



# REPUBLIC OF THE MARSHALL ISLANDS

## Maritime Administrator

### SFERA CASUALTY INVESTIGATION REPORT

#### Occupational Fatality Due to Fall from Height

Philippine Sea | 10 June 2020

Official Number: 5194

IMO Number: 9304576





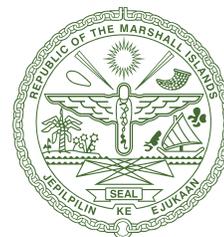
## **DISCLAIMER**

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## **AUTHORITY**

An investigation, under the authority of the Republic of the Marshall Islands laws and regulations, including all international instruments to which the Republic of the Marshall Islands is a Party, was conducted to determine the cause of the casualty.



*Maritime Administrator*



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## PART 1: EXECUTIVE SUMMARY

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On 10 June 2020, the Republic of the Marshall Islands-registered bulk carrier SFERA, managed by OCM Maritime Adventure LLC (the “Company”), was underway in the Philippine Sea on a ballast voyage to Newcastle, Commonwealth of Australia. Planned work for the day included cleaning the lower portions of the cargo holds under closed hatches. During the afternoon, the Able Seafarer Deck (ASD) 1 fell approximately 3-3.5 meters (m) while climbing down a portable ladder after cleaning a portion of the forward bulkhead in Cargo Hold No. 2 that had not been cleaned the previous day. At the time, he was working with the Bosun. The ASD1 suffered serious head injuries and died later that day.

The marine safety investigation conducted by the Republic of the Marshall Islands Maritime Administrator (the “Administrator”) identified the below factors:

1. Causal factors that contributed to this very serious marine casualty include:
  - (a) the ASD1 slipped and fell approximately 3-3.5 m while climbing down a portable ladder without maintaining three points of contact;
  - (b) non-compliance with the procedures in the Company’s Safety Management System (SMS) for:
    - (i) safe use of portable ladders; and
    - (ii) use of required personal protective equipment (PPE) while climbing and working from a portable ladder; and
  - (c) ineffective supervision of the ASD1.
2. Additional causal factors that may have contributed to this very serious marine casualty include:
  - (a) an apparent acceptance of the risk associated with working from height while not wearing the required PPE; and

- (b) the decision to work from height without first obtaining a Working Aloft Permit, securing the ladder, and rigging a fall arrester before cleaning a dirty section on the forward bulkhead.
3. Additional issues that were identified but that did not contribute to this very serious marine casualty include:
- the Company's current generic risk assessments reduce the effectiveness of pre-task hazards assessments;
  - the Company's generic risk assessment for hold cleaning did not identify falls from height either while entering or exiting a hold as a potential hazard;
  - the Cold Work Permit issued for cleaning the holds on 10 June 2020 did not indicate which holds would be cleaned during the day, or that the Bosun and deck ratings would be divided into teams working simultaneously in different holds, and that it was planned to only clean the lower portions of the holds;
  - ineffective supervision of the deck ratings working in Cargo Holds Nos. 5 and 7 from 1030<sup>1</sup> onwards;
  - inconsistencies between the Company's procedures, the ship's Working Practices Standing Orders, and crewmembers' understanding of the height above the deck that was considered working at height; and
  - the Company's PPE requirements for cargo handling do not refer to the International Maritime Organization's (IMO's) International Maritime Solid Bulk Cargoes Code (IMSBC Code) requirements or the relevant material safety data sheet (MSDS), which can create the potential for crewmembers not using the PPE for a particular cargo.

## PART 2: FINDINGS OF FACT

The following Findings of Fact are based on the information obtained during the Administrator's marine safety investigation.

- Ship particulars: *see* chart to right.
- On the morning of 6 June 2020, SFERA departed Zhanjiang, People's Republic of China after discharging a cargo of sulphur on a ballast voyage to Newcastle, Commonwealth of Australia. The ship's drafts were 4.2 m forward and 7.8 m aft.

<sup>1</sup> Unless otherwise stated, all times are ship's local time (UTC +9).

### SHIP PARTICULARS

**Ship Name**  
SFERA

**Registered Owner**  
OCM Maritime Adventure LLC

**ISM Ship Management**  
Maru LLC

**Flag State**  
Republic of the Marshall Islands

IMO No.	Official No.	Call Sign
9304576	5194	V7BT4

Year of Build	Gross Tonnage
2006	40,042

Net Tonnage	Deadweight Tonnage
25,318	76,081

**Length x Breadth x Depth**  
1218.9 x 32.2 x 19.8 meters

**Ship Type**  
Bulk Carrier

**Document of Compliance  
Recognized Organization**  
Bureau Veritas

**Safety Management Certificate  
Recognized Organization**  
Bureau Veritas

**Classification Society**  
ClassNK

**Persons on Board**  
23

3. During the days of 8–9 June 2020, the Bosun, ASDs, and Ordinary Seafarers (OSs) had been cleaning the ship’s cargo holds without incident preparing for loading at Newcastle. The work that was completed during this time was conducted with the hatches open and included cleaning the upper portions of Cargo Hold No. 2.
4. On 10 June 2020, the ship was underway in the Philippine Sea on a south-southeasterly heading at around 12 knots.
5. That morning while planning the day’s work, the Master approved the Cold Work Permit that the Chief Officer (C/O) had completed for washing the cargo holds. The holds to be washed that day were not identified on the permit.
6. The permit identified that the work would be done under closed hatches as a special condition and that the holds would be vented to the atmosphere. It also indicated that neither an Enclosed Space Entry Permit nor a Working Aloft Permit was required.
7. The Bosun was listed as the responsible person in attendance for the work, and that the work would be done by the three ASDs and two OSs. The permit did not include any statement that the work would be done from the tank top, or that only the lower portion of the holds would be cleaned.
8. The C/O stated that a Working Aloft Permit was not required since only the lower portions of the cargo holds would be cleaned. This was because fall arresters could not be rigged with the hatches closed.
9. The C/O and Bosun stated it was necessary to leave the hatches closed due to the existing weather conditions. The weather recorded in the ship’s Deck Log at 0800 was overcast skies with rain, Beaufort Force 6 winds from the east southeast.
10. The C/O, Bosun, and some of the deck ratings stated that the cargo holds were not considered enclosed spaces when empty.

11. The C/O also reviewed the Company's generic risk assessments for hold cleaning, use of high-pressure equipment,<sup>2</sup> and washing down. Some of the hazards and the associated existing controls and safeguards included on those risk assessments are shown in the below table:

Risk Assessment	Hazard	Existing Controls and Safeguard
Hold cleaning	Contaminated atmosphere in holds	<ul style="list-style-type: none"> <li>• Use of permits</li> <li>• Adequate ventilation</li> <li>• Rescue equipment on standby</li> <li>• Crew adequately warned and briefed</li> </ul>
	Darkness / inadequate illumination	<ul style="list-style-type: none"> <li>• Routine checks and maintenance of existing lights</li> <li>• Use of portable lights</li> </ul>
	Adverse weather (ship movement) and unsafe / slippery surfaces	<ul style="list-style-type: none"> <li>• Good housekeeping</li> <li>• Adequate PPE</li> <li>• Safe access to all critical areas maintained on deck</li> </ul>
Use of high-pressure equipment	High pressure	<ul style="list-style-type: none"> <li>• Routine maintenance / checks per manufacturer's instructions</li> <li>• Checking equipment prior to using</li> </ul>
	Slippery / unsafe surfaces	<ul style="list-style-type: none"> <li>• Use of proper PPE</li> <li>• Good housekeeping</li> </ul>
Washing down	Excessive pressure on the hose	<ul style="list-style-type: none"> <li>• Precautions as per procedures and checklists</li> </ul>
	Adverse weather conditions (rolling, pitching, etc.)	<ul style="list-style-type: none"> <li>• If required, work suspended until weather improves</li> <li>• Weather continuously monitored</li> </ul>

12. The Company's generic risk assessment for hold cleaning did not identify falls from height as a potential hazard either when entering or exiting a hold, or while performing the task.
13. Each generic risk assessment included a place for additional control measures that might be necessary if the existing procedures were not enough to adequately mitigate the risk associated with a given hazard. The assessments also had space to identify conditions that would require work to be stopped. They did not include space to identify other hazards that might be associated with the task and the related controls.

<sup>2</sup> This risk assessment was for use of equipment such as high-pressure washers, sand blasters, and paint sprayers.

14. On each of the risk assessments, the C/O identified that work should stop if the weather deteriorated. On the risk assessment for hold cleaning, he also identified inadequate PPE and inadequate illumination as reasons to stop work.
15. Before work started on 10 June 2020, the C/O held a Toolbox Talk with the Bosun, ASD2, ASD3, OS1, and OS2 to review the planned work.<sup>3</sup> This included completing washing the lower portion of Cargo Hold No. 2 and to start washing the lower portions of Cargo Holds Nos. 3, 5, and 7. The required PPE was also reviewed.
16. Following the Toolbox Talk, the Bosun and deck ratings rigged portable lights in the four cargo holds scheduled for cleaning during the day. They also rigged fire hoses and fitted filters in the bilge boxes in Cargo Holds Nos. 5 and 7.<sup>4</sup> The Bosun assigned ASD2 and OS1 to work in Cargo Hold No. 5 and ASD3 and OS1 to work in Cargo Hold No. 7.
17. The atmosphere inside the cargo holds was not checked before crewmembers entered them on 8–10 June 2020. The C/O stated that the atmosphere inside the holds was last checked during cargo discharge on 5 June 2020.
18. The cargo holds in which crewmembers were working on 10 June 2020 were ventilated by opening the vents on the hatch covers and the access hatches.
19. After the regular coffee break between 1000–1030, the Bosun reviewed the planned work with the ASD1. They entered Cargo Hold No. 2 and started washing the lower portion of the hold. They worked without incident until stopping for lunch at 1200.
20. The weather improved throughout the morning. By noon, the rain had stopped, the wind had shifted to the east southeast at Beaufort Force 5-6, and the seas were 1-2 m. The crewmembers working in the cargo holds stated the ship was rolling slightly.
21. The Bosun stated that although the weather had improved, it was decided to continue working during the afternoon with the hatch covers closed.
22. Around 1300, the Bosun and ASD1 returned to Cargo Hold No. 2. The other deck ratings resumed working in Cargo Holds Nos. 5 and 7. All of the crewmembers were wearing the required PPE when they went back into the cargo holds to resume cleaning.
23. Sometime after 1400, the Bosun and ASD1 noticed a portion of the forward bulkhead just above the lower stool that had not been cleaned the previous day (9 June 2020). This area was about 3.5 m above the tank top (*see Figure 1*).

<sup>3</sup> The record of ASD1's work and rest hours indicates he had been working from 0400–0600 and was resting from 0800–1000 on 10 June 2020.

<sup>4</sup> Filters had previously been installed in the bilge boxes in Cargo Holds Nos. 2 and 3.



Figure 1: Cargo Hold No. 2 showing the approximate location of the area that had not been cleaned. The portable ladders had been left in the hold when the crew finished work on 9 June 2020.

24. The Bosun stated they were unable to clean this area from the tank top and that the ASD1 decided to use a portable ladder that was left in the hold when the crew finished working on 9 June 2020. The Bosun also stated he told the ASD1 not to use the ladder, but that he went ahead and set it up anyway.
25. According to the Bosun's statement, the ASD1 picked up the wand for the high-pressure washer, climbed up the ladder, and washed the dirty area. It was reported that the ASD1 used both hands to hold the wand while cleaning the dirty area. The Bosun also stated that the ladder had not been secured, but that he had held it steady for the ASD1.
26. The Bosun stated that the ASD1 slipped and fell to the tank top from a height of 3-3.5 m as he was climbing down the ladder. He also stated that the ASD1 was carrying the wand in one hand and using his other hand to hold the ladder when climbing up and down the ladder.
27. The crewmembers working in Cargo Holds Nos. 5 and 7 stated that they were working without supervision on 10 June 2020.
28. There is no indication that the C/O had come out on deck either in the morning or after lunch to check on the work being done in the cargo holds.

**Emergency Response**

29. The Bosun determined that the ASD1 was unconscious, breathing, and had a pulse.
30. At 1425, the Bosun called the Officer of the Watch (OOW) by radio and reported that there had been an accident in one of the holds. The OOW immediately informed the C/O, who was in his cabin. The C/O went to the Bridge, verified where the accident occurred, and then went to Cargo Hold No. 2. Then the OOW informed the Master and the Third Officer (3/O), who both went directly to the Bridge.
31. Within minutes of the Bosun’s initial report, the ASD3 and OS2 arrived in the cargo hold. The OS2 held the ASD1’s jaw and tongue to keep his airway clear, and the Bosun and ASD3 monitored his breathing and pulse.
32. By 1427, the 2/O had turned the watch over to the 3/O and went below to the ship’s Hospital. He, along with another crewmember, started heading to Cargo Hold No. 2 with medical oxygen, a stretcher, and first aid supplies.
33. At about 1430, the C/O arrived in the cargo hold and examined the ASD1. The C/O stated that he found him unconscious, breathing heavily, that he had a “massive hematoma” on the upper left side of his head, and that he was bleeding from his left ear. The C/O also said he had a large bruise on his left side of his body. The C/O told the Master and OOW of the situation and asked that medical oxygen and the first aid kit be brought to the scene.
34. The Master informed the Company after receiving the C/O’s report. He then called the Maritime Rescue Coordination Center (MRCC) Philippines and requested urgent evacuation of the ASD1. He then made initial contact with the German Telemedical Maritime Assistance Service. The Master continued providing them with regular updates and received medical advice in response.
35. By 1440, the crewmembers began to administer medical oxygen, applied dressings to try to stop the bleeding, and covered him with blankets. The crewmembers also continuously monitored his breathing and pulse.
36. At 1517, the C/O reported that the ASD1 had started bleeding from the nose and that about 15 minutes later his pupils stopped reacting to light.
37. At 1545, the Master ordered the ship’s course changed and speed increased to divert to the nearest port, Tacloban, Republic of the Philippines, which was about 280 nautical miles (NM) to the west.
38. Simultaneously the OOW broadcast a PAN PAN message by very high frequency (VHF) radio for assistance from any nearby naval vessels. No response was received. The Master also contacted MRCC Philippines and requested an immediate evacuation of the ASD1 by helicopter.
39. At about 1600, the C/O reported that the hematoma on the ASD1’s head was becoming larger. It was also reported that his pupils had become larger and remained unreactive to light. Soon after this, his breathing and pulse became increasingly irregular.

40. At 1709, the ASD1 stopped breathing and had no detectable pulse. The C/O, with assistance from other crewmembers, administered cardiopulmonary resuscitation (CPR) until he started breathing and a pulse was detected. They then increased the amount of oxygen being administered. CPR was administered several times after this when the ASD1 stopped breathing and did not have a detectable pulse.
41. At 1830, MRCC Philippines instructed the Master to divert to Davao, Republic of the Philippines, which was approximately 325-350 NM to the southwest of the ship's position. The Master ordered the ship's course changed accordingly.
42. From 1830 onward, the ASD1's condition steadily worsened and the C/O, with assistance from other crewmembers, provided continuous assistance including administering CPR and multiple injections of adrenaline.
43. At 2105 the C/O and 2/O determined that the ASD1 was deceased.
44. At 2200, the body of the ASD1 was removed from Cargo Hold No. 2. His body was disembarked in Newcastle following the ship's arrival.

#### *Ship's Crew*

45. SFERA had a complement of 23 crewmembers, seven more than required by the Minimum Safe Manning Certificate issued by the Administrator. All were Ukrainian nationals and held the appropriate Republic of the Marshall Islands-issued seafarer documentation for their positions on board.
46. Crewmember experience:

RANK	TIME ON BOARD SFERA	TIME IN RANK	TIME WITH COMPANY	TOTAL TIME AT SEA
Master	4.5 months	2.4 years	4.5 months	16 years
C/O	6.5 months	1.3 years	6.5 months	9.5 years
Bosun	2.5 months	12.5 years	9.5 months	20 years
ASD1	6.5 months	1.1 years	6.5 months	2.5 years

47. Although the Master, C/O, and Bosun had all been with the Company for less than a year, they were all experienced seafarers and had extensive familiarity with bulk carriers and operations such as cargo hold cleaning.
48. The alcohol testing of the crew conducted on the evening of 10 June 2020 found the blood alcohol content in the crewmembers was 0.0%.
49. There was no indication that any crewmembers involved with this incident had failed to receive the amount of rest mandated by the IMO's Seafarers Training, Certification and Watchkeeping Code, Section A-VIII/1, paragraphs 2 and 3 and the International Labour Organization's Maritime Labour Convention, 2006, Regulation 2.3.

**SMS**

50. As required by the IMO's International Management Code for the Safe Operation of Ships and for Pollution Prevention (International Safety Management (ISM) Code), the Company's SMS provides processes and procedures for shipboard operations and maintenance. These include requirements for cargo hold cleaning, PPE to be worn when performing different types of operations, using portable ladders, and enclosed space entry.
51. The Company's requirements for cargo hold cleaning are based on guidance issued by The Standard Club. These include general safety procedures, guidance for different methods of cleaning, and cargo specific guidance.
52. The general safety procedures address use of a permit to work system and the need to conduct Toolbox Talks before starting hold cleaning operations. It also states that enclosed space precautions should be followed when working under closed hatches, that proper PPE be worn, all equipment checked to ensure it is in good condition, that all portable ladders are properly secured, that proper lighting is provided, and that there are adequate communications between those in the hold, on the deck, and on the Bridge.
53. The guidance specific to sulphur notes the importance of cleaning holds after carriage since residues can form sulphuric acid and damage the ship's structure. It also highlights the safety precautions and PPE requirements contained in the IMSBC Code.
54. There are some differences between the specific PPE required in the IMSBC Code schedules for sulphur.<sup>5</sup> However, both schedules require that persons involved in cleaning wear protective clothing and eye protection. The schedule for formed or solid sulphur also requires that consideration be given to using approved respirators and that the relevant recommendations of the IMO be taken into consideration when entering cargo spaces.<sup>6</sup>
55. The Company's SMS details PPE required for different shipboard operations, including cargo handling and use of high-pressure washers.
56. The PPE required for cargo operations includes safety helmets, safety boots or shoes, coveralls, appropriate gloves, and suitable eye protection. It also requires the use, when needed, of fall preventors, a visor or hood, respiratory equipment, chemical suits or aprons, and personal gas meters. The Company's PPE requirements for cargo operations do not require that consideration be given to the relevant IMSBC Code requirements or the MSDS received from the shipper when determining PPE required for a particular cargo.
57. The PPE required when using a high-pressure washer includes safety helmets, safety boot/shoes, coveralls, appropriate gloves, appropriate eye protection, a visor or hood, and hearing protection. It also requires respiratory equipment be worn when using chemicals.

5 The IMSBC Code, Appendix 1 has a schedule for formed or solid sulphur and a second schedule for crushed lump and coarse grained sulphur.

6 The IMO recommendations for enclosed space entry are found in IMO Assembly Resolution A.1050(27) – Recommendations for entering enclosed spaces aboard ships.

58. The Company has detailed procedures for enclosed space entry. These include a requirement that the atmosphere inside the space be tested and determined that is safe for entry. The Company's procedures also contain a non-exhaustive list of enclosed spaces which includes cargo holds. Each ship in the Company's fleet must maintain a list of all enclosed spaces on board.
59. SFERA's enclosed spaces list includes cargo holds when loaded with oxygen depleting or gas emitting cargoes. It also states that "empty cargo holds vented to atmosphere are not designated as enclosed spaces."<sup>7</sup>
60. A Working Aloft Permit is required by the Company's SMS when work more than 2 m above a base level is planned. This permit requires verifying that the necessary PPE will be used and that there is a safe means for the crewmembers to access the location of the planned work.
61. The Company's SMS includes procedures for portable ladder use. They include a requirement to use a safety harness with lifeline secured above the work position when working from a height of more than 2 m above a base level. They also require someone to hold the ladder base and that the top be secured when possible (otherwise the bottom should be secured). Both hands must be on the ladder rungs, and tools should never be carried when climbing.<sup>8</sup>
62. The ship's Working Practices Standing Orders issued by the current Master and C/O required that proper PPE always be worn when on deck.<sup>9</sup> They also required that any job higher than deck level be considered as work aloft (and a fall arrester must be used), and that a Toolbox Talk be held each day before starting work.
63. The Bosun and other deck ratings stated that work more than 1.5 m above the deck is considered work aloft and that the use of fall arresters was required when working above this height.

## PART 3: ANALYSIS

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The following Analysis is based on the above Findings of Fact.

### *The ASD1's Fall*

Based on the Bosun's statement, after washing a portion of the forward bulkhead that had not previously been cleaned inside Cargo Hold No. 2, the ASD1 slipped and fell about 3-3.5 m to the tank top while climbing down a portable ladder.

The ladder rungs may have become wet from using the high-pressure washer to clean the dirty area. This would have increased the potential for someone climbing on it to slip. As previously noted, this is also a hazard

<sup>7</sup> This list is dated 8 May 2019 and was signed by the Master who was on board at the time.

<sup>8</sup> These requirements mirror those in the United Kingdom Maritime and Coastguard Agency's Code of Safe Work Practices (2015 edition, Amendment 5, October 2020), paragraph 17.3.6, which states that "personnel negotiating a ladder should use both hands, and not attempt to carry tools or equipment in their hands."

<sup>9</sup> The PPE listed in these Working Practices Standing Orders was consistent with the PPE required by the Company's SMS.

identified on the Company's generic risk assessment for the use of high-pressure equipment. It is also possible that he either missed a rung or that his boot got caught on a rung.

The Bosun stated that the ASD1 was carrying the high-pressure washer wand in one hand and was holding onto the ladder with the other, both when he climbed up and when climbing down. The Company's procedures require keeping both hands on the ladder while climbing up and down to maintain three points of contact. Not maintaining three points of contact would have increased the potential of falling due to slipping or misplacing a foot.

Crewmembers stated that SFERA was rolling slightly while they were cleaning the cargo holds on 10 June 2020. The Bosun stated that although neither the top nor the bottom of the ladder had been secured as required by the Company's SMS, he had been holding the base while the ASD1 was climbing and working on it. Holding the ladder would not have been as effective as securing it, but it may have been enough to prevent it falling.

The ASD1 had been cleaning SFERA's cargo holds on 8–9 June 2020. That work included working from height using portable ladders to clean portions of Cargo Hold No. 2. He had been sailing for 2.5 years and had been with the Company for 6.5 months, so it is likely that he had previously worked on portable ladders while cleaning cargo holds. Although it cannot be verified, it is possible that he considered this a routine task and did not take sufficient time to assess the possible risk of falling while climbing a portable ladder or working from it.

### ***Company Procedures***

The Company had procedures to ensure that crewmembers could safely access and clean the ship's cargo holds. These included requirements for conducting risk assessments and issuing work permits, conducting Toolbox Talks, using portable ladders, and PPE. To be effective they must be consistently implemented.

### ***Pre-task Planning***

The pre-task planning for cleaning the cargo holds on 10 June 2020 included the C/O reviewing the Company's generic risk assessments for hold cleaning, use of high-pressure equipment, and washing down, the Master approving a Cold Work Permit, and the completion of a Toolbox Talk.

The Company's generic risk assessments for hold cleaning, using high pressure equipment, and washing down include hazards commonly associated with those tasks. For example, the risk assessment for hold cleaning identified contaminated atmosphere in the holds, inadequate illumination, and adverse weather as potential hazards. An additional hazard commonly associated with hold cleaning that is not included on the generic risk assessment is falls from height. Although no work from height was planned to be conducted on 10 June 2020, falls from height can also occur as crewmembers are climbing ladders to enter or leave a cargo hold.

Generic risk assessments can reduce the time required to conduct a pre-task hazards assessment. However, they can also potentially reduce the effectiveness of these assessments if they do not cover all aspects of a specific task and the existing circumstances.

On 10 June 2020, the Master approved a Cold Work Permit for cargo hold cleaning. The permit did not identify which holds were to be cleaned during the day, or that the crewmembers would be working in separate teams. The permit indicated that a Working Aloft Permit was not required, it did not include a statement limiting the planned work to lower portions of the holds or that the planned work would be conducted from the tank top.

Before the Bosun and other deck ratings began cleaning the cargo holds on 10 June 2020, a Toolbox Talk was held to review the risk assessments and planned work.<sup>10</sup> Although the ASD1 was not present at the Toolbox Talk that morning, the Bosun did review the planned work with him before he started work later in the morning.

### ***Use of Portable Ladders***

The Company had procedures for portable ladder use including requirements to reduce the potential of a ladder falling and of a seafarer falling while using a ladder. As stated in the section addressing the ASD1's fall, these requirements were not fully complied with.

Although the Bosun was familiar with the Company's requirements for working aloft and use of portable ladders, he and the ASD1 did not stop work to obtain a Working Aloft Permit, open the hatch cover, and rig a fall arrester. Why these requirements were not complied with cannot be determined with certainty.

The Company procedures provide a clear statement that a safety harness with lifeline be used when working more than 2 m above the base position. The Working Practices Standing Orders issued by the Master and C/O state that any job higher than deck level be considered as work aloft and that a fall arrester be used. In contrast, the Bosun and deck ratings all stated that work more than 1.5 m above the deck is considered work aloft and that it was the minimum height when it was necessary to use fall arresters. The Working Practices Standing Orders and the crewmembers' understanding of what is considered working at height are both lower than the height established by the Company's procedures. These differences create ambiguity that can contribute to inconsistent or ineffective implementation of Company requirements.

### ***Company PPE Requirements***

The Company's PPE requirements for cargo operations include equipment that must always be used with additional equipment required when necessary. However, they do not provide guidance to consult the relevant IMSBC Code requirements or the MSDS received from the shipper when determining what additional PPE, if any, is required for a particular cargo.

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<sup>10</sup> Based on the information obtained by the Administrator, this also occurred before the crewmembers began cleaning cargo holds on 8–9 June 2020.

### *Supervision*

The Cold Work Permit issued for cleaning cargo holds on 10 June 2020 listed the Bosun as the responsible person in attendance. As such, he was required to ensure that the assigned work was completed. He was also responsible for seeing that the work was done safely and in accordance with the Company's procedures. This required him to not only monitor the work, but also to observe the crewmembers who were assigned to complete it. He was also responsible for stopping any work if he observed a potential safety issue.

The work was to be carried out by the ASDs and OSs. The Bosun, along with the five deck ratings, had been divided into three two-person teams. Two teams had an ASD and an OS. The third team was the Bosun and the ASD1. Each team worked simultaneously in different holds under closed hatches throughout the day.

The Bosun was responsible for supervising the entire job, he was not able to directly observe the work in the other two holds. From 1030 onward he had been working in Cargo Hold No. 2 with ASD1. Although he may have been able to monitor the progress of the work in the other holds by radio, he could not have ensured that the work was done safely.

## **PART 4: CONCLUSIONS**

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The following Conclusions are based on the above Findings of Fact and Analysis and shall in no way create a presumption of blame or apportion liability.

1. Causal factors that contributed to this very serious marine casualty include:
  - (a) the ASD1 slipped and fell about 3-3.5 m while climbing down a portable ladder without maintaining three points of contact;
  - (b) non-compliance with the procedures in the Company's SMS for:
    - (i) safe use of portable ladders; and
    - (ii) use of required PPE while climbing and working from a portable ladder; and
  - (c) ineffective supervision of the ASD1.
2. Additional causal factors that may have contributed to this very serious marine casualty include:
  - (a) an apparent acceptance of the risk associated with working from height while not wearing the required PPE; and
  - (b) the decision to work from height without first obtaining a Working Aloft Permit to work from height, securing the ladder, and rigging a fall arrester before cleaning a dirty section on the forward bulkhead.
3. Additional issues that were identified but that did not contribute to this very serious marine casualty include:
  - (a) the Company's current generic risk assessments reduce the effectiveness of pre-task hazards assessments;

- (b) the Company's generic risk assessment for hold cleaning did not identify falls from height either while entering or exiting a hold as a potential hazard;
- (c) the Cold Work Permit issued for cleaning the holds on 10 June 2020 did not indicate which holds would be cleaned during the day, or that the Bosun and deck ratings would be divided into teams working simultaneously;
- (d) ineffective supervision of the deck ratings working in Cargo Holds Nos. 5 and 7 from 1030 onwards;
- (e) inconsistencies between the Company's procedures, the ship's Working Practices Standing Orders, and crewmembers' understanding of the height above the deck that was considered working at height; and
- (f) the Company's PPE requirements for cargo handling do not refer to the IMSBC Code requirements or the relevant MSDS, which can create the potential for crewmembers not using the PPE for a particular cargo.

## **PART 5: PREVENTIVE ACTIONS**

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In response to this very serious marine casualty, the Company has taken the following Preventive Actions.

1. Established a requirement for ships' Masters and Chief Engineers to conduct daily, random inspections to ensure required PPE is being used.
2. The frequency of training regarding safe work practices and use of PPE on the Company's ships was increased to once a week.
3. Established a requirement that records of Toolbox Talks and work permits be signed by all involved crewmembers.
4. Work must be stopped immediately if required PPE is not used.

## **PART 6: RECOMMENDATIONS**

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The following Recommendations are based on the above Conclusions and in consideration of the Preventive Actions taken.

1. It is recommended that the Company:
  - (a) ensure that ship board requirements are consistent with Company procedures;
  - (b) revise its procedures for pre-task risk assessments to ensure that potential hazards for the conditions that exist at the time that the task is going to be performed are identified and addressed when planning the work;

- (c) revise its generic risk assessment for hold cleaning to include all reasonably foreseeable hazards commonly associated with this task, including falls from height;
- (d) revise its procedures for issuing work permits to require that the actual scope of any planned work is described; and
- (e) revise its requirements for cargo operations to include guidance to check the relevant IMSBC Code cargo schedule and MSDS to determine cargo specific PPE requirements.

The Administrator's marine safety investigation is closed. It will be reopened if additional information is received that would warrant further review.