECDIS are fully utilised. The occasional fix - with limited reliability - is far from sufficient.

3. A safe passage plan takes into account those points on the route which might need more people on the bridge. It should also include other precautions such as a reduction in speed due to factors such as the proximity of dangers, the likelihood of dense traffic or poor visibility. Passage planning requires thought, and involves far more than putting lines on charts.

4. Adjusting ETA by stopping in open water at the start or during a passage tends to reduce flexibility later. It is good to have time in hand when busy waters with hidden dangers lie ahead.

▲ View of bottom damage



▲ Paper chart showing planned track and the reef

MARS 201174
Electrocution from unsafe plug

Edited from IMCA Safety Flash 02/10

An offshore installation was undergoing major refit works at a repair yard. There were a large number of sub-contractors working at many locations, including fitting a new detachable electrical power supply system to the temporary living quarters (TLQ). However, when it was observed that there was no power supply, the ship's electrician was asked to investigate. He saw that the main power supply lead cable, terminating at a 4-pin-male plug, was disconnected from the socket/isolator. Without ascertaining that the terminals were not live, he grabbed the plug in an attempt to push it into the female socket and immediately received a 440 Volt electric shock, sustaining an electric burn on the left middle finger and an abrasion on the right palm. He was attended to by medical personnel onboard the vessel and an ECG (electrocardiograph) was recorded. He was admitted to hospital for 24 hours and subsequently placed on light duties for a few days.

Root cause/contributory factors

1. The TLQ's wiring system was fitted with female sockets which resulted in the extension supply lead cable having live male ends;

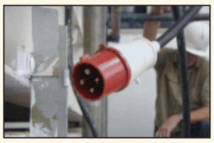
2. The 440 Volt power supply was not isolated from the main switchboard prior to the re-connection attempt.

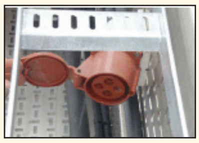
Corrective/preventative actions

1. The sockets on all the three TLQ modules were changed for male sockets so that the live supply wire terminals could be fitted with safer female plugs;

2. The manufacturer of the TLQ modules was informed of this potentially hazardous arrangement of power supply sockets;

3. The importance of rigorous lock-out tag out procedures was reinforced to crew and fleet.


▲ Unsafe live male plug with exposed conductors


▲ Protected female sockets replaced male plugs for power supply cables

■ **Editor's note:** Similar electrical plugs and connectors may be encountered on refrigerated (reefer) containers, portable blowers, pumps, welding transformers and accessories (extension/jumper cables and 'pigtails' etc.). Mariners must exercise great caution before handling such cables and connectors, ensuring that the power has been switched off locally before making or breaking the circuit. In equipment incorporating a capacitor or electrical condenser, (e.g. motor starter), it is possible that residual potential difference or voltage may still exist between the terminals even when the equipment is switched off/circuit is broken/breaker is open.

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 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.

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, 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, Sail Training International, Shipowners Club, The Marine Society and Sea Cadets, The Swedish Club, UK Hydrographic Office, West of England P&I Club.