



MARS – Lessons Learned

MARS Report No 380 June 2024

MARS 202429

Line breaks six times – when is enough enough?

➔ A tanker had moored to a single point mooring (SPM) buoy ready to start discharging operations. A tug was used aft to apply tension on the vessel and keep it in line with the predominant swell during the discharging operation. Wind and swell were coming from astern and were just within the maximum agreed conditions so discharging operations were started.

Over the next 40 hours of discharging, the tug's line to the tanker broke six times. Each time a break occurred the discharging was halted and another line was installed. Then discharge operations continued. At no time did the tanker's Master question the mooring Master's decision to continue the discharging operation or to stop work and re-evaluate the conditions or the assumptions on which past decisions were made.

Lessons learned

- Luckily, no injuries were sustained during these incidents. Hindsight being 20/20, it seems clear in retrospect that after several line failures (3?, 4?) a decision to delay the discharge should have been taken by the vessel's Master or the mooring Master.
- When bad outcomes happen, investigate – ask why! At a minimum, reevaluate the conditions of work.



MARS 202430

Pressure washer injury

➔ Deck crew were performing maintenance on a tanker underway, de-rusting with a high pressure water-blast machine and then painting. A minimum of two persons were required for the task; one to handle the spray gun and the other to hold and manage the water hoses. The crew were working in pairs, swapping roles every 30 minutes.

After a full morning of this work, the crew returned to the job after lunch. At one point, the water jet was inadvertently turned towards the foot of the crew member handling the nozzle. The water jet penetrated his safety shoe just above the steel protection (photo, right) causing an injury to the foot. The victim was assisted to the ship's hospital where first aid was administered.

Released from his duties for precautionary reasons, the victim visited a hospital at the first opportunity.

No fracture was found by X-ray and no infection or skin necrosis was observed. He returned to full duties shortly after.



Lessons learned

- A pressure washer is like a loaded gun – see also earlier MARS reports (201921 and 202337), which also highlight injuries due to this equipment. The water forces generated can cause severe injury when in contact with a person's body.
- If a pressure washer is on, always hold the lance with both hands to have full control. Never point the lance at yourself or others.
- Proper PPE will help reduce the severity of an injury but is not infallible.

MARS 202431

Limited experience + limited communication = bad consequence

As edited from SHK (Sweden) report 2023:11e
<https://tinyurl.com/MARS202431>

➔ A ferry was in port loading cars and trucks. Communication between the drivers and the crew members during loading took place visually through hand signals and via hearing with whistles. The crew who were loading wore yellow high-visibility clothing equipped with reflectors, and the deck apprentice, who was not participating in loading, wore an orange vest that was marked 'Cadet'.

One semi-trailer truck had already been parked in lane C and another one was being directed to reverse in the same lane by crew member B, parking in front of the first truck. As this was happening, crew member A stepped in front of the first parked truck to retrieve an electrical cable. He then realised the second truck was reversing towards him, and tried to escape his precarious position but was trapped.

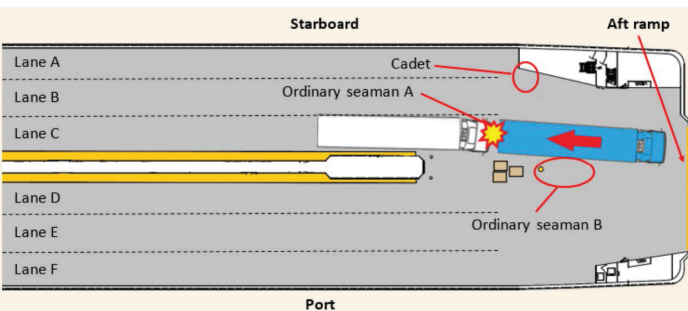
The reversing truck driver felt resistance and stopped the truck. The previously parked truck driver saw the impending accident unfold so he quickly reversed. Crew member A was slightly crushed but due to the quick actions of both truck drivers was spared serious injuries. Once the ambulance arrived, the victim was examined and then taken to hospital for further investigations and observation for three days.

Safety mitigation measures had been implemented following an earlier company risk assessment related to accidents while loading,

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These included wearing reflective overalls, yellow reflective gloves and using a whistle as a stop signal. Other measures documented were that the person directing traffic was to stand where they are visible to the driver and not directly behind reversing vehicles.

Among other things, the investigation found that crew member A had not conducted loading towards the aft ramp in lane C before. Neither of the crew members on duty had previously been responsible for reversing vehicles. As it was, they were tasked with duties with which they did not have previous experience but were expected to perform safely nonetheless.



Lessons learned

- While wearing high visibility PPE is certainly a needed precaution for crew loading a ferry, this precaution does not solve everything. Good judgement and common sense are also needed.
- Good communication is a key component of safety. In this case the crew member directing the truck was not in contact with the victim.
- The victim's actions are an example of single-minded attention to one task; he wanted to retrieve the electrical cable. But, without first examining his environment, he walked into a dangerous situation. Always keep your situational awareness sharp!
- A preferred practice is to mix an experienced crew with a less experienced crew member in order to reduce the chances of inexperience causing a negative outcome.

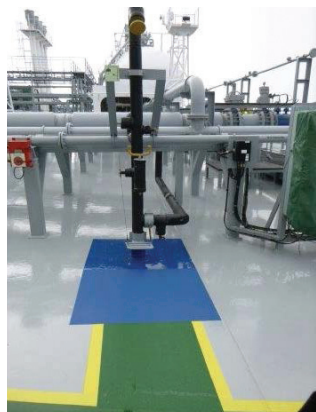
MARS 202432

New eyes see potential slip zone

➔ On a tanker during a Safety Observation Round it was found that there was no anti-slip paint applied to give safe access to the emergency shower station. Wet decks are notoriously slippery. Also, if an emergency shower station is needed, it is probably an emergency and victims will probably not be paying attention to the condition of the deck.



Before



After

Lessons learned

- Here, once again, is a good example of examining your ship with new eyes. We often become blind to hazards in plain sight because they have been in plain sight for so long.
- Good practice dictates all deck pathways are covered in non-slip coatings.

MARS 202433

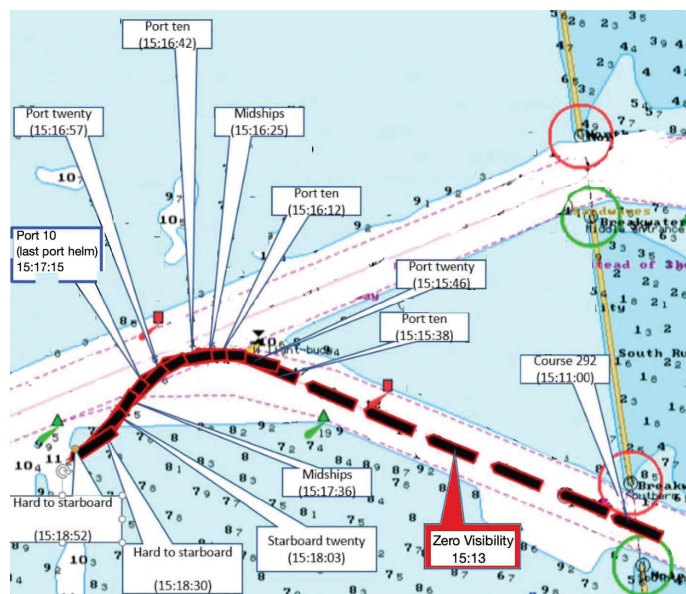
Unexpected fog throws bridge team into disarray

As edited from Taiib (Latvia) report 2-2018 <https://tinyurl.com/MARS202433>

➔ A loaded cargo vessel was outbound under pilotage in daylight and moderate visibility. A tug was in attendance but was released once the vessel was past the port breakwaters. About seven minutes after the tug departed the vessel, visibility unexpectedly reduced to about 200m. The vessel was at a speed of six knots, and over the next two minutes the pilot gave helm orders to make a 44 degree port turn out to sea (see diagram).

The vessel turned further to port than desired. Once the pilot realised this, he gave starboard helm orders, but it was too late. The vessel grounded outside the buoyed channel about four minutes after the first port helm order was given. Attempts to use ship's power to return to the channel were fruitless and salvage tugs were needed.

The investigation found, among other things, that the vessel lacked a complete voyage plan to exit the harbour (ie courses, safety distances, clearing bearings, rate of turn etc.) and that the pilot was navigating primarily by visual means. When the visibility unexpectedly reduced, the bridge team were at a disadvantage. No one on the bridge was in control of the progress of the 44 degree port turn by electronic means such as ECDIS or radar.



Lessons learned

- A shared plan is a safer plan. In this case, the plan was in the pilot's head, much as we saw in MARS 202153.
- Even with a pilot on board a Master should ensure courses are put on the chart or ECDIS and OOWs are closely following the progress of the vessel.
- Visual navigation in fog is a recipe for an accident.
- When in doubt, slow down if possible. In this case the vessel was

at six knots which is not that fast – except they didn't have good situational awareness. At 4 knots they would have had 50% more time to evaluate.

■ **Editor's note:** Some past MARS reports with similar circumstances are MARS202153, MARS202154, MARS202155.

MARS 202434

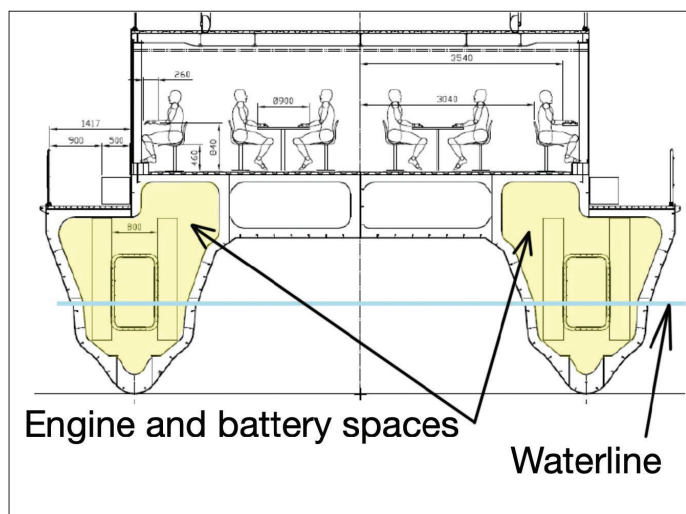
Wet batteries cause serious fire

As edited from NSIA (Norway) report MARINE 2022/08

<https://tinyurl.com/MARS202434>

→ A small hybrid passenger catamaran vessel was underway in coastal waters, with no passengers on board, when the fire alarm sounded. The fire alarm panel indicated fire in both the battery room and the engine room in the starboard pontoon. An engineer opened the door to the starboard engine room and saw smoke. He immediately closed the door to reduce the air admission. The port engine and batteries in the port pontoon were still operational.

The crew believed the starboard engine room to be the seat of the fire, and the fire suppression agent Novec was released into the starboard engine room. About seven minutes later the crew released Novec into the battery room. These measures had the effect of temporarily slowing down the smoke development. A search and rescue (SAR) vessel soon arrived on the scene and evacuated the four crew. The catamaran was towed to port and extinguishing efforts continued for several days before the vessel was considered safe to board.



Fire damage to starboard battery room

Technical examinations showed that the fire started in a battery stack module. It is highly probable that seawater ingress through the ventilation outlet had leaked through the ventilation fan and down onto the batteries. This caused a short-circuit and electric arcs, which were considered to be the source of the fire.

Important information about flooding points from the ventilation system to the battery room was missing from the freeboard plan. This meant that the regulatory personnel responsible for approving the freeboard plan were unaware of the position of the ventilation outlet and the risk that it posed. After the accident, the vessel owners have made several changes to the ventilation system.

The investigation also showed that the battery system had a low ingress protection (IP) rating, so that when seawater entered the battery modules and high-voltage components there were severe consequences. A higher IP rating (and therefore a higher degree of protection) would have reduced the consequences of seawater ingress to the battery room. It would appear that the regulations do not sufficiently address the need for ingress protection of battery systems.

Lessons learned

- Because the fire was incorrectly understood to be in the engine room, approximately seven minutes passed before the extinguishing agent was released to the battery room. In order to be effective, a fire suppression agent needs to be released quickly and, if possible, automatically.
- Battery safety as a whole was not adequately addressed in the regulations. The risk assessment relating to the battery system did not reflect all risks associated with the system. For example, the risk of seawater ingress through the ventilation arrangements was missed.
- The ingress protection (IP) rating of marine battery systems should be carefully considered.
- Classification societies may have different requirements for battery safety, which can result in different vessels having different standards of battery safety. Based on current rules and regulations, the same error may occur again.
- At present, there is no fire suppression system that is capable of safely extinguishing a lithium-ion fire.
- Novec can be considered unsuited as a fire suppression agent in battery rooms because of the complexity of correct use, its poor cooling effect and the fact that it devolves into toxic gases at high temperatures.

■ **Editor's note:** With the ongoing electrification of all transportation modes including seagoing vessels, this accident is an important milestone. The Lessons Learned mentioned above are an edited summary of the plethora of serious and as yet unaddressed risks uncovered during the investigation. Interested readers are advised to consult the original report for more detailed information.

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