



REPUBLIC OF THE MARSHALL ISLANDS

Maritime Administrator

DERBY CASUALTY INVESTIGATION REPORT

Fall From Height

Indian Ocean | 13 February 2021

Official Number: 7749

IMO Number: 9482562



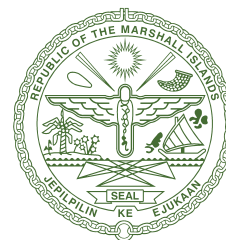
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AUTHORITY

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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LIST OF ABBREVIATIONS AND ACRONYMS

ASD.....	Able Seafarer Deck
C/O	Chief Officer
cm	Centimeter
COVID-19.....	Coronavirus Disease
CPR.....	Cardiopulmonary Resuscitation
ILO	International Labour Organization
IMO.....	International Maritime Organization
ISM Code	International Safety Management Code
kg.....	Kilogram
m	Meter
MLC, 2006	Maritime Labour Convention, 2006
MRCC.....	Maritime Rescue Coordination Centre
NM	Nautical Miles
OOW.....	Officer on Watch
OS	Ordinary Seafarer
PPE	Personal Protective Equipment
SMS.....	Safety Management System
STCW Code	Seafarers Training, Certification and Watchkeeping Code
UTC.....	Universal Time Coordinated



PART 1: EXECUTIVE SUMMARY

On 13 February 2021, the Republic of the Marshall Islands-registered bulk carrier DERBY, managed by Orion Reederei GmbH & Co. KG (the “Company”), was underway in the Indian Ocean. The ship had discharged coal in the Republic of Indonesia (hereinafter “Indonesia”) and was on a ballast voyage to Maputo, Republic of Mozambique (hereinafter “Mozambique”). Cleaning of all cargo holds was being conducted in preparation for loading.

Cleaning of Cargo Hold No. 3 was planned for 13 February 2021. Prior to starting work that day, the C/O conducted a Toolbox Talk with all involved crewmembers. The Bosun, ASD1, ASD2, OS1, and OS2 began by moving a mucking winch to the sludge hatch of Cargo Hold No. 3. The Bosun, ASD1, and OS2 used this winch to lower two portable ladders to the tank top. The Bosun then released the ASD1 and OS2 to go down into the hold to disconnect the ladders.

Shortly after, the Bosun was attempting to attach a bucket of tools to the mucking winch hook when he fell through the open sludge hatch about 18.5 m to the tank top. The crewmembers that witnessed the fall immediately began rendering first aid to the Bosun. He was initially conscious and alert but with multiple injuries to his torso and extremities. He was placed on a stretcher, hoisted out of the hold, and brought to the ship’s Hospital.

MRCC Maldives was contacted and emergency medical evacuation of the Bosun was requested. MRCC Maldives provided a position for rendezvous with a rescue boat that was about 180 NM from DERBY’s position. The Master immediately altered DERBY’s course while other crewmembers continued providing care to the Bosun. Despite crewmember’s efforts, the Bosun’s condition quickly deteriorated, and he was pronounced deceased before arrival at the rendezvous position.

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

1. Causal factors that contributed to this very serious marine casualty include:
 - (a) the Bosun’s fall into the hold through the open sludge hatch of Cargo Hold No. 3 while holding a bucket of tools;
 - (b) attempting to attach the bucket of tools, without assistance, to the mucking winch hook while it was hanging over the open sludge hatch; and
 - (c) releasing the ASD1 and OS2 to go down into the hold, leaving the Bosun to attach the remaining bucket without assistance.
2. Causal factors that may have contributed to this very serious marine casualty include:
 - (a) not recognizing, or complacency to, the risks associated with holding a loaded bucket of tools over the open hatch; and
 - (b) not requiring at least two crewmembers when raising or lowering items with the mucking winch.

PART 2: FINDINGS OF FACT

The following Findings of Fact are based on the information obtained during the Administrator’s marine safety investigation. Due to travel restrictions imposed in response to the COVID-19 pandemic, the Administrator was not able to arrange for onboard attendance as part of its marine safety investigation of this very serious marine casualty. All related information available to the Administrator was obtained remotely.

1. Ship particulars: *see* chart to right.
2. DERBY is a bulk carrier with seven cargo holds (*see Figure 1*).

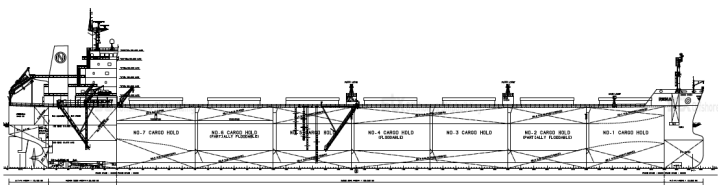


Figure 1: General arrangement of DERBY.

3. On 13 February 2021, DERBY departed the Republic of Singapore (hereinafter “Singapore”) in ballast after bunkering, bound for Maputo, Mozambique for loading. DERBY previously discharged coal in Indonesia and departed on 7 February 2021.

SHIP PARTICULARS

Ship Name
DERBY

Registered Owner
Derby Maritime Limited

ISM Ship Management
Orion Reederei GmbH & Co. KG

Flag State
Republic of the Marshall Islands

IMO No. 9464780	Official No. 7749	Call Sign V7DT7
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Year of Build 2011	Gross Tonnage 29,736
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Net Tonnage 14,113	Deadweight Tonnage 51,406
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Length x Breadth x Depth
222.4 x 32.2 x 20.1 m

Ship Type
Bulk Carrier

**Document of Compliance
Recognized Organization**
ClassNK

**Safety Management Certificate
Recognized Organization**
DNV GL

Classification Society
ClassNK

Persons on Board
20

4. During the voyage to Maputo, cleaning of all cargo holds was required. Cargo Holds Nos. 1, 2, and 4 were cleaned on 10 February, 12 February, and 8 February, respectively. The remaining holds were to be cleaned after departing Singapore. Toolbox Talks were conducted each day prior to work starting.
5. On the morning of 13 February 2021, the C/O assigned the Bosun, ASD1, ASD2, OS1, and OS2 to begin cleaning Cargo Hold No. 3. The C/O conducted a Toolbox Talk with the involved crewmembers. The planned work, the tools to be used, and the safety precautions to be taken were discussed. A Permit to Work Aloft was not required by the SMS since the planned work was to be conducted from deck level and adequate guarding was deemed to be in place.
6. The weather on 13 February 2021 was reported as Beaufort Force 4 to 5 winds out of the north and a 2 m head swell. It is reported that DERBY was not significantly pitching or rolling.
7. At about 0900,¹ the Bosun, ASD1, ASD2, OS1, and OS2 brought a mucking winch to Cargo Hold No. 3 and secured it to the sludge hatch coaming. The mucking winch had been used to hoist tools out of Cargo Hold No. 7 earlier that morning.

Sludge Hatch and Mucking Winch

8. The sludge hatch for Cargo Hold No. 3 is located on the main deck at the aft end of the hold, on the ship's centerline. The hatch opening is 82 cm x 82 cm, with a coaming extending 65 cm above the deck (*see Figure 2*).



Figure 2: Sludge hatch of Cargo Hold No. 3.

9. The mucking winch is comprised of a portable davit with a pneumatic winch attached (*see Figure 3*). The control for the winch is located directly on top of the winch motor. The mucking winch was secured by metal brackets on the sludge hatch (*see Figure 2*). It is used to lower items into and hoist items out of the cargo hold. The hoisting wire has a swiveling hook. The davit is secured with two stays to keep it stationary over the hatch opening.

¹ Unless otherwise specified, all times are ship's local time (UTC +6).



Figure 3: Mucking winch mounted over Cargo Hold No. 3 sludge hatch. Photo taken from aft, facing forward.

Incident

10. After setting up the mucking winch, the crewmembers opened Cargo Hold No. 3's hatch covers. The ladders, hoses, and hand tools needed to clean the hold from the tank top were positioned near the sludge hatch.
11. The ASD1 and OS2 assisted the Bosun with lowering two ladders into the hold using the mucking winch. The Bosun then directed the ASD1 and OS2 to go down into Cargo Hold No. 3. After reaching the tank top, the ASD1 began preparing to wash the hold while the OS2 disconnected the ladders from the mucking winch hoisting wire.
12. The Bosun hoisted the wire back up and prepared a large bucket of tools to lower into the hold (*see Figure 4*). The bucket was a plastic drum, cut in half, with a rope bridle that was estimated to weigh 10 kg. The mucking winch hook was suspended over the sludge hatch.



Figure 4: A photo of a bucket of tools aboard DERBY similar to what was being lifted by the Bosun. The mucking winch hook is highlighted in red.

13. At about 0910, the Bosun was holding the bucket of tools over the open sludge hatch and trying to connect it to the hook when the OS1 saw him fall through the hatch. At the time, the OS1 was standing on deck near the hatch to the Australian ladder and assisting the ASD2 with moving a hose. The Bosun and the bucket of tools fell about 18.5 m to the tank top below.
14. It is reported that the deck around the sludge hatch was dry and free of cargo residues or other debris.
15. The ASD1 and OS2 were working in the hold when they heard the Bosun yell, followed by a loud noise. They turned to find the Bosun lying motionless on the tank top, with his head on one of the portable ladders that was on the tank top. The OS1 witnessed his fall and immediately notified the OOW. The OOW then notified the remaining crewmembers.
16. The Master and C/O went to the cargo hold to check the Bosun's condition. He was conscious and responsive to questions when they arrived. He had multiple injuries to his torso and extremities.
17. At about 0935, crewmembers prepared the Bosun for removal from the hold. He was secured on a stretcher and hoisted to the main deck using a cargo net.
18. While other crewmembers were assisting the Bosun, the Master requested shoreside medical advice. He also notified MRCC Maldives and requested immediate medical evacuation of the Bosun.
19. The Bosun was brought to the ship's Hospital at 1040. He was able to communicate with crewmembers and drink water.
20. At about 1045, MRCC Maldives notified the Master that a rescue boat would rendezvous with DERBY at a position about 180 NM to the west. The ship changed course to proceed directly to the rendezvous point.
21. At about 1200, the Bosun complained of increasing pain. He was administered additional pain medication, as recommended by shoreside medical advice.

22. About 30 minutes later, the Bosun's respiratory rate and pulse began to slow, and his blood pressure dropped. Medical oxygen was immediately administered.
23. At 1256, the Bosun stopped breathing and no longer had a pulse. CPR was immediately started. Despite continuous lifesaving efforts by crewmembers, CPR was stopped and the Bosun was determined to be deceased at 1325.
24. The Bosun's remains were disembarked upon arrival at Addu City, Maldives. A death certificate issued by local authorities indicated that the Bosun died due to injuries consistent with a fall from height.

SMS

25. As required by the IMO's ISM Code, the Company's SMS provided procedures for shipboard tasks such as cargo hold cleaning and working from height. Additionally, the Company's SMS included requirements for implementing safe work practices, using PPE, crewmember training, hazard identification, and hazard mitigation.
26. The Company's SMS requires that a risk assessment be completed and/or reviewed for all jobs which include hazards to the ship and crewmembers. A standing risk assessment for hold cleaning is included in the Company's SMS. Among others, this risk assessment identifies "falling into manholes" as a hazard associated with hold cleaning. Controls to minimize this hazard include the reminder not to reach over openings and to always maintain proper footing. The risk assessment does not require the use of two or more crewmembers when using winches to raise or lower equipment. This risk assessment is reviewed at least annually and with all newly joining crewmembers. The last two routine reviews of this risk assessment were conducted on 28 November 2020 and 30 January 2021. Records indicate the Bosun attended both.
27. The Company's SMS also includes a program for building and maintaining a safety culture aboard ships in their managed fleet. This program requires all crewmembers, regardless of rank, to actively participate in ensuring the safety of crewmembers, ship, and environment. Aside from formal risk assessments, the SMS states that all crewmembers should continually evaluate all tasks to identify safety issues and to implement measures to reduce the risk.
28. The Company's SMS requires that a Toolbox Talk be completed prior to starting the planned work. This Toolbox Talk does not need to be written; however, the planned work and associated hazards must be discussed with the involved crewmembers. The completion of a Toolbox Talk must be indicated on the Permit to Work for those tasks that require it to be issued.
29. The Company's SMS also details the PPE required for various shipboard tasks. Coveralls, safety glasses, safety shoes, safety helmet, and gloves are required when cleaning cargo holds. A safety harness with lifeline is required when the work involves the risk of falling from height.
30. Procedures specific to conducting hazardous work are included in the SMS. They require the issuance of a Permit to Work when entering enclosed spaces, working aloft or overboard, conducting hot work, and working on energized electrical systems. The Permit to Work Aloft is required to be issued before starting work where there exists the risk of a fall from height. The Company's SMS does not set a specific height which is considered working at height. Instead, the determination if a particular task qualifies as working at height is based on the risks presented by the work, regardless of the height at which it is performed.

31. Cargo hold cleaning from the tank top and raising or lowering equipment into the cargo holds are not automatically considered high-risk tasks by the Company’s SMS. Regardless of whether the task is specifically identified or not, the SMS requires that the high-risk task procedures be applied to any work deemed to present a risk of falling from height. The C/O determined that, in accordance with the SMS, the planned work on the day of the incident did not present a risk of falling from height since the cleaning was being conducted from the tank top and because the open sludge hatch was provided with a coaming that was determined to be reasonably adequate for preventing a fall.
32. The Company’s SMS also requires that crewmembers complete initial shipboard familiarization training on joining the ship. This includes familiarization with the Company’s safe work procedures and standing risk assessments. Records indicate that all involved crewmembers completed this training upon joining DERBY.
33. The Company’s Stop Work Authority policy permits any crewmember, regardless of rank, to take action to stop a task when unsafe actions or conditions are observed.

DERBY Crew

34. DERBY had a complement of 20 crewmembers, four more than required by the Minimum Safe Manning Certificate issued by the Administrator.
35. All involved seafarers held the appropriate Republic of the Marshall Islands-issued seafarer documentation for their positions.
36. Experience of relevant crewmembers:

RANK	TIME ON BOARD DERBY	TIME IN RANK	TIME WITH COMPANY	TOTAL TIME AT SEA
Master	7 days	24 years	2 years	40 years
C/O	7 days	5 years	9 years	17 years
Bosun	4 months	3 years	4 months	11 years
ASD1	4 months	4 years	2 years	5 years
ASD2	6 months, 21 days	3 years	6 months, 21 days	4 years
OS1	6 months, 21 days	4 years	6 months, 21 days	5 years
OS2	6 months, 21 days	1 year	6 months, 21 days	2 years

37. The Administrator found no indication that any crewmembers involved with this incident failed to receive the amount of rest mandated by the STCW Code, Section A-VIII/1, paragraphs 2 and 3 and MLC, 2006, regulation 2.3.
38. The Bosun’s most recent pre-employment medical examination was conducted on 7 October 2020. He was found fit for duty without restrictions. The examination record indicates that the Bosun was 169 cm tall.
39. It is reported that the Bosun participated in the cleaning of all cargo holds on three previous occasions while on board DERBY.

PART 3: ANALYSIS

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

Bosun's Fall

On the morning of 13 February 2021, DERBY's crewmembers were preparing to clean Cargo Hold No. 3. The Bosun, ASD1, and OS2 used a mucking winch to lower two portable ladders into the hold. Once the ladders were on the tank top, the ASD1 and OS2 went down to unhook the ladders from the hoisting wire. The hook was then hoisted back up to the main deck. An assortment of hand tools were placed into a large bucket with a rope bridle, which was estimated to weigh 10 kgs. The Bosun was observed holding the bucket of tools over the hatch and was trying to connect it to the mucking winch hook when he fell through the opening.

The cause of the Bosun's fall is not known. The area around the hatch was dry and clear of debris. The Bosun may have lost his balance or footing while attempting to attach the bucket onto the mucking winch hook, which was suspended over the open sludge hatch. The Bosun was reported to be 169 cm tall, while the hatch coaming was 65 cm in height. More than half of his body would have been above the coaming, likely creating a pivot point below his waist. His center of gravity likely being above the coaming, along with the weight of the bucket being held away from his body, may have contributed to him falling into the opening.

The Bosun fell about 18.5 m to the tank top. He had multiple injuries to his torso and extremities. When initially assessed by the crewmembers, he was conscious and responsive. He was quickly removed from the hold and urgent assistance was requested from MRCC Maldives. The MRCC provided a position for rendezvous with a rescue boat and DERBY immediately altered course towards it.

While proceeding to the rendezvous position, the Bosun's condition began to quickly deteriorate and he eventually became unresponsive. Despite the efforts of the crewmembers, the Bosun was subsequently pronounced deceased as a result of the injuries he suffered from the fall.

Sludge Hatch and Mucking Winch

The sludge hatch for Cargo Hold No. 3 is on the ship's centerline, aft of the hold. The hatch is used to remove cargo residues from the hold, as well as raising and lowering tools. The hatch opening is 82 cm x 82 cm with a 65 cm coaming. The aft side of the coaming has a permanent mounting bracket for the mucking winch.

At the time of the incident, the mucking winch was secured to the hatch's mounting bracket with two stays used to keep the davit stationary over the opening. The mucking winch's hoisting wire had a weighted hook with swivel and safety latch. The hook was suspended over the open sludge hatch when the Bosun was attempting to attach the bucket of tools.

Risk Assessment

The Company uses a standing risk assessment that applies to cargo hold cleaning, a frequent task on board bulk carriers. The Company determined that periodic review of a standing risk assessment was adequate to reasonably identify the associated risks. Among other hazards, the standing risk assessment identifies the risk of falling into open

hatches. A reminder not to reach over the openings and to maintain proper footing at all times is listed as a mitigating action for this hazard. The risk assessment does not specify the minimum number of crewmembers needed when operating the mucking winch.

The cargo hold cleaning standing risk assessment is reviewed at least annually and with any newly joining crewmembers. The Bosun had last been involved in the review of this risk assessment on 30 January 2021.

As required by the SMS, the C/O conducted a Toolbox Talk with the involved crewmembers before starting work on the morning of the incident. The specific tasks to be completed, the tools necessary, and the safety considerations were discussed.

Permit to Work

The Company's SMS includes a policy addressing certain high-risk tasks and the requirement to issue Permits to Work, including for working aloft. The Permit to Work Aloft is required anytime a task requires working at height. The Company's SMS does not specify a height which constitutes working at height; however, it states that the Permit to Work Aloft is required anytime a task presents the risk of falling from height.

Before starting work, the C/O assessed the tasks required for cleaning the cargo holds from the tank top. It was determined that this did not present the risk of falling from height since all crewmembers would be working at deck level and that the coaming provided adequate guarding of the sludge hatch opening. Lowering tools into the cargo hold through the sludge hatch was also not deemed to be working at height, and a Permit to Work Aloft was not required by the SMS.

Safety Awareness

In addition to formal risk assessments, the Company's SMS specifies that all seafarers should engage in informal, personal risk assessments as they prepare for and while completing assigned tasks. This personal assessment requires seafarers to continually assess the work being conducted to identify new or unexpected risks so that actions may be taken to mitigate them. This can include modifying how the task is completed or stopping work, as provided for by the Company's Stop Work Authority policy.

Cargo hold cleaning is a frequent task aboard DERBY. The Bosun had participated in this on three previous occasions while on board. When the incident occurred, the Bosun was working alone after he released the ASD1 and OS2 to go into the hold. Additional tools still needed to be lowered into the hold, which required the Bosun to attach the bucket to the mucking winch hoisting wire by himself. The Bosun decided to lift the bucket of tools and hold it over the open hatch while trying to attach the handles to the hook.

To mitigate the risks associated with holding the full bucket over the open hatch, the Bosun could have requested assistance from another crewmember. The mucking winch could have been rotated from over the opening, attached to the bucket, and then rotated back over the hatch. Alternatively, the hoisting wire could have been payed out so that the hook was attached to the handles while the bucket was on the deck. The bucket could then be guided up and over the hatch coaming before being lowered into the hold.

Stop Work Authority policy

The Company's SMS includes a Stop Work Authority policy which allows all crewmembers to take action to stop work when unsafe acts or conditions are observed. Following the Bosun releasing the ASD1 and OS2 to go into the hold, he attempted to lower a bucket of tools without assistance. The OS1 was helping the ASD2 with moving a hose on the main deck when he observed the Bosun holding the bucket out over the open sludge hatch. It is not known if the OS1 recognized these actions as unsafe.

PART 4: CONCLUSIONS

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 Bosun's fall into the hold through the open sludge hatch of Cargo Hold No. 3 while holding a bucket of tools;
 - (b) attempting to attach the bucket of tools, without assistance, to the mucking winch hook while it was hanging over the open sludge hatch; and
 - (c) releasing the ASD1 and OS2 to go down into the hold, leaving the Bosun to attach the remaining bucket without assistance.
2. Causal factors that may have contributed to this very serious marine casualty include:
 - (a) not recognizing, or complacency to, the risks associated with holding a loaded bucket of tools over the open hatch; and
 - (b) not requiring at least two crewmembers when raising or lowering items with the mucking winch.

PART 5: PREVENTIVE ACTIONS

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

1. The lessons learned from this incident were shared with all of the ships in the Company's managed fleet.
2. A special safety training was held with DERBY's crewmembers to review the risk assessments associated with working aloft, cargo hold cleaning, and hatch cover operations. The importance of maintaining situational awareness at all times was also discussed.
3. The Company's SMS was updated to include cargo hold cleaning as a high-risk task requiring a Permit to Work. This designation requires conducting a task specific risk assessment that is discussed during the Toolbox Talk.
4. The Company's procedures for cargo hold cleaning were updated to include the requirement for two crewmembers to be present whenever the mucking winches are being used to raise or lower items.

PART 6: RECOMMENDATIONS

Based on the above Conclusions and in consideration of the Preventive Actions taken, the Administrator has no Recommendations.

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