Mariners' Alerting and Reporting Scheme

MARS – Lessons Learned

MARS Report No 372 October 2023

MARS 202345

Scrap metal fire hazard

As edited from NTSB (USA) report MIR-23-07

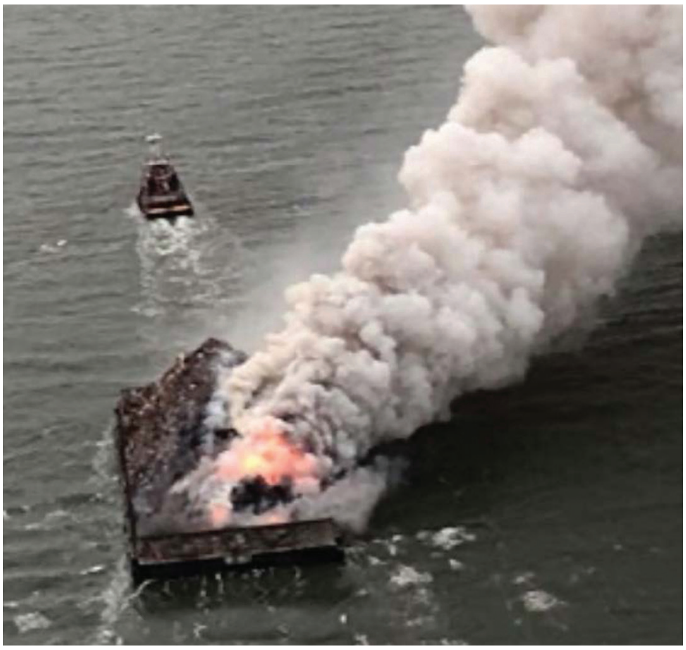
➔ A tug was towing a scrap metal barge in coastal waters in easy wind and wave conditions. The scrap metal was 'shredder feed', which is a lower grade than heavy melting steel. Shredder feed consists of a variety of different metal scraps, including end-of-life vehicles that have been crushed (but with free-flowing liquids – gasoline, oil, paint, anti-freeze, lubricants – removed), household appliances, and various other ferrous metal pieces greater than one-quarter inch in thickness.

Early one morning a crew member on watch saw smoke and a red glow emanating from the pile of scrap metal on the barge being towed 200m astern. Soon, flames were seen coming from the same area of the barge. The alarm was raised. The fire on the barge was quickly getting larger, and the tow wire was shorted to about 100m to better control the barge.

Soon, Coast Guard and local authorities arrived on scene and began fighting the fire. At this point, the fire on the barge had grown exponentially. The barge was towed into shallower water and beached. Firefighting efforts continued for the next 24 hours before the fire was finally extinguished. No pollution or injuries were reported. Damage to the barge was extensive and estimated at $7 million.

The NTSB determined that the probable cause of the fire was the ignition of a combustible material by an undetermined source, such as sparking from shifting metallic cargo, self-heating of metallic or nonmetallic cargo, improperly prepared vehicles and appliances, or damaged lithium-ion batteries.

The International Maritime Solid Bulk Cargoes Code (IMSBC Code), lists scrap metal as a 'Group C' cargo, which is unlikely to liquefy, does not possess chemical hazards, is noncombustible, and has a low fire risk.



Lessons learned

- Scrap metal seems innocuous and is listed as noncombustible in the IMSBC Code, but is nonetheless a fire risk. Another MARS report of this type can be found at 202243 and below, at 202346.
- Scrap metal fires tend to be hard to extinguish and burn hot and long, often causing major damage. See MARS report below.

Risk reduction measures for this type of cargo could include:

- Checking the temperature of the cargo regularly to ensure the load is not self-heating. If the temperature is higher than 55°C, the cargo should not be loaded. If, during the voyage, the temperature rises to 80°C, this is a potential fire risk and the vessel should immediately proceed to the nearest port.
- Appointing a qualified cargo surveying company to assist the vessel's Master before and during loading.

MARS 202346

Scrap metal fire extinguished but vessel sunk

As edited from JTSB (Japan) report MA2018-10

➔ A general cargo vessel was loading scrap metal into both the forward and aft cargo holds. A loader was lowered into the aft cargo hold to smooth the heap of scrap metal in certain areas. At one point, the operator of the loader saw a small amount of white smoke rising from

within the scrap heap in the port aft section of the hold. He immediately raised the alarm.

The shore fire department was called while crew prepared fire hoses. Soon, the loader operator – who was still in the hold – saw flames in the scrap heap. A few minutes later, crew were able to direct water jets from fire hoses onto the scrap metal heap. The loader operator evacuated the hold, leaving the arm of the loader extended above the hatch coaming. Local shore fire fighters arrived and took control of the fire fighting activities. Not long after, the crew were asked to evacuate the vessel for their safety.

The shore fire fighters decided, based on experience in past firefighting of ship fires, to use a protein foam spray delivered from a large aerial-platform chemical-spray fire truck. As they made preparations for the application of the protein foam spray, the vessel listed to port, and the firefighters on the vessel withdrew. The fire continued to increase in size. About an hour after arriving, the shore fire fighters began spraying the protein foam into the aft cargo hold. This technique did not seem to have the desired effect and the shore firefighters asked the Master for permission to continue to use water. Permission was granted, but some 12 hours later, after the application of copious amounts of water, the vessel sank alongside the berth. The fire was then declared extinguished.

The investigation found, among other things, that the source of the fire was most likely to be a spark created by contact between metal objects, a battery, etc., in the scrap. The source then ignited combustible material mixed in the scrap (eg plastic, rubber, wood chips, paper). It was not possible to determine the exact origin of the fire.

The investigation also found that the Master did not think to use the hold's fixed CO_2 firefighting equipment after the fire was first discovered. In fact, this was a moot point because the loader was left with its arm extended above the hatch coaming. This would have prevented the closing of the hold's hatch, a necessary first step before releasing CO_2.

Lessons learned

- As seen in the previous MARS report (202345), scrap metal, while intuitively innocuous and listed as noncombustible in the IMSBC Code, is nonetheless a fire risk.
- Reactions during an emergency are honed with training. Masters and crew should be aware of the most efficient fire fighting methods on their ship and quickly be able to put these into practice.
- Copious and uncontrolled amounts of water poured into a ship will cause a loss of stability and possibly the foundering of the vessel. This will, however, probably succeed in extinguishing any fire on board.

MARS 202347 – DOCKING KNOCK

As edited from NTSB (USA) report MIR 23-10

➔ A passenger ship was on a berthing approach to a dock. The Master took the con about 0.5nm from the pier, with the ship making about 7 knots. When the vessel was about 0.37nm from the pier and making about 6 knots, the Master began the near 180° rotation to port in order to back into the berth and make a starboard docking. Two of three bow thrusters and both azipods were online.

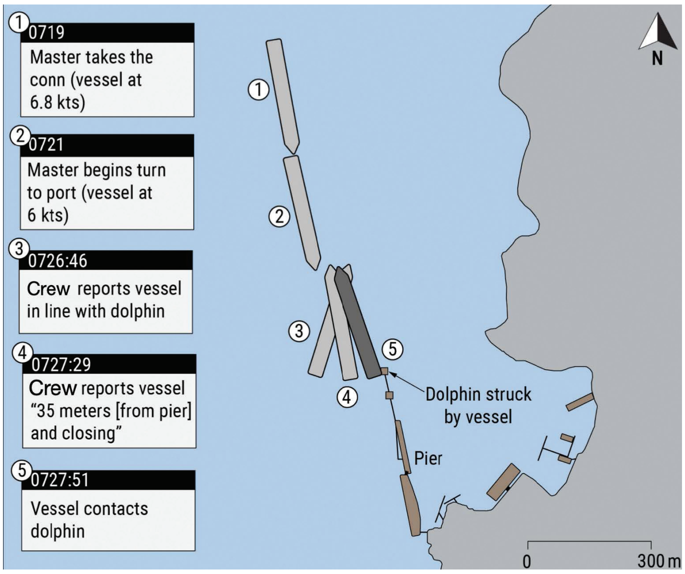
The Master, staff captain, and a pilot were stationed on the port bridge wing. The ship rotated to port, with its stern swinging to starboard toward the pier. It needed to clear the pier's northernmost mooring dolphin.

The staff captain managed communications with the forward and aft mooring decks; he also operated a starboard bridge wing camera (using a joystick), which allowed him to see the pier and mooring dolphins.

The chief officer and another pilot were located on the starboard bridge wing. The first officer was stationed at the forward console to monitor the ECDIS – which used integrated radar – and inform the Master of the vessel's distance to the pier every tenth of a mile as it approached the terminal. The second officer was stationed at the console at the back of the bridge. A helmsman and a lookout were also on the bridge. A crew member, who was in charge of the aft mooring deck team, was stationed on the stern to provide the vessel's distance to objects and the pier by radio when requested by the staff captain on the bridge.

After the vessel began rotating, the first officer stopped calling out the vessel's position relative to the mooring dolphin at the end of the pier. Instead, the Master relied on the bosun's distance callouts via radio and the ECDIS display on the bridge wing to identify the vessel's position relative to the pier, using the ECDIS. The Master also used the starboard bridge wing camera operated by the staff captain to note when the ship, moving athwartships to starboard, was clear of the dolphin, allowing him to go astern to the berth. However, the crew stated that the camera froze during the manoeuvre due to a hardware issue.

When the vessel was almost completely turned, the crew member aft reported the vessel was in line with the dolphin. Soon after, he reported the vessel was 56 metres away from the dolphin. About 30 seconds later, he reported the distance as 35 metres and closing. Very shortly after, the ship's starboard quarter struck the mooring dolphin at the end of the pier. Vessel damage was minor but damage to the pier was estimated at $2.1 million.



The investigation found, among other things, that the cruise terminal pier had been extended northward by 120 metres with the addition of two dolphins and a connecting walkway about a year before the accident. However, this change was apparently not communicated to the responsible hydrographic authorities. As a result, the pier was not accurately depicted on any navigational charts. Therefore, the vessel's ECDIS showed the original, non-extended pier. Even so, as the vessel approached the pier, the weather was clear, and visibility was good. The Master and bridge team should have been able to see the extended pier and added dolphins. However, none of the members of the bridge team reported the extension as the vessel approached the pier. Instead, the Master relied on the ECDIS – which showed the old, inaccurate Electronic Nautical Chart (ENC) – to determine the vessel's position relative to the pier.

The investigation determined that the crew member calling out distance aft was giving accurate distances to the pier's northernmost dolphin from the ship's stern. However, the Master incorrectly assumed the bosun was calling out how much clearance the ship would have as the stern passed the dolphin. The crew member had either not been properly briefed before the manoeuvre or had received no instruction as to what exactly he was expected to communicate to the bridge team. Had the Master and crew member clearly understood what distances were being communicated, the Master and bridge team may have been aware of how close the vessel was to the dolphin and could have taken action to avoid the casualty.

Lessons learned

- There is no substitute for clear, concise communication. In this instance, notwithstanding good visibility and daylight, the nine person berthing team either miscommunicated or under-communicated, thus paving the way for a negative outcome.
- Although an excellent navigational tool, ENCs can be inaccurate for a wide range of reasons. In this case, we observe that the berth extension of 120m completed about a year earlier was not reported to the hydrographic authority. As such, the ECDIS image the Master was referencing was not a reflection of reality.
- It is good practice in navigation and manoeuvring to use more than one source of position data input.

MARS 202348

Crushing fatality while moving pontoon tweendeck

As edited from FEBIMA (Belgium) report 2021/000704

→ A general cargo vessel had berthed and was discharging cargo from the upper port cargo hold. The tween-deck had been emptied and next the pontoons would be removed in order to access more cargo below. The vessel's crew began the tweendeck pontoon removal, a job they knew well. One crew member was assigned to operate the crane. One seaman was assigned as signal man and was equipped with a portable two-way radio to communicate with the crane operator. He was assisted by another crew member. Together, they would be rigging (hooking-on) the tween-deck pontoons in the cargo hold.

Designated safe area

The two crew were positioned in the forward part of the cargo hold, where they would hook the pontoons on to the crane. A third crew member was assigned to un-hook the pontoons once they were laid down on top of other tween-deck pontoons against the bulkhead in the aft part of the cargo hold. This crew member had to shelter in a safe position aft until the first pontoon was laid down on deck. The dedicated safe position during the manoeuvring was inside a passage between the port and starboard holds.

The first pontoon was hooked on and, once at a safe distance, the signalman gave hoisting orders to the crane operator through his portable two-way radio, as well as the usual hand-signal. As tension came on the slings, the signalman checked that the pontoon was well slung and that the other crew member was in the dedicated safe position. The signal man signalled the crane operator to hoist and move the pontoon by means of hand signals and verbal commands.

The crane operator first lifted the pontoon approximately 1.5 m by hoisting the crane hook. To move the pontoon aft, he then raised the boom of the crane while lowering the hook. By doing so, the pontoon was kept more or less stable at the same height whilst moving aft.

The lifted pontoon did not make any uncontrolled movement. The pontoon was not swinging or turning. Reportedly, nothing unusual was heard or seen until the signalman saw that the crew member who was supposed to be sheltering aft to unhook was lying on the deck. The signalman raised the alarm with the VHF radio and stopped the operation. The victim was given first aid and a doctor came to the scene but he was declared deceased.

The investigation found, among other things, that because the pontoon itself had blocked a proper and full view of the work area, neither the signalman nor the crane operator had been able to see that the victim had entered the danger zone between the bulkhead and the hoisted pontoon. Although the victim knew to stay in the designated shelter area until the pontoon was safely down, it is possible he attempted to quickly remove some cargo debris as the lift was under way.

Lessons learned

- Human nature is such that we want to get the job done – the 'can do' attitude which probably explains the victim not remaining in the designated safe area. The 'can do' attitude can be perilous if we ignore established procedures in the process.
- The victim did not have a VHF radio so he would have been unable to stop the operation, had he seen this was necessary.

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