# MARS – Lessons Learned

MARS Report No 364 February 2023

MARS 202305

## Fixed $CO_2$ system serviced yet left unserviceable

**As edited from Marine Safety Forum Safety Alert 22-10**

➔ A vessel underwent a routine firefighting equipment survey. All equipment was fully inspected, and any faults or non-conformities were apparently rectified. The fixed $CO_2$ system had reached its 10 year service life interval, so the flexible hoses were renewed and replaced.

In order for the survey to be conducted in a safe manner, the safety pins were inserted on the cylinder activators before the survey began. After the survey, the pins should have been removed from the activators to make the system ready for use. Unfortunately, the contractor left them in place, and the crew did not immediately notice this misstep.

Almost four weeks later, a regular crew change took place, and the new officers made a routine inspection of the vessel. During this inspection, it was noticed that the safety pins were still in place. The pins were removed to ensure the $CO_2$ system would function as required if needed.

### Lessons learned

- Work is only complete when the isolations are removed, and the permit can be closed.
- Never assume that all will be well after private contractors finish a job. Assumption is the pathway to undesired events. Always check and verify. It is your ship.
- Fresh eyes can often see a dangerous condition that was in plain sight. Do a round of your vessel and ask yourself 'Am I using "fresh eyes"?'

MARS 202306

## Too many negative factors can give a negative outcome

**As edited from NTSB (USA) report MIR-22/27**

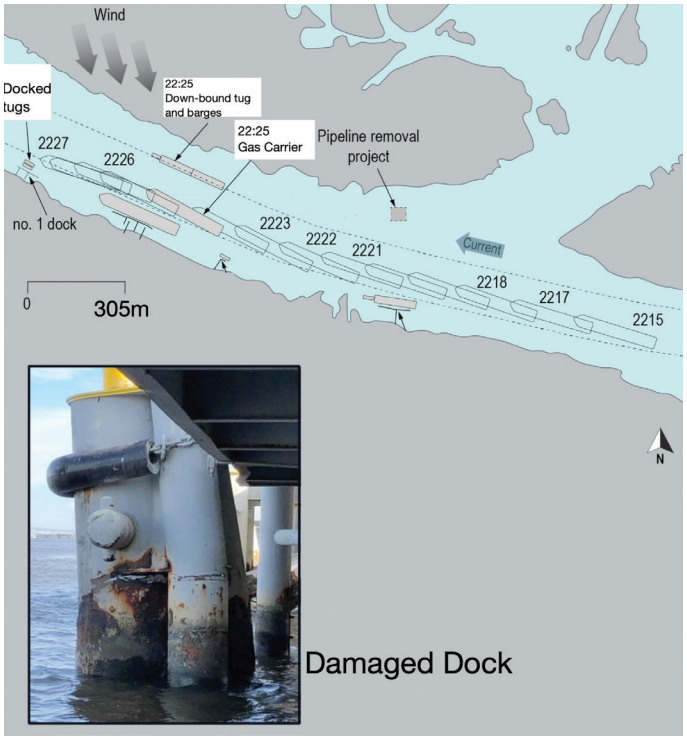
➔ An LPG carrier in ballast was being piloted up a narrow waterway in darkness to the loading berth with one tug escort secured astern. The pilot reduced the vessel's speed to minimise the wake before passing a pipeline removal project that was outside but close to the navigation channel.

Once clear of the pipeline removal project, the pilot requested the escort tug astern to give full thrust to help get past a ship docked to port. A down-bound tug pushing barges, which was near the northern limit of the channel, passed the gas carrier starboard to starboard.

At the time, the following current was about 0.4 knots (flood current). With the wind about 25 knots off the gas carrier's starboard side, the pilot now issued multiple rudder orders, and a half-ahead propulsion order, as well as an order to the tug to 'get the stern out'. The gas carrier was still very close to the channel's southern limit, making a speed of 4.1 knots.

About one minute later, as the gas carrier passed the moored vessel closely to port, the pilot ordered five short blasts of the ship's whistle, and requested the escort tug to give full thrust as well as various engine and helm orders. The gas carrier's bow was now moving toward some tugs moored at dock number 1 (far left of diagram), so the starboard anchor was released and engine emergency full astern was requested. Notwithstanding these last desperate actions the gas carrier's port bow collided with a berthed tug at dock number 1. Combined damage to the moored tugs and the dock were in the order of one million USD.

Although the NTSB found that the 'probable cause' of the collision was the low speed of the gas carrier causing a loss of rudder effectiveness in strong crosswinds, other factors also contributed. For example, down-bound traffic made for less space at a critical juncture in the narrow waterway. The escort tug secured astern could not effectively help the gas carrier's bow come away from the berthed tugs at a critical instance. Another factor was the darkness, which affects visual perception, acuity and depth of field. This in turn affects a person's responses and timing during manoeuvres. Finally, a following current will adversely affect a manoeuvre making a vessel's speed through the water less than its speed over the ground, thus inherently less manoeuvrable.




■ **Editor's note:** we apologise that it is not possible to publish diagrams at a larger scale. Please see the original report for a larger version.

### Lessons learned

- It is often said that hindsight is 20:20. In this case we can see, after the fact, that given the winds and current, a meeting with the tug and barges may have been safer at a spot other than abeam the docked vessel.
- Factors that negatively affect a situation are not always evident at

first but as the situation develops they become risk multipliers. In this case darkness was a pre-existing negative factor. Combined with the winds, the following current, the vessel's slow speed to accommodate the pipeline removal project and the down-bound traffic at a critical juncture made for an almost untenable situation.

- In restricted waterways manoeuvres, it is an advantage that our foresight be as acute as our hindsight. Be mindful of accumulating 'risk multipliers' and act conservatively.

**MARS 202307**

## Corroded extinguisher proves fatal

**As edited from Marine Safety Forum Safety Alert 21/11**

➔ A handheld (cartridge-type) dry chemical powder fire extinguisher was condemned during an annual third-party inspection due to corrosion issues. It was subsequently discharged, ostensibly for demonstration purposes. When the internal carbon dioxide cartridge was activated to pressurise the fire extinguisher, the unit ruptured at the base.

The person activating the extinguisher was struck in the head by pieces of flying metal which proved to be fatal.

### Lessons learned

- Condemned material should be discarded, not used for demonstration purposes.
- Cartridge-type fire extinguishers that utilise a cartridge to charge the main fire extinguisher cylinder shall be handled with care. The fire extinguisher should be placed on the deck at arm's length from the body. Point the top of the extinguisher away from the body while holding the handle and hose in one hand. Trigger the carbon dioxide charging cylinder with the other hand. Do not energise these types of fire extinguishers near the body.
- Consider using stored pressure type fire extinguishers as opposed to the cartridge type.

**MARS 202308**

## Car carrier stability less than required

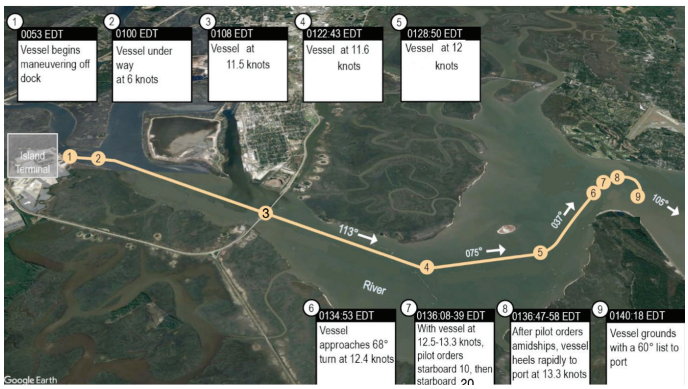
**As edited from NTSB (USA) report NTSB/MAR-21/03**

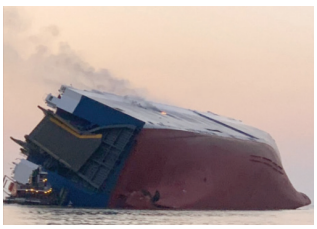
➔ In the early morning hours, a car carrier departed port in a partially loaded condition. As the vessel progressed out to sea in a river channel, a 68° starboard turn in the channel was required. The pilot ordered 10° of starboard rudder. There was no indication from anyone on the bridge that there were any concerns with the vessel, and no alarms sounded on the bridge. Shortly after, the pilot ordered 20° starboard rudder. Seconds later he ordered the rudder returned to midships. But within seconds, the vessel started to heel significantly to port. The pilot ordered the helmsman to move the rudder to port to counter the increasing heel but this action did not arrest the heel. The vessel reached a heel of 60° to port in less than a minute before grounding on the shallow area outside the channel.

Responders were initially able to rescue the pilot and 19 of the 23 crewmembers on board. Four engineering crewmembers remained trapped in the engine room until the following day when responders cut into the vessel's hull to rescue them. Thankfully, no fatalities were incurred during this accident, and only two serious injuries were suffered. Monetary cost including the total loss of the vessel, cargo and salvage costs was estimated at more than 450 million USD.

The official investigation found, among other things that;

The car carrier's GM at the time of the heeling was not more than 1.8 metres, well below the 2.45 metre GM reportedly calculated in the stability computer. The investigation postulates that the chief officer had entered the data for the ballast tanks into the stability computer manually, and in doing so had made a data entry error. This in turn led to an incorrect determination of the vessel's stability. At a higher level, the investigation found that the vessel operator did not have a method in place (training and auditing) to ensure that the chief officer, although experienced, was proficient in using the shipboard stability computer.



### Lessons learned

- When only one person is responsible for a safety-critical task without a backup to help identify possible errors, single point failure can occur. Had the Master taken a more active role in reviewing aspects of the vessel's stability and the chief officer's stability calculations, he may have been able to identify the error.
- Given the critical nature of stability calculations on car carriers, it is of utmost importance that operators ensure officers are well trained in the use of the loading computers on board, and that they have adequate procedures in place to guide crew in ballasting practice and sequencing.

■ **Editor's note:** Other 'stability hiccups' on car carriers can be found in MARS reports 202041 and 202043. Notably, an investigation into a similar accident involving a car carrier in 2016 uncovered evidence that suggests sailing without a finalised and accurately calculated GM is a practice that extends to the car carrier sector in general. Without proper training it is likely that unsafe practices will become the norm. When unsafe practices become the norm, it is only a matter of time before an accident re-occurs.

MARS 202309

## A fall too far

**As edited from Marshall islands report published 16 February 2022**

➔ The deck crew of a bulk carrier were undertaking hold cleaning while at sea in ballast. Based on the completed risk assessment, the PPE required for the job included a safety harness with lifeline. The Australian ladders (**Editor's note:** ladders with intermediate platforms) were to be used to enter and exit the holds and the vertical ladders were to be used only as an emergency exit.

Holds 1 to 5 were cleaned without incident. The atmosphere in the holds was tested before entry, as required by the enclosed space procedures, and the Australian ladders were used for entry and exit. The Bosun and two crew then moved on to cleaning hold 6, before breaking for lunch. After lunch, the two crew returned to hold 6 and started their descent into the hold via the Australian ladders. Before they arrived at the bottom of the hold they saw the Bosun lying motionless on the tank top of the hold at the bottom of the vertical ladder forward.

The alarm was raised, and first aid was delivered, but the victim had no pulse and was not breathing. CPR was administered for some time, but with no response, and was eventually declared deceased. The victim's body was removed from hold 6 and, when examined, both legs appeared broken just above the ankles. Bones could be observed sticking through the skin near the heels of both feet. No other bleeding or external injuries were noted. These injuries point to a fall from a substantial height; the hold was about 16 metres deep.

It could not be determined why the victim, a very experienced seafarer, chose to descend the vertical ladder instead of the Australian ladder. This went against recent practice and the agreed method to enter and exit the hold. The investigation found that although the victim was wearing a safety harness, it was of the single strap/clip variety, not a double strap/clip. There were no indications that the safety harness, lifeline, or clip had failed.

**Single strap/clip in conjunction with continuous vertical safety line/rail**
**Photo: Capital Safety Australia**

**Safety harness used by victim**


### Lessons learned

- The only way to reduce the risk of falling from a vertical ladder is to use either a double strap/clip arrangement such that one clip is always attached to a secure point or, if a single strap/clip, to use it in combination with a vertical continuous safety line/rail and fall arrestor, as in the photo left.
- If such equipment is not on board, Australian ladders should always be used to enter and exit a hold.
- Never climb or descend a vertical ladder without continuous fall protection. Your life depends on it.

MARS 202310

## Exhaust valve springs fly into face

➔ A member of the engine room staff was carrying out routine maintenance on an auxiliary engine while the vessel was at anchor. He was extracting the suction and exhaust valves of the auxiliary engine by decompressing the support springs, using the correct tool for the purpose, when the tool slipped and the springs jumped off, striking him on the chin, lower lip and left eye.

The victim was evacuated to a shore hospital for treatment.

**Correct position is with back straight – head away from the tool and cylinder head while loosening the nut to avoid such injuries**

### Lessons learned

- When working with elements that have potential energy, proper PPE and correct body position are vital for safety.

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