BSAFE

INCIDENT CASE STUDY No.5

BRITANNIA COMMENTARY | MARCH 2021

AS PART OF THE CASE STUDY MATERIAL, THE FOLLOWING COMMENTARY PROVIDES FURTHER ANALYSIS OF SOME OF THE KEY ISSUES TO SUPPORT REFLECTIVE LEARNING.

The first three pages of this commentary discuss some of the contributory factors and lessons learned in more detail with particular reference to best practices. The final page illustrates graphically some of the barrier control measures that could have potentially mitigated against the risks associated with the hazards using Britannia's interpretation of the Hierarchy of Barrier Controls triangle as a framework.

DOUBLE FATALITY RESULTING FROM ENCLOSED SPACE ENTRY

THIS INCIDENT APPEARS TO BE THE RESULT OF A COLLECTIVE FAILURE OF A NUMBER OF SAFETY PROCESSES AND BARRIERS, WHICH SHOULD HAVE BEEN FULLY IMPLEMENTED AS PART OF THE ONBOARD SAFETY MANAGEMENT SYSTEM (SMS).

The apparent disregard of the well-known risks associated with the carriage of logs may point to an ineffective onboard safety culture. Tragically, the scenario where a rescuer succumbs to the same fate as the person being assisted in an enclosed space is all too familiar in the maritime industry.

The case study and investigation identified a number of factors and lessons learned, as discussed below.

SAFE WORK PRACTICES

The company's SMS made reference to the requirements for the loading of log cargoes and the dangers associated with this cargo. It also included enclosed space procedures and explicitly defined a cargo hold as an enclosed space. The incident pre-dated the latest IMO recommendations on enclosed space entry procedures (Resolution A.1050(27))[1] which should now be followed. However, the company's procedures at the time still included various requirements[2] which should have acted as barriers to prevent this incident. These included ensuring that the space was adequately ventilated and the atmosphere regularly tested[3]; and also the completion of an Enclosed Space Entry Permit (ESEP), as detailed below. This needless tragedy should have been prevented if these procedures had been followed.

Both the C/O and AB were experienced seafarers and the C/O had experience of carrying bulk cargoes, including logs. The investigation did not identify why the C/O, who was partly responsible for onboard safe working practices, decided to enter an enclosed space without taking the necessary precautions. It is possible that the delay in the ship's departure (caused by the fumigation officials raising certain problems) may have affected his decision making. However, commercial or operational pressures should never lead to the bypassing of safety critical procedures.

It is possible that the AB's decision to enter the hold was influenced by an emotional instinct to try to rescue a colleague in difficulty. However, as the access to the hold had been left unattended after the initial incident, it is also possible that he did not realise that the C/O had lost consciousness due to the oxygen deficient atmosphere caused by the decomposition of the logs. A suitably trained attendant should always be in place during an enclosed space entry and also throughout any emergency incident in order to maintain communications and prevent further unsafe access to the space.

TRAINING

The SMS highlighted the requirement for training drills in emergency response procedures to be carried out on board. However, this training had not been included as part of the ship's emergency response drill matrix and there were no records of any such drills taking place in the 3 months before the incident.

[1] IMO (2011). Revised Recommendations for Entering Enclosed Spaces Aboard Ships (Resolution A.1050(27)), available at: https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/AssemblyDocuments/A.1050(27).pdf

[2] It should be noted that IMO Resolution A.1050(27) includes various recommendations not included in the company procedures, for example, that persons entering an enclosed space should be provided with a calibrated and tested multi-gas detector.

[3] Although after this incident, SOLAS Chapter XI-1, Regulation 7 came into force on 1 July 2016 requiring ships to carry an appropriate portable atmosphere testing instrument capable of measuring O_2, flammable gases or vapours, H_2S and CO.

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TRAINING (continued)

The emergency response was uncoordinated and indicative of insufficient knowledge and inadequate training, with several different parties acting independently. The general alarm was not sounded until 8 minutes after the incident and it took about 15 to 20 minutes to retrieve the casualties. Given the short survival time in the oxygen deficient atmosphere, any rescue attempt needed to be started immediately and carried out efficiently.

The investigation found no records of the C/O and AB attending any enclosed space training. Given the C/O's rank and experience, he should have been familiar with the hazards and precautions. The AB's decision to try to rescue the C/O may have been different if he had received proper training about enclosed space entry. The actions of some of the other crew, such as the bosun, who attempted to enter the hold despite his own concerns, also suggest that they would have benefited from enclosed space entry training.

Adequate training and drills are a vital part of an efficient SMS and the need for enclosed space entry training is highlighted in IMO Resolution A.1050(27). Although not a requirement at the time of this incident, in January 2015 it became mandatory in SOLAS[4] for crew members with enclosed space entry or rescue responsibilities to participate in onboard enclosed space entry and rescue drills at intervals not exceeding two months. Details of the content of these drills is provided in SOLAS, while Chapter III Reg. 19.4.2 also requires training to be provided in the risks associated with enclosed spaces.

ENCLOSED SPACE ENTRY PERMIT (ESEP)

Although the company's enclosed space entry procedure required an ESEP to be completed, there was no evidence of this having been done. A properly completed ESEP would have made sure that the various precautions and actions were considered in order to mitigate against the hazards. These would include ensuring adequate ventilation and correct testing of the atmosphere, as well as the provision of readily available emergency response equipment at the entrance to ensure a swift and coordinated response in case of an incident. Resolution A.1050(27) recommends that an ESEP should be issued by the master or the nominated responsible person, and completed by the personnel entering the space. prior to entry.

An effective SMS and safety culture should prevent any attempt to enter an enclosed space without completing an ESEP. It should also result in a near miss or observation/non-conformity report being raised if any such attempt is made.

HAZARD IDENTIFICATION AND TOOLBOX TALK (TBT)

The company's enclosed space entry procedure did not explicitly require an additional risk assessment or toolbox talk (TBT) to be conducted as part of the ESEP process. Although an ESEP should list the standard safety precautions to be taken, an additional risk assessment of the activity can assist the responsible person with assessing the actual situation, including any specific risks not addressed by the standard form, for example due to any maintenance work being carried out.

A TBT typically takes the form of a short, job-specific meeting attended by all the personnel involved in the task and should take place immediately before the work starts. This allows time for proper consideration of the findings of the hazard identification process and completed permits to work, as well as thinking about the requirements in the company's procedures. This then ensures that everyone is aware of the risks and is focused on completing the task safely.

CLEAR COMMUNICATION

The event which triggered this incident was the conversation between the master and C/O when they discussed the issues with the holds that had been raised by the fumigation officials and which were likely to delay departure. The specific details of this conversation were not provided in the investigation report, but the master later confirmed that he was unaware of the C/O's intentions following their conversation, as no decisions had been made or orders given. This conversation appears to have resulted in some confusion, as No. 5 cargo hold, where the enclosed space incident occurred, was not one of those identified by the fumigation officials as needing water removed. It was only the seal on the hold access door that needed replacing and this could have been easily checked from the deck. There was, therefore, no need for the C/O to have gone down into the hold at all.

[4] Safety of Life at Sea Convention as amended, Chapter III Reg. 19.3.3, 19.3.6 and 19.4.2.

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CLEAR COMMUNICATION (continued)

Given the likely impact on the ship's departure time, it is possible that the sudden stress of needing to rectify the problems identified by the fumigation officials may have caused confusion. The ability to communicate clearly and effectively is key to the successful and safe operation of any ship. Safety-critical information should be acknowledged, understood and clarified, if needed. Ambiguity can lead to assumptions and may have a significant impact on safety.

The investigation highlighted various other onboard communication issues. It was unclear whether the C/O informed the officer on watch (OOW) about his intention to enter the hold, which would have helped ensure the task was carried out in accordance with the correct procedures. As mentioned above, the onboard response lacked coordination and was also affected by poor communication, for example, resulting in the master and 3/O initially proceeding to hold No. 4 as they were unsure of the incident location.

STOP WORK AUTHORITY (SWA)

The incident would have been prevented if the C/O had taken notice of the bosun's warnings about the dangers of entering the hold, given the smell coming from the cargo. The investigation did not indicate whether the company had adopted a stop work authority (SWA) programme at the time of the incident. This would have supported the bosun in firmly challenging the C/O, and may have made him reconsider his actions. A SWA policy provides crew members with the responsibility and obligation to stop work in case of an apparent unsafe condition or behaviour without fear of retribution, and therefore contributes to a positive safety culture.

RESCUE EQUIPMENT

Although not contributing to the incident itself, the well-intended response of the 1/E in putting on an emergency escape breathing device (EEBD) to try to recover the AB may have resulted in a third fatality, as his EEBD started to run out of compressed air before he was able to exit the hold. An EEBD is a small device designed only to be used while escaping a hazardous atmosphere and should never be used to enter an enclosed space. It is essential that any rescue attempt from an enclosed space is made safely using appropriate equipment of an approved type which is readily accessible, such as a breathing apparatus (BA) set. An assessment of the suitable rescue equipment to be provided should be included as part of the identification of all enclosed spaces on board a ship.

ENCLOSED SPACE ACCESS CONTROL

There was no indication that the hold access hatch had been marked as an enclosed space; a sign alerting personnel about the risks of entering the space would have acted as a barrier. Furthermore, an effective means of controlling access to an enclosed space should be established to ensure that only authorised personnel are allowed to open or enter the space and only after completing the required formalities.

SEE NEXT PAGE FOR HIERARCHY OF BARRIER CONTROLS DIAGRAM.

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

THE SOURCE OF THIS CASE STUDY IS DRAWN FROM THE INVESTIGATION REPORT 10-201 PUBLISHED BY THE TRANSPORT ACCIDENT INVESTIGATION COMMISSION, NEW ZEALAND AT: https://www.taic.org.nz/sites/default/files/inquiry/documents/10-201%20Final%20Version.pdf

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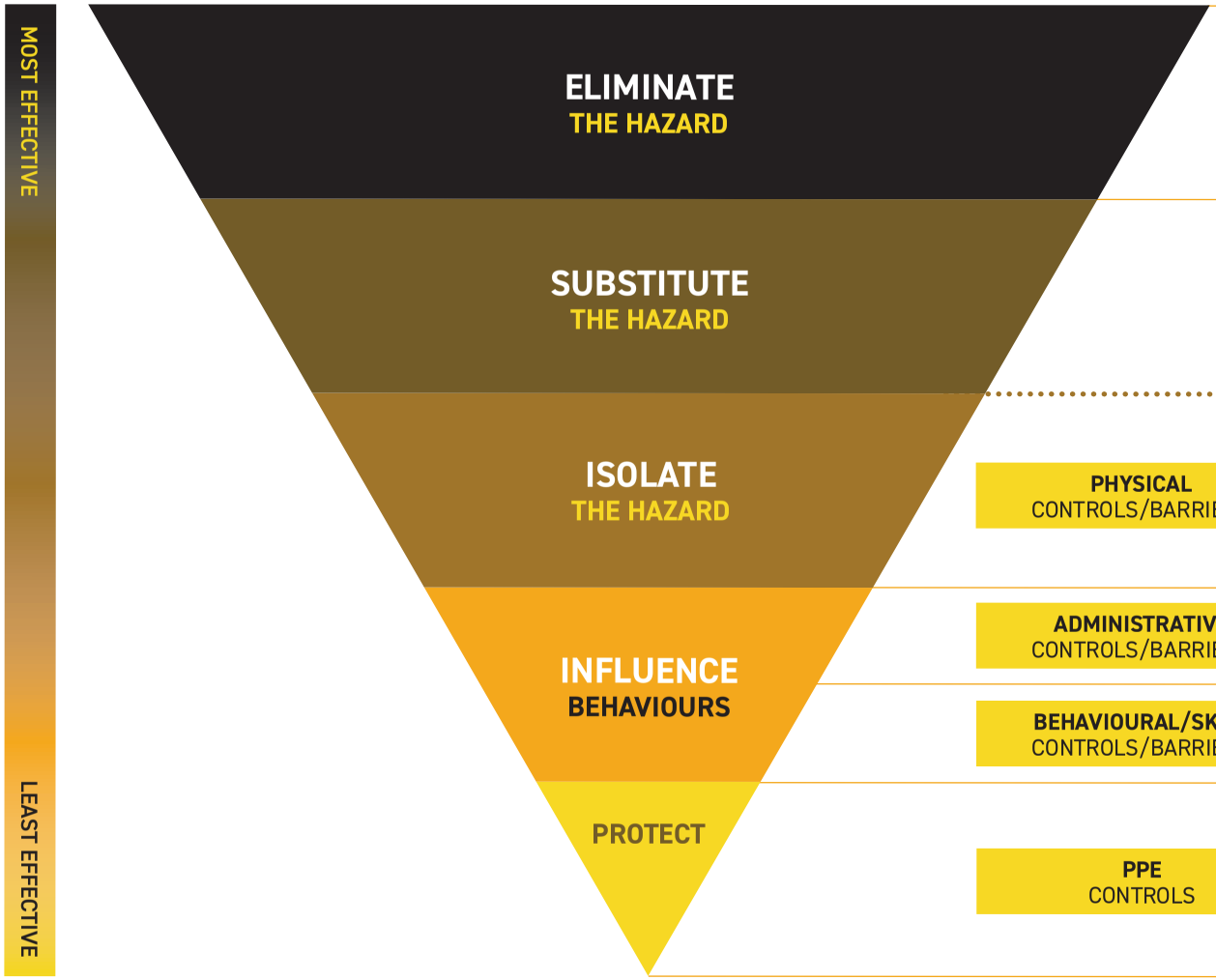
HIERARCHY OF BARRIER CONTROLS



PHYSICAL CONTROLS/BARRIERS

ADMINISTRATIVE CONTROLS/BARRIERS

BEHAVIOURAL/SKILL CONTROLS/BARRIERS

PPE CONTROLS

EXAMPLES OF POSSIBLE RISK MITIGATION CONTROL MEASURES RELATED TO THE CASE STUDY

DESIGN allows for remote operation limiting the need to access enclosed space?

ADEQUATE NATURAL VENTILATION to ensure the inside atmosphere is safe for entrance at all times.

TESTING ATMOSHPERE to ensure oxygen and gas levels are within the required parameters before entrance.

MECHANICAL VENTILATION to ensure the space can be ventilated before entrance.

ATTENDANT at entrance.

CONTROLLED ACCESS to space with locked hatches, key control.

PERMIT TO WORK/PESE, including Job Hazard Analysis, Toolbox Talk. **WARNING SIGN** on enclosed space entrance. **COMMUNICATION** system for all parties in place.

TRAINING/DRILLS in enclosed space hazards and rescue.

STOP WORK AUTHORITY programme.

USE of appropriate PPE (eg. footwear, carry personal multi-gas detector, rescue harness, fall protection, EEBD (for escape), BA set (for rescue operations)).

The suggested barriers/controls above are provided to help generate reflective discussions, and should not be considered as conclusive/definitive or comprehensive for the provided case study. The risk and control measures relating to any similar scenario or activity must always be appropriately assessed based on the specific onboard arrangement and circumstances.