MARS – Lessons Learned

MARS Report No 383 September 2024

■ **Editor's Note:** This month's edition of MARS Lessons Learned puts the spotlight on work at height. In one case, the work was not even considered to be 'at height' but it certainly was. In another report the height was not great at all, yet a crew member suffered a serious injury nonetheless. The third report, a horrible sequence of events, brings to the fore the importance of being aware of simultaneous operations in a shared space on a vessel.

Much as entering 'enclosed spaces' has been in the spotlight as a factor of serious accidents in the past decade, work at height is another high risk undertaking that deserves special attention. Learn these lessons from past events instead of making the same mistakes yourself.

The final report of this issue is yet again an enclosed space double mortality. Incredibly, the shore-based personnel apparently used live chickens to test for noxious gases and lack of oxygen.

MARS 202446

Work from height fatality

As edited from NSIA (Norway) report MARINE 2024/04
https://tinyurl.com/MARS202446

➔ A passenger vessel berthed and the crew was preparing to move the gangway from deck 2 to deck 1 to accommodate the tidal range, which was lower than at the last port. Extra deck crew were asked to assist with the move, although they were unfamiliar with this task. A work supervisor was responsible for the procedure and for overall safety. This person had several other areas of responsibility. Many tasks were lined up for the deck crew that day, and there was a sense of time pressure.

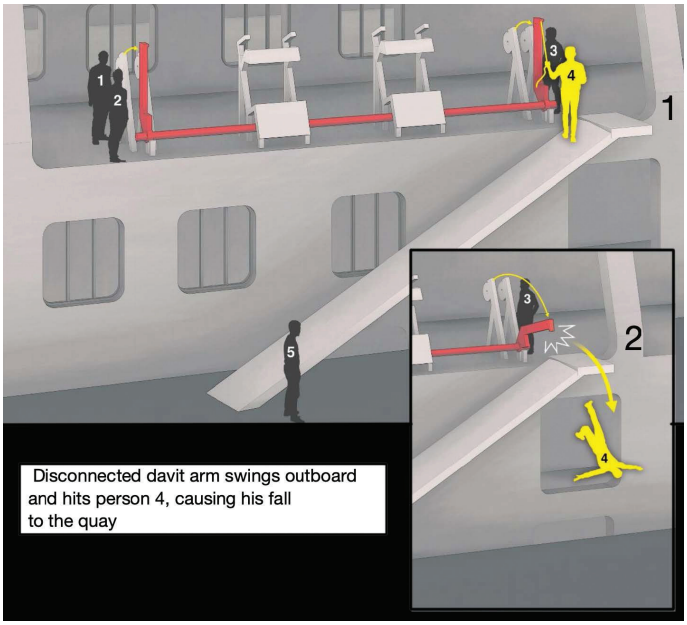
The crew first dismantled the railing and the gangway safety net so that wire rope cables could be connected. The crew involved in the work still had to use the gangway to get up and down from the quay area, despite the dismantling of the safety features. On deck 2, three people were initially involved in the work on the gangway. Person 3, operating the winch, had not done so before and was given an introduction to which buttons to press by person 4, who had more experience with the winch and gangway. Person 1 observed the work from the forward part of the davit and Person 2 watched the cable of the forward davit.

The davit was hoisted back into its cradle so that it would not obstruct access to the gangway. The davit stuck in the vertical position, and when the cable was run out further, it became slack, while the davit remained vertical. Person 4 moved from the deck onto the gangway and pulled the cable in an attempt to loosen the davit. Person 3 was told to stop the winch and put the control down. With the cable now slack, there was nothing to prevent the davit from pivoting back down to the horizontal position. As it pivoted down it struck person 4, who lost his balance and fell to the quay. First aid was administered and he was taken to a shore hospital by helicopter. He was later pronounced deceased as a result of the injuries sustained in the fall.

The investigation found, among other things, that the crew did not consider gangway rigging tasks to be 'work at height'. The crew had experience rigging the gangway from deck 1, which was lower, but not from deck 2.

The accident sequence revealed that the work method needed from deck 2 was different compared with that from deck 1; from deck 2 the davit had to be brought back to the cradle so as not to obstruct free passage of the gangway.

The crew did not habitually wear helmets or fall protection equipment for this job when it was performed from deck 1, nor did they do so when working from on deck 2 on the day of the accident.



Lessons learned

- A 'dynamic risk assessment' process is a technique whereby workers constantly scan the workspace for hazards and make the necessary adjustments. In this case, the method of work for gangway manipulation from deck 1 was used, although the work was being carried out on deck 2. A dynamic risk assessment process should have identified that deck 2 presented a new hazard – work from height.
- Working from height requires fall protection. Working on deck requires hard hat protection regardless of the task or location.
- As mentioned in MARS 202443, time pressures are usually self-imposed. Even if time pressures are overtly expressed, the proper mindset should be 'Safety First'.

MARS 202447

Fall from low height still consequential

➔ A vessel was underway at sea and crew were undertaking normal maintenance. One person, assisted by another, was to replace a limit switch on the provisions crane. The limit switch was on the crane post approximately two metres above the deck. A ladder had to be used and the work was thus approximately 0.8m over the deck (i.e. on the third step of the ladder) – which is still work at height. While one worker was away fetching tools, the other worker went up the ladder and tried to check something on the switches. While descending the ladder he tripped and fell to the deck.

The crew were alerted and the victim was transferred to the bridge deck for treatment. The victim's shoulder was dislocated and he was in pain. The next day the victim was sent to a shore hospital and was repatriated several days later.

Simulation of worker's position on the ladder

Lessons learned

- Working at height, but a low height, can be an insidious danger. It can be an accident waiting to happen if you let your guard down. Falling from a low height can still have serious consequences, as this report illustrates.
- Irrespective of height, ladders should be secured in place. For low heights, a safety attendant should be on deck behind the worker.

MARS 202448

Work at height with added hazards

As edited from MAIC (Cyprus) report 49E/2022
https://tinyurl.com/MARS202248

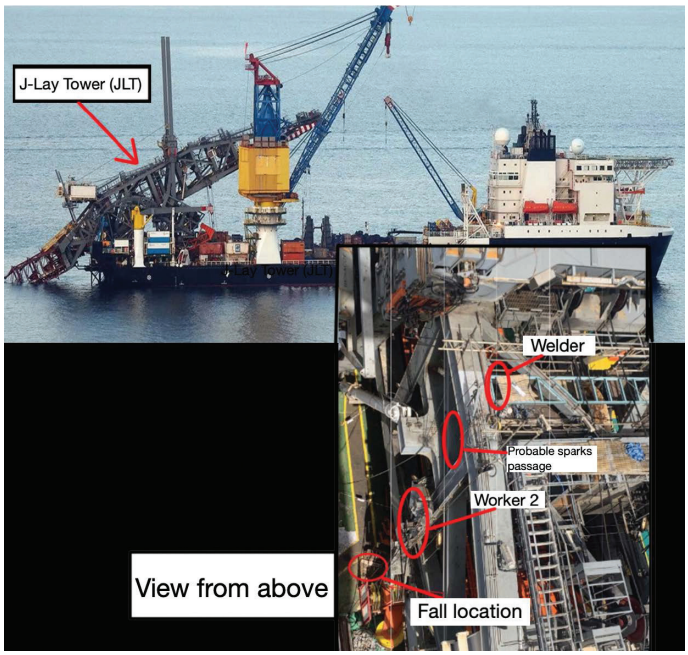
➔ A pipe-laying vessel was at anchor and maintenance was being done on the 'J-Lay Tower' (JLT) by a sub-contractor specialised in work at height. Two workers were tasked with chipping and painting the JLT. They relieved each other at height in alternation according to an agreed schedule.

At 0700, worker 1, secured with a safety harness and safety line, was chipping on a surface of the JLT at about 8m above the deck while worker 2 was attending on main deck. This work configuration continued in the morning and after lunch. By about 1530, worker 2 was ready to work at height on the JLT while worker 1 was to stay on deck. As worker 2 climbed up, worker 1 commented that another team of workers were welding a project higher up on the JLT, and that sparks were coming from the welders' work area (2-3m horizontally from worker 2, and about 3-4m higher). Worker 2 acknowledged the comment but apparently said it was OK.

Worker 2 intended to clean and paint the metal surface of the JLT on the same day. He had tied a can of paint thinner to his second safety line, which was hanging at his side, and was using a needle gun to chip the surface of the JLT, with the thinner for cleaning.

About 45 minutes after worker 2 had commenced the chipping and cleaning at height, sparks from the overhead welding operation fell into the thinner can hanging at his side. The thinner ignited. In a panic, he tried to get rid of the burning can, but it was still secured to his safety line. The can swung back on to him as a pendulum and ignited thinner splashed onto his coveralls. The fire burned the safety harness and the rope securing it, causing him to fall to the deck, where the victim continued to burn. The flames were quickly extinguished by crew and the vessel's attending doctor arrived within minutes, but after many resuscitation manoeuvres, the victim was declared deceased.

The investigation found, among other things, that the identification of simultaneous operations had not been done nor had a permit to conduct Hot Work been granted to the welding team.



Lessons learned

- While the inadequate implementation of the vessel's Safety Management System (SMS) could be seen as the principal underlying factor of this accident, this statement is at once too general and unspecific to be of any use. Yet, if a company's SMS is followed, such accidents should never happen.
- This accident brings to light the importance of identifying simultaneous operations in a shared space on a vessel.
- A permit to conduct hot work should always be the first step in hot work tasks. The permit must not be a check box exercise but consist of an analysis of the work area and all existing conditions and hazards.

MARS 202449

Confined space gas test using live chickens does not work

As edited from MARDEP (Hong Kong) report published February 2024 https://tinyurl.com/MARS202449

➔ A general cargo vessel was berthed and stevedores were preparing to unload logs from the holds, which had been opened several hours earlier. During the pre-unloading meeting, the vessel's Chief Officer (C/O) instructed the stevedores to use a work cage operated by a shore crane for accessing the holds. This was necessary because the logs were blocking the access stair trunks. The stevedore foreman insisted that once enough logs were unloaded, the stevedores should use the access entrances and fixed steel ladders on the main deck. The C/O agreed and had the safety grilles to the hold access ladders unlocked.

The stevedore foreman then asked that the ventilation be stopped. Unloading commenced about seven minutes later, after the stevedores had ostensibly conducted gas testing inside the access spaces. Testing was done without the presence of shipboard personnel and was apparently conducted with gas detectors and live chickens.

The next day, the log unloading continued. That morning, a stevedore entered the forward deck access to hold No. 2 to help move an excavator into the hold with the shore crane. Another stevedore entered

the aft deck access to the same hold, not realising that the access from the ladder trunk to the hold was blocked by cargo. His goal was to release the excavator's slings.

When the first stevedore exited the hold, he realised the other stevedore was missing. He tried to communicate with him via walkie-talkie but there was no response. He then attempted to enter the hold via the aft ladder trunk to search for him, but exited shortly afterwards due to breathing difficulty inside the ladder trunk. He reported the situation to the ship's duty officer and a few minutes later the C/O, wearing only a mask respirator (to filter toxic gases but not deliver oxygen), arrived at the scene and entered the ladder space via the aft entrance.

Within a minute, the C/O stopped responding to calls, prompting the shipboard alarm to be raised. A rescue team equipped with self-contained breathing apparatuses entered the ladder trunk and found the C/O unconscious on the ladder steps. They put an emergency escape breathing device (EEBD) on him and brought him to the deck. The fire-fighting team then arrived and quickly extracted the unconscious stevedore. Unfortunately, both the C/O and the stevedore were declared dead.

The investigation found, among other things, that the hold access trunk contained an O_2 concentration of only 3%, and 1.3 ppm of phosphine (a fumigation product). The level of carbon monoxide exceeded the upper range of the gas detector. The report found that if proper access controls to the entrance to the ladder trunks had been in place, the fatal accident might have been avoided.

The investigation also found that the initial actions taken by the crew in response to the emergency in the ladder trunk were not properly organised and failed to follow recommended practices. For example, the mask worn by the C/O during his solo improvised rescue attempt was only to filter toxic gases but did not provide survivable oxygen. In short, the crew were not familiar with the limitations of the mask respirator. It could be deduced that the shipboard safety training and drills for enclosed space entry and rescue were ineffective.

Lessons learned

- Proper gas testing cannot be undertaken in six minutes using gas detectors and certainly not by using chickens.
- This accident is a prime example of a vessel's leaders bowing to the pressures of shore stevedores. A vessel's crew, by virtue of its company's SMS, are bound to ensure compliance with the enclosed space procedures on their vessel. In this case gas testing, enclosed space access, and victim rescue were all either ignored, outsourced or not properly carried out.
- It would appear that the crew, notwithstanding having done enclosed space rescue exercises as per SOLAS, were unfamiliar with the limitations of the mask respirator, among other things. Another glaring deficiency was the C/O's improvised solo rescue attempt with the wrong equipment.
- Mandatory enclosed space rescue exercises are now required by SOLAS but how do you practice something you don't really know how to do in the first place?

As mentioned in MARS 202424, the 'elephant in the room' remains the lack of standardised and comprehensive training for crew on enclosed space rescue and the lack of mandatory rescue equipment that should be kept on board. This paradox was raised in a *Seaways* article in June 2021 and can be accessed at https://tinyurl.com/enclosedspacerescue

This accident, which claimed the life of one crew member and one stevedore, is yet another example of what appears to be a persistent hazard. According to IMO document CCC 6/INF.7, covering the period from 1999-2018:

- Approximately 2/3 of enclosed space accidents happen in port.
- Of all enclosed space accidents, some 78% were in cargo hold access ladders and trunks.
- Close to 39% of enclosed space fatalities were stevedores. Enclosed space training and awareness is not just a concern for ship's crews, but for shore-based stevedore as well.

Another enclosed space rescue attempt gone very wrong can be found at MARS202124.

Visit www.nautinst.org/MARS for online database

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