

RISK ALERT



Dangers of working in and around Cargo Holds



Written by
Taslim Imad
Loss Prevention

Introduction

For dry cargo vessels, properly maintained, sound and clean cargo holds are very important if a shipowner is to be profitable. If the cargo holds are not ready to receive cargo at the port of loading, then there could be long delays for the vessel and possible disputes with the charterers or shippers of cargo.

For the crew, various tasks related to cargo hold maintenance and cleaning might be considered an everyday exercise, and some may find it very basic and dull due to its repetitive nature. These normal “routine” tasks may have very serious consequences should complacency set in and they go wrong, potentially resulting in a serious accident and a [Marine Casualty](#).

This Risk Alert is intended to highlight some of the dangers of working in and around the cargo holds during “routine” maintenance and cleaning operations. Crewmembers may fail to follow correct [ISM](#) procedures for any number of reasons, such as, complacency, having an excessive workload or insufficient time to complete the task, or there may not be available suitably robust ISM procedures.

Accident Investigation Report 1

[The Republic of the Marshall Islands \(RMI\) Maritime Administrator](#) recently published a marine [casualty investigation report](#) for a fatality which occurred during cargo hold cleaning operations.

A bulk carrier was underway on a ballast voyage with the crew cleaning and washing cargo holds. On the day of the accident, cleaning was planned for the lower portions of the cargo holds. The Master approved the “Cold Work Permit” that had been completed for washing the cargo holds, although the actual cargo holds to be washed were not identified on the permit. The permit identified that the work would be done under closed hatches due to the prevailing weather conditions, and that the cargo holds would be vented to the atmosphere.

During task planning it was decided that, since only the lower portions of the cargo hold would be cleaned, and fall arrestors could not be rigged with the hatches closed, a “Working Aloft Permit” was not required. Equally, the cargo holds were empty therefore the crew did not consider the requirement for an “Enclosed Space Entry Permit”. The Bosun was listed as the responsible person in attendance for the work, and the work would be undertaken by three Able Seamen (AB) and two Ordinary Sailors (OS).

After a lunch break, the Bosun and an AB (who was not present during the morning toolbox talk carried out by the Chief Officer), returned to cargo hold No. 2. All crew were wearing the required PPE when they returned to the cargo holds to resume the hold cleaning. During cleaning, the Bosun and AB noticed a portion of the forward bulkhead, just above the lower stool, had not been cleaned the previous day. This area was about 3.5 m above the tank top.



Cargo Hold No. 2 showing the approximate location of the accident.
(Source – [RMI investigation report](#))

Neither the Bosun or the AB could clean this area from the tank top and the AB decided to use a portable ladder that had been left in the hold from the previous working day. The portable ladder was not secured but held by the Bosun. The AB took the spray gun for the high-pressure washer, climbed the ladder and washed the dirty area. It was whilst descending the portable ladder that the AB fell 3 - 3.5 meters on to the steel deck, suffering serious head injuries. The AB died later that day.

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Accident Investigation Report 2

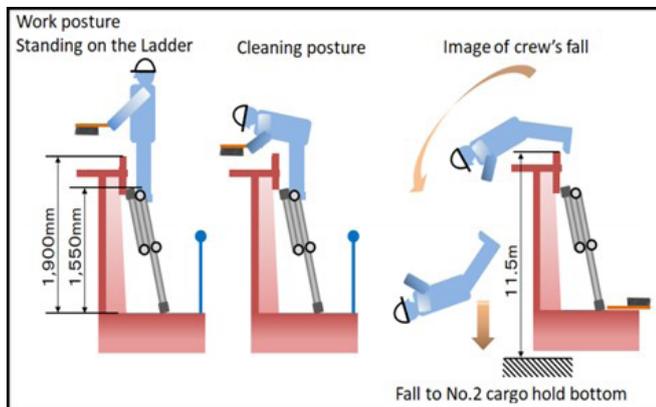
In 2019, [Japan Transport Safety Board](#) published [accident investigation report](#) MA2019-02 concerning the fatality of a seaman who fell into a cargo hold.

The vessel was moored at Mitsubishi Naoshima wharf, Japan. Four crewmembers were performing cleaning work of the upper hatch coaming of the cargo holds after unloading of cargo. "The cleaning work was an item of routine works taking about 30 minutes"



Cargo Hold No. 2 showing approximate location of the accident. (Source – [JTSB investigation report](#))

The hatch coaming was 1.9m above main deck level which necessitated the use of a portable ladder to sweep the hatch coaming channel. The AB sweeping the hatch coaming of cargo hold No. 2 was standing on an unsecured portable ladder without a safety harness



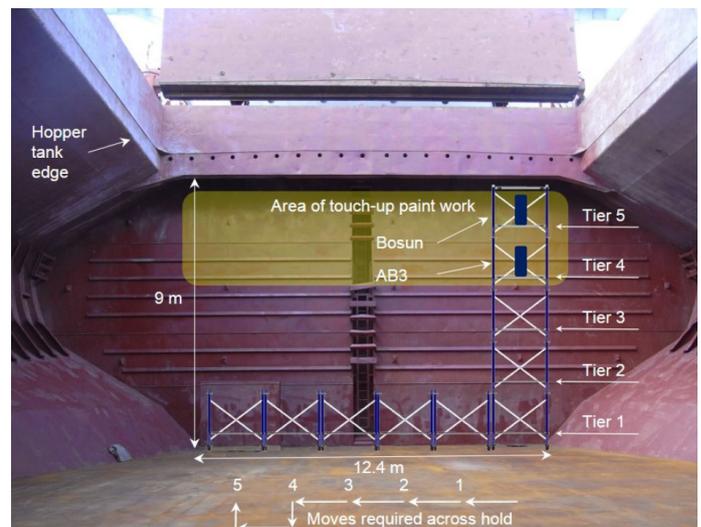
Work posture on the ladder and fall position at the time of the accident. (Source – [JTSB investigation report](#))

The AB, from his thigh and upwards was seen to be higher than the top of the hatch coaming and he was reported as having an unstable body posture. He fell forward, twisting his body as he tried unsuccessfully to clutch the upper hatch coaming with his left hand but fell from the hatch coaming to the bottom floor of the cargo hold. The AB was fatally injured.

Accident Investigation Report 3

In 2019, [accident investigation report](#) 328-MO-2017-001 published by the [Australian Transport Safety Bureau](#) reported on the serious injuries to two crewmembers who fell from a mobile scaffold tower.

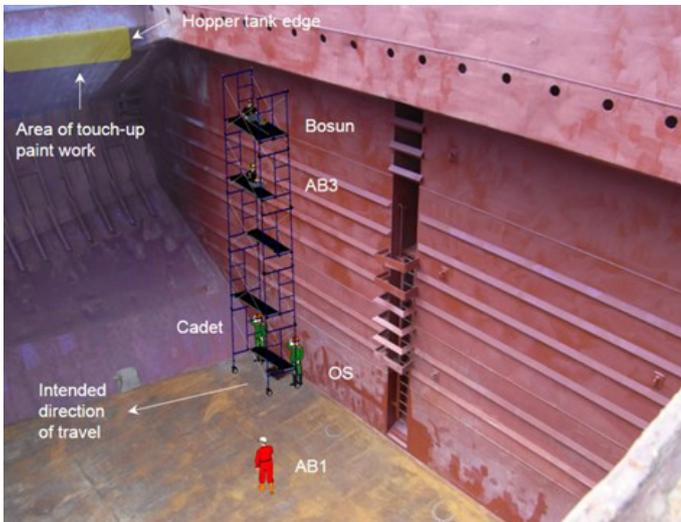
While the vessel was at anchor, the ship's crew went about routine duties including painting and touch-up work in cargo holds. This required the crew to work from the ship's portable, modular scaffold tower.



Cargo hold No. 4 scaffold arrangement and moved (Source – [Australian Transport Safety Bureau](#))

On the day of the accident, the morning painting and routine touch-up work session was properly supervised by the Chief Officer (C/O). Correct PPE was used and correct procedures were followed such as the scaffold tower being properly secured by guy ropes and the crew on the scaffold wearing safety harnesses and lines led up onto and secured on the ship's deck. During repositioning of the scaffold tower, safety lines were released, and the crew were climbing down. After repositioning the scaffold tower both the crew safety lines and scaffold tower guy ropes were resecured. This process was followed throughout the morning and by lunch time touch-up work in cargo hold No. 1 had been completed.

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Cargo hold No. 4 scaffold arrangement and crew member at completion of work and direction of next move.

(Source – [Australian Transport Safety Bureau](#))

After lunch the crew returned to cargo hold No. 4, but the C/O did not return, he was resting in preparation for bridge watchkeeping duties. Painting in cargo hold No. 4 resumed and, as in the morning work session, the crew used a mobile scaffold tower to access higher areas of the bulkhead. However, during the afternoon session, the correct procedures were not followed and the two crew on the scaffold tower remained unsecured both whilst working and during repositioning of the tower. After painting of the aft bulkhead was completed, it was decided to paint the hopper tank edge, subsequently the scaffold tower was moved with the unsecured crew still on it. During this repositioning the scaffold tower became unbalanced and toppled forward onto the tanktop. The two crewmembers on the scaffold tower were seriously injured in the fall and were evacuated to a hospital ashore for treatment.

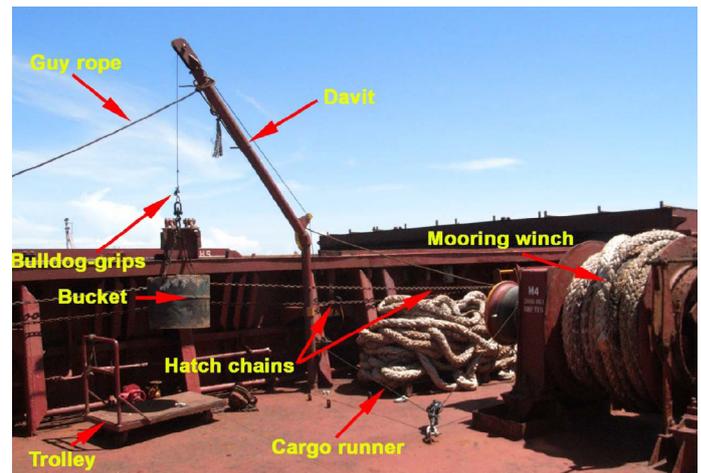
Accident Investigation Report 4

In 2011, [accident investigation report](#) 284-MO-2011-002 published by the [Australian Transport Safety Bureau](#), reported on the fatality of a crewmember who fell from the hatch coaming onto the tank top below.

A bulk carrier was on its way to load iron ore cargo at Port Hedland, Australia. It was routine practice for the cargo holds to be cleaned during the voyage.

On the day of the accident, the deck crew met with the Chief Officer (C/O) to discuss the task of cargo holds cleaning and the necessary precautions to be taken. In particular, they discussed the care that should be taken while the crew climbed up and down the cargo hold ladders. The weather conditions were good, but rain was

expected at times during the day. The crewmembers split into two groups, each consisting of four men, and began removing the iron ore residue.



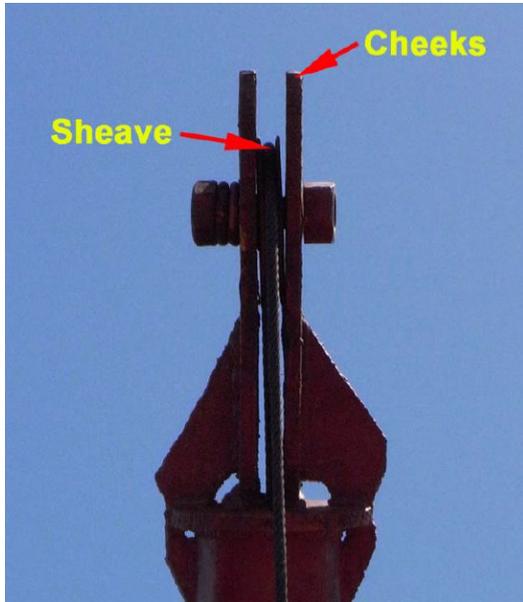
Portable cargo hold davit in position in Cargo hold No. 8

(Source – [Australian Transport Safety Bureau](#))

After the lunch break, a team of four went to start work at cargo hold No. 8. They opened the hatch covers and agreed that two crew would climb to the bottom of the hold to fill the buckets, the cadet would operate the winch and the bosun would work the davit and direct the cadet. The bosun and cadet connected the bucket, lifted it and swung it over the hatch coaming, tied off the davit's guy ropes and then began lowering the bucket into the cargo hold. While the bucket was being lowered, the bosun climbed up the side of the hatch coaming and stood on the hatch lid drive chains so that he could see over the hatch coaming into the hold and give directions to the cadet.

The team had lifted a bucket successfully and the bosun was in the process of sending another bucket into the cargo hold, connecting an empty bucket to the cargo runner and signalling the cadet to hoist the bucket clear of the hatch coaming. The cadet stopped hoisting but the winch ran on a little. The bosun swung the davit back over the hatch coaming and told the cadet to lower the bucket. When the cadet tried to lower the bucket, the cargo runner went slack, but the bucket did not lower. It was found that the bulldog grips attaching the shackle to the wire runner had jammed in the head of the davit, between the sheave and the davit head cheeks. The bosun told the cadet to stop lowering and climbed onto the hatch coaming to free the jammed cargo runner.

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Davit Head - (Source – [Australian Transport Safety Bureau](#))

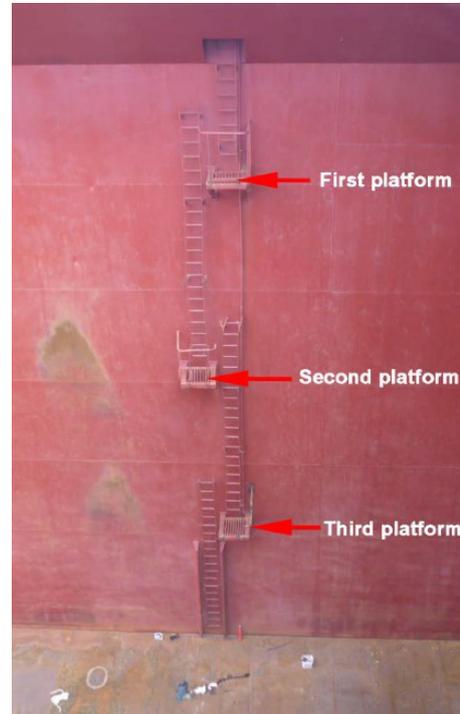
The bosun pulled on the bucket, trying to unsuccessfully to release the shackle from the davit head. The bosun pulled again on the bucket and on this occasion the davit moved. As the davit moved the bosun lost his balance, falling about 25 m into the empty cargo hold, landing on the tank top below resulting in the loss of life.

Accident Investigation Report 5

[The Australian Transport Safety Bureau](#) published [accident investigation report](#) 281-MO-2010-010 regarding a fall from a cargo hold ladder which resulted in a loss of life.

A bulk carrier was en route from Hong Kong to Port Kembla, Australia. During the voyage, when cargo hold cleaning was completed, the Chief Officer (C/O) noted that the handrail around the third platform of cargo hold No. 5 ladder was damaged and would need to be repaired.

On the day of accident, the C/O met with the storekeeper and OS and instructed them to repair the hand railings. The C/O had already filled out the necessary permits so the three men discussed the precautions to be taken, signed the permits and then went to work. The crewmen gathered the equipment they needed and went to cargo hold No. 5. The storekeeper rigged a halogen lamp to provide lighting, as the hatch covers had been kept closed, and removed the damaged sections of hand railing, he climbed out of the hold and went to the welding workshop to repair the damaged hand railing.



Ladder arrangement of Cargo Hold No. 5
(Source – [Australian Transport Safety Bureau](#))

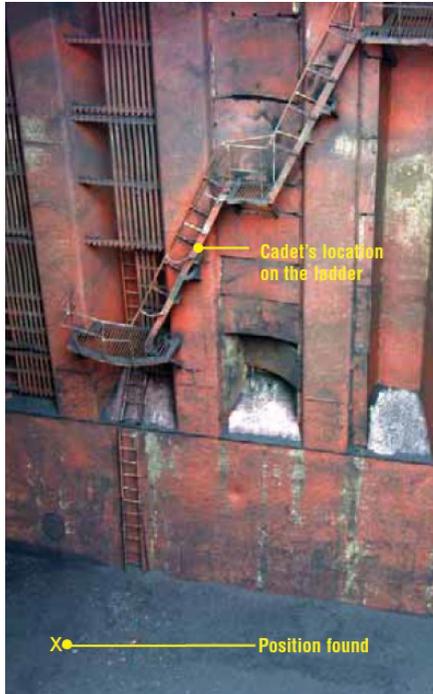
After the lunch break, the storekeeper and OS lowered a small portable welding machine, the repaired hand railing and a bucket filled with tools to the second platform of the cargo hold. The storekeeper climbed down to the second platform (without a safety harness) and moved the equipment while the OS remained on deck. The OS could only see as far as the second platform because of the lighting, so he lost sight of the storekeeper at about this time. Approximately 5 minutes later, the OS heard a noise that sounded like something falling. He shouted to the storekeeper but received no reply so climbed down to the first platform to check what had happened. When he reached the platform he could see the storekeeper lying on the tank top. The OS climbed out of the hold and ran for help. The ship's staff tended to the storekeeper but his condition did not improve and he died as a result of his injuries.

Accident Investigation Report 6

[The Australian Transport Safety Bureau](#) also published [accident investigation report](#) 201-2004 which covers a fall from a cargo hold ladder, resulting in a fatality.

A bulk carrier anchored off the port of Hay Point, Australia was carrying out routine maintenance tasks, including the repair of grab damage to ladders in the cargo holds.

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Ladder arrangement of Cargo Hold No. 6
(Source – [Australian Transport Safety Bureau](#))

On the day of accident, preparations were made to crop and replace damaged handrails on ladders in the forward part of cargo hold No. 6. The repair team, consisting of Chief Engineer, the first oiler and an engineer cadet, starting from the uppermost horizontal platform in the cargo hold, began identifying which handrails were to be cropped and once identified, began cropping damaged rails and welding new handrails. All three wore safety equipment, including safety harnesses. The engineer cadet, while standing about two metres above the C/E, suddenly fell approximately ten metres into the hold. He landed near the base of the lower vertical ladder and died from his injuries before Medivac could be effected.

The fall was not witnessed; however, evidence suggests that the cadet was leaning out over the handrails to observe the repairs and that he lost his balance. The cadet was wearing cotton gloves that would have afforded little grip when holding the new galvanised pipe handrails. The cadet had previously been wearing a safety harness but had released this to pass some materials to the chief engineer. His safety harness was not secured at the time he fell.

Causes

Maintenance of cargo holds including cargo hold cleaning, painting, welding etc. are very common tasks on vessels such as general cargo, bulk carrier and dry cargo barges. It could be large ocean-going vessels, small coasters or river barges, the risks associated

with cargo holds related tasks remain the same. For the crew of any vessel, a normal routine task has the potential to quickly turn into a casualty even with the correct procedures in place. A ship's crew comprise individuals who will have many differences based on for example their ethnic origin, language, physical abilities, gender, motivational level, their intelligence, attitude and perception towards safety and the risks that they face, that's why the [Human Element](#) is "estimated to be a contributing factor in 75% to 96% of marine incidents" ([Allianz AGCS Shipping Review 2020](#))

A crewmember may be familiar with a task, leading to a false sense of security, a perceived lessening of risk and a feeling of being in their comfort zone. Similarly, with a new task and with all the correct procedures in place, crew may have a heightened sense of awareness, being unfamiliar with the task and being out of their comfort zone.

Other, often hidden and less obvious factors such as commercial pressure, operational pressure, lack of safety culture, lack of safety procedures, lack of motivation, fatigue, lack of leadership or supervision, inexperience and an excessive workload may also contribute to incorrect or flawed decision making.

In most of the cases referenced above, it is noticeable that there appears to be an acceptance of the risk associated with working from height, whilst also choosing to ignore the correct working procedures and correct PPE application. In some cases, there was an apparent lack of correct working practices and procedures and an absence or lack of appropriate supervision.

Preventative Measures

The [ISM Code](#) became mandatory over two decades ago with the purpose of providing "[an international standard for the safe management and operation of ships and for pollution prevention](#)" however we are still witnessing serious accidents, fatalities and environmental disasters. The Club would like to reiterate and remind Members of the need for effective implementation of the ISM Code in order to avoid accidents.

There is still a perception amongst some crew, that the ISM Code is a paper intensive exercise and that there is commercial/operational pressure being exerted on them to complete a task as quickly as possible. It is very important to recognise that perceived and / or actual pressure to complete a task may result in stress on the crew, leading to poor decision making, often by experienced crewmembers, as they can overlook safety critical steps in procedures with the potential outcome being accidents and incidents. It is vital to ensure that the

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crew follow procedures fully, complete tasks safely and do NOT take shortcuts.

Effective implementation of a safety culture both within a company and on board a ship, is a two-way process. As much as it is the company's responsibility to ensure that ship specific safe systems of work are implemented effectively on board their ships, it is also the crew's responsibility to always follow them, not to take shortcuts or other risks which could put the safety of the ship and fellow crewmembers in jeopardy. It is also entirely possible that even in a company with very good safety procedures, providing all the necessary safety equipment and appropriate training, some crewmembers may still disregard these procedures due to complacency through never having had an accident!

REMEMBER a single incident could result in the loss of their own or a fellow crewmember's life.

The SMS should include procedures to ensure non-conformities, accidents and hazardous situations, no matter how minor they may appear, are recorded in order that they may be investigated. Appropriate corrective actions then be developed to mitigate recurrence, with the purpose of improving safety on aboard the vessel.

To conclude, a good safety culture requires continuous improvement. A robust procedure identifies potential problem areas through continuous Risk Assessment, meaning that, before the commencement of any task, it has been carefully evaluated against existing control measures. Prior to undertaking the repeat task, rather than relying on original risk assessments, a review of the Risk Assessment should be undertaken recognising the potential for changes in risk and available control measures. Where the existing control measures are evaluated as being insufficient to make a task safer, then additional control measures will be required.

In most instances, in addition to a robust procedure, personnel protective equipment (PPE) is considered to be a key control measure in mitigating against risk, this should not be the case. The most effective control measure for any task is to actually eliminate the risk, with the reliance upon PPE being a last resort.



Safety Culture Cycle

After completing/reviewing a risk assessment ahead of undertaking a task, a meeting is required where planning and organisation of the task is discussed by all interested parties, sometimes known as the Job Safety Analysis (JSA). In this planning session there should be the opportunity to review the procedure, identify potential areas for improvement, make decisions as to the use of equipment, tools and re-affirming the correct working practices to be followed. After planning, crewmembers are to be assigned their tasks. Any language barriers are to be considered with the objective being to ensure that everyone understands their role and responsibility. It is very important to monitor the task and to ensure that, in accordance with the SMS and Company's procedures, the correct control measures are in place and are being followed. When undertaking the task, if anything is considered unsafe then the task should be stopped and a review of the procedure carried out to address the risk. Finally, when the task is completed it is very important to review the task in order that any lesson learnt and future areas for improvement can be identified and incorporated into the procedure to avoid the potential for an incident in the future.

Suggested References

- [The International Safety Management \(ISM\) Code](#)
- [The Human Element](#) – a guide to human behaviour in the shipping industry by Maritime Coastguard Agency, UK