BSAFE

INCIDENT CASE STUDY

No.23 | MAY 2024

FATAL ACCIDENT DURING GANTRY CRANE OPERATIONS

A STEVEDORE ON BOARD A GENERAL CARGO SHIP WAS FATALLY CRUSHED BETWEEN THE GANTRY CRANE AND A HATCH COVER DURING CARGO DISCHARGE IN ANTWERP, BELGIUM. DESPITE NO ONE WITNESSING THE INCIDENT, IT IS BELIEVED THAT HE POSITIONED HIMSELF BETWEEN THE MOVING GANTRY CRANE AND THE HATCH COVER TO CHECK ON HIS TEAM'S PROGRESS WORKING IN THE HOLD.

FIGURE 1 GENERAL CARGO SHIP
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

WHAT HAPPENED

A general cargo ship moored starboard side to berth, at a bulk terminal, to unload its cargo of fine coke, also known as 'coke breeze'. The weather was cloudy, with light rain and a gentle breeze coming from the north. Between midnight and 0600 hours, the third officer on watch was operating the ship's gantry crane (Figure 2), to stack the hatch covers, following the cargo unloading plan (Figure 3).

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WHAT HAPPENED (CONTINUED)

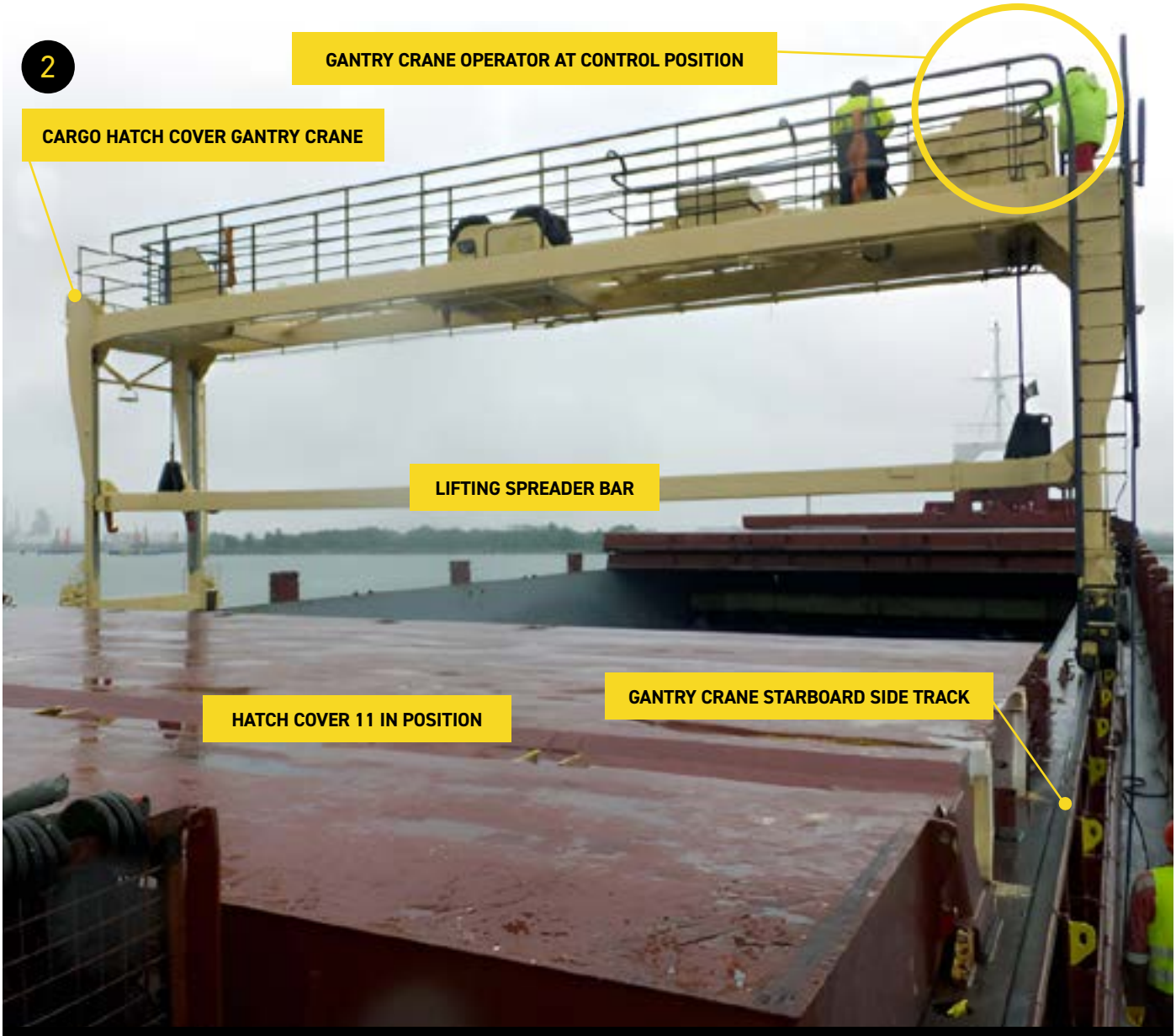

FIGURE 2 SHIP'S HATCH COVER GANTRY CRANE (PHOTOGRAPH TAKEN FROM SHIP'S STARBOARD SIDE, LOOKING FORWARD)
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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WHAT HAPPENED (CONTINUED)

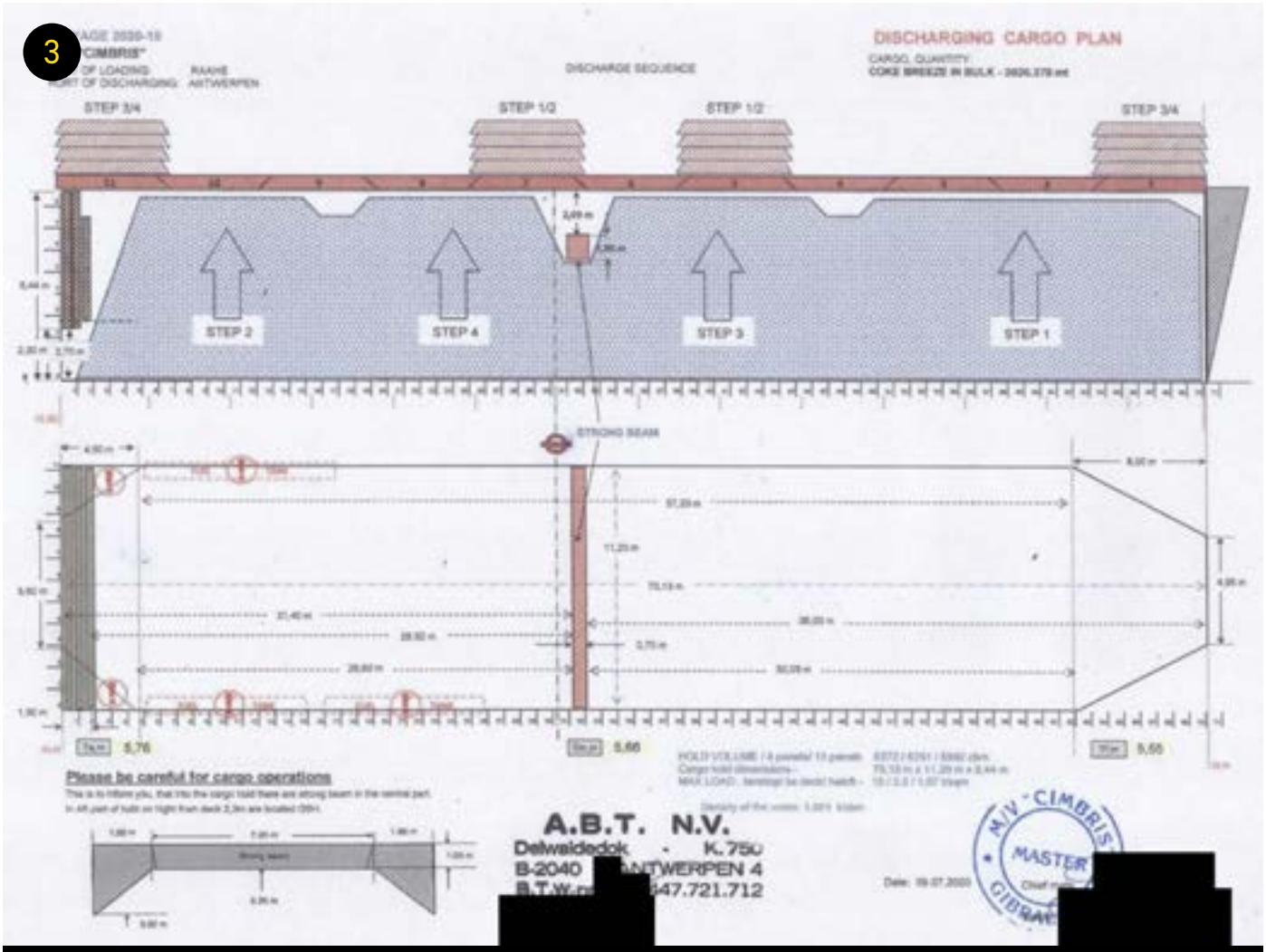

FIGURE 3 SHIP'S CARGO DISCHARGE PLAN
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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WHAT HAPPENED (CONTINUED)

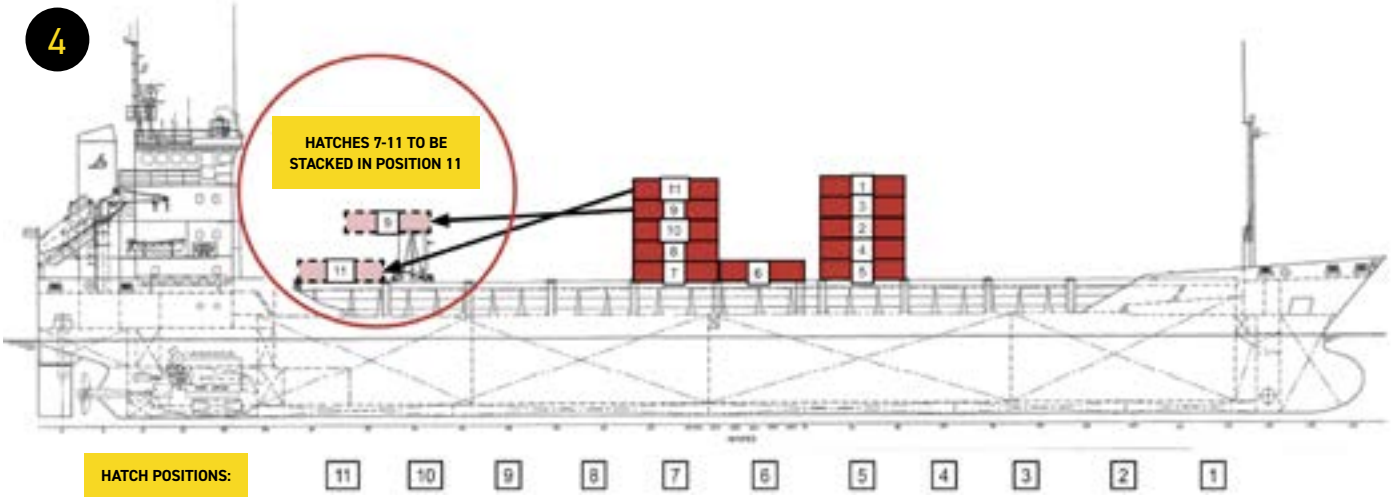

FIGURE 4 HATCH CONFGURATION BEFORE AND AT THE TIME OF THE ACCIDENT
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

At 0600 hours, five stevedores boarded the ship to begin unloading the cargo. The team consisted of a foreman, a stevedore coordinator, a front-end loader driver, and two dockworkers/cleaners. Another team member remained onshore to operate the discharge grab crane. The foreman discussed the unloading plan with the chief officer (C/O) in English and briefed the rest of his team. Unloading started at the aft end of the hold, with the foreman instructing that hatch covers 7 to 11 should be moved once this area completed discharge. The foreman then left the ship while the stevedore coordinator, loader driver, and dockworkers remained on board.

The stevedore coordinator directed the shoreside crane operator from the ship's port side walkway using a handheld radio. To oversee the operation, he climbed the ship's fixed ladders and leaned over the top of the 2m high hatch coaming to view the progress inside the cargo hold (Figure 5). Meanwhile, the C/O and an able-bodied seaman (AB) remained on board with the C/O monitoring cargo operations and the ship's stability, while the AB maintained security at the gangway to monitor mooring lines and fendering.

Shortly before 0900 hours, as the unloading of the aft part of the hold neared completion, the stevedore coordinator confirmed with the C/O that, once the front-end loader had been lifted into the hold by the shore crane, hatch covers 7 to 11 would be moved aft and stacked at the hatch cover 11 position. The transfer of the front-end loader into the hold was supervised by the coordinator, and once completed, the C/O made his way to the ship's gantry crane, while the stevedore coordinator proceeded towards the forward end of the hold via the port walkway.

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WHAT HAPPENED (CONTINUED)

The C/O ensured that the gantry crane's path was clear on both sides of the main deck before climbing up to the crane's control position. He then moved the crane forward and positioned it over the hatch covers stacked on hatch cover 7. Next, he connected hatch cover 11 to the crane, lifted it clear, and moved the crane aft, lowering the hatch cover into position. The C/O then climbed down to the main deck and walked around the hatch cover to confirm it had seated fittingly on both sides before returning to the crane's control position to proceed to collect hatch cover 9.

Meanwhile, the shore crane began its work in the forward part of the hold under the supervision of the stevedore coordinator, who then went to check on the progress of his colleagues in the aft part of the hold. At the same time, the C/O had already checked the clearance on the walkways and coamings before climbing back to the control position to drive the gantry crane aft.

FIGURE 5 THE POSITION OF THE STEVEDORE COORDINATOR AND HIS TEAM OF STEVEDORES
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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WHAT HAPPENED (CONTINUED)

Around 0900 hours, while the C/O was moving the gantry crane over hatch cover position 10, it abruptly stopped (Figure 6). At this point still uncertain of the cause, the C/O was alerted by the stevedore foreman who was boarding the ship. The foreman spotted the stevedore coordinator's head above hatch cover 11 on the port side. Realising an accident had occurred, they both hurried to the portside aft walkway, where they found the stevedore coordinator trapped between the aft leg of the gantry crane and hatch cover 11, with a gap of approximately 130mm (Figure 7). It should be noted that when the hatch cover was suspended, the stevedore coordinator remained obscured and could not be seen by the C/O.

FIGURE 6 GANTRY CRANE (IN ACCIDENT POSITION) WITH HATCH COVER 9 SUSPENDED
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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WHAT HAPPENED (CONTINUED)

Immediately, the foreman ordered the cessation of the unloading operation and the evacuation of the personnel on board. The foreman radioed the terminal operations supervisor, while the C/O notified the master about the incident. The terminal operations supervisor promptly dispatched the port's emergency services.

Tragically, the stevedore coordinator sustained severe injuries and was pronounced dead at the scene by the terminal's emergency services.

FIGURE 7 VIEW OF LOCATION WHERE STEVEDORE COORDINATOR WAS DISCOVERED
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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POST ACCIDENT FINDINGS

The inspection of the gantry crane revealed that its emergency stops, movement warning bell, and flashing light were all functioning properly. The loudness of the warning bell and the visibility of the flashing light meant it is unlikely that they were drowned out by ambient noises at the time of the accident. However, the suspended hatch cover could have obscured the flashing light from the view where the stevedore coordinator was positioned, as the crane approached.

At the start of the operation to move hatch cover 9, there was a clear line of sight from the gantry crane's control position to the area where the stevedore coordinator was later crushed (Figure 8). However, as the gantry crane approached hatch cover position 10, visibility of the crush site became obscured by the suspended hatch cover. The distance from the starting position to where the crane structure aligned with hatch cover 11, where the coordinator was trapped, was about 20 meters. From the post-accident report, a reconstruction of the accident shows that it takes approximately 45 seconds for the crane to travel from hatch cover 7 to hatch cover 11, with the crush site becoming obscured from the crane's control position for the final 20 seconds of travel.

FIGURE 8 VIEW FROM THE GANTRY CRANE CONTROL POSITION TOWARDS THE ACCIDENT LOCATION
SOURCE MARINE ACCIDENT INVESTIGATION BRANCH - ACCIDENT REPORT 12/2021

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BRITANNIA COMMENTARY ON INCIDENT

THE INVESTIGATION AND CASE STUDY IDENTIFIED SEVERAL CONTRIBUTING FACTORS AND LESSONS LEARNED. THESE ARE BASED ON THE INFORMATION AVAILABLE IN THE INVESTIGATION REPORT AND ARE NOT INTENDED TO APPORTION BLAME ON THE INDIVIDUALS OR COMPANY INVOLVED.

SAFETY MANAGEMENT

The stevedore coordinator's entrapment was not witnessed by anyone on board; however, it is clear he suffered fatal crushing injuries because he positioned himself directly in the path of the moving gantry crane. The stevedore was not visible to the C/O as he moved the gantry crane aft.

The company had a documented procedure within its Safety Management System (SMS) that should have prevented such an incident. It was specified that a minimum of two personnel were required for lifting operations, at least one crew member was to act as a lookout or banksman for the crane operator. Had this procedure been followed, it is very likely that the stevedore would have been seen by the crew and the crane stopped or the person asked to move clear before a risk of entrapment occurred.

It is also noted that personnel remained within the cargo hold during lifting operations, and this was also prohibited by company procedures.

These breaches of company procedure had become commonplace and indicate an inadequate level of safety management. Procedures are important, however if they are not followed, they can provide a false sense of security for all parties. This shows the importance of regularly checking that procedures are followed. If procedures are not being followed, the reason why should be discussed. Often it is enough to explain why a procedure exists to improve compliance, but it is also possible that challenges are present that require modifications to make the procedure workable.

EFFECTIVE COMMUNICATION

A safety toolbox meeting should have been conducted between the crew and port workers before commencing operations.

During this meeting, the port workers could have been reminded that they were to stay clear of the crane whilst it was moving and were not to be positioned under the suspended load at any time.

The crane path was fixed and predictable. The lifting plan should have been discussed with the stevedores, and a reminder made that there were areas that the crane operator would be unable to see whilst the crane was in motion. A safe area for stevedores to remain whilst lifting operations were taking place should have been agreed between all parties.

In general, the liaison between the ships crew and the stevedores appears inadequate. The accident investigation raised the possibility that no agreement had been reached between the stevedores and the crew concerning the safety standards that would be followed. Establishing clear lines of responsibility and ensuring an agreed communication method is vital when external parties are on board a ship. The experience and training of external parties cannot be known, and their knowledge of shipboard procedures may be lacking. A formal exchange of information prior to starting work, and at any change of shift, is essential to reduce the risk of misunderstanding.

Situational awareness would have been enhanced if effective communications and proper control of the deck operations had been established.

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BRITANNIA COMMENTARY ON INCIDENT (CONTINUED)

TRAINING

From a training perspective, the responsible officer should conduct risk assessments and mitigation prior to any operations on board, identifying areas that require attention. Improving supervision and information sharing among crews and stevedores is essential. It's imperative to enhance safety training, focusing on communication, implementing the "stop work" policy, and ensuring adherence to company SMS policy requirements.

CONCLUSION

The stevedore coordinator suffered fatal crushing between the gantry crane and hatch cover because he positioned himself in the crane's path, likely believing he could safely move out of the way. The C/O did not stop the gantry crane because he was unaware of the coordinator's presence on the track. The cargo hatch cover lifting operation also lacked proper planning, supervision, and safe execution, with no additional lookout deployed.

Overall, the incident involved lack of communication and deficiencies in following the company's SMS procedures which led to the death of the stevedore. The sequence of events highlights the importance of situational awareness, vigilant monitoring/supervision, effective communication, positive safety culture, and proper planning to avoid such incidents.

Britannia has issued publications on Safety Leadership along with further guidance on working safely on board that can be found on Britannia's website.

CONTACT

For more information on this incident email lossprevention@tindallriley.com

THIS CASE STUDY IS DRAWN FROM THE ACCIDENT REPORT 12/2021 PUBLISHED BY MARINE ACCIDENT INVESTIGATION BRANCH.
https://assets.publishing.service.gov.uk/media/614994fd8fa8f503c4b20991/2021-12-Cimbris-Report.pdf

REFLECTIVE LEARNING MATERIAL ON NEXT PAGE

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REFLECTIVE LEARNING MATERIAL - GANTRY CRANE OPERATIONS

THE QUESTIONS BELOW WILL HELP YOU TO REVIEW THE INCIDENT CASE STUDY EITHER INDIVIDUALLY OR IN SMALL GROUPS. IF POSSIBLE, DISCUSS YOUR CONCLUSIONS WITH OTHERS, AS THIS IS AN EFFECTIVE WAY OF THINKING ABOUT THE ISSUES IN MORE DEPTH.

PLEASE USE THE INFORMATION PROVIDED IN THE CASE STUDY TOGETHER WITH YOUR OWN EXPERIENCES AND THOUGHTS, TO REFLECT ON THE INCIDENT AND HOW THE ISSUES IDENTIFIED MIGHT RELATE TO YOUR OWN SITUATION.

WHAT DO YOU BELIEVE WAS THE IMMEDIATE CAUSE OF THE INCIDENT?

WHAT OTHER FACTORS DO YOU THINK CONTRIBUTED TO THE INCIDENT?

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WHAT DO YOU BELIEVE WERE THE BARRIERS THAT SHOULD HAVE PREVENTED THIS INCIDENT FROM OCCURRING?

WHY DO YOU THINK THESE BARRIERS MIGHT NOT HAVE BEEN EFFECTIVE ON THIS OCCASION?

WHAT ACTIONS SHOULD THE MASTER OR CHIEF OFFICER HAVE TAKEN TO PREVENT THE INCIDENT FROM HAPPENING?

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WHAT WOULD BE THE APPROPRIATE WORK PROCESS THAT CAN PREVENT SUCH AN INCIDENT FROM HAPPENING?

WHAT WOULD HAVE BEEN A MORE APPROPRIATE MANPOWER ALLOCATION/ ARRANGEMENT TO IMPROVE THE WORK PROCESS IN THE CASE OF OPERATING HATCH COVER WITHOUT A CLEAR LINE OF SIGHT.

WHAT POSSIBLE REASON(S) MIGHT HAVE LED TO THE SHIP OPERATIONS NOT FOLLOWING THE PROCEDURES LISTED IN THE COMPANY's SMS?

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NOTES