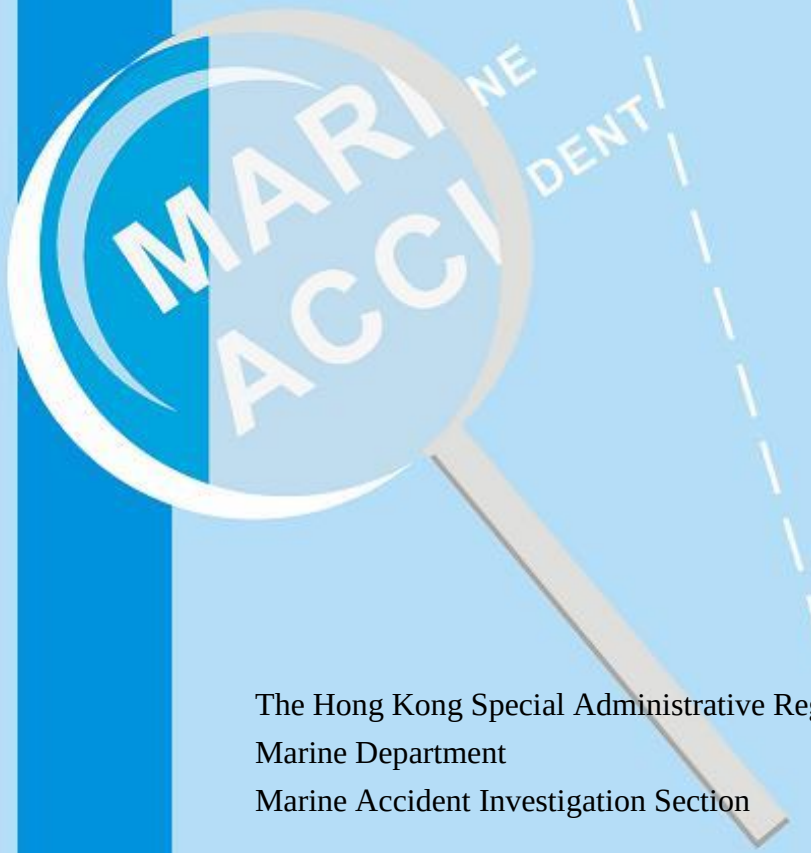
Report of investigation into the fatal accident on board the Hong Kong registered bulk carrier "*Bao Run*" at sea on 18 January 2021



The Hong Kong Special Administrative Region
Marine Department
Marine Accident Investigation Section

5 January 2022

Purpose of Investigation

The purpose of this investigation, conducted by the Marine Accident Investigation Branch (MAIB) of Marine Department, is to determine the circumstances and the causes of the incident with the aim of enhancing the safety of life at sea and avoiding similar incidents in future.

It is not intended to apportion blame or liability towards any particular organization or individual except so far as necessary to achieve the said purpose.

The MAIB has no involvement in any prosecution or disciplinary action that may be taken by the Marine Department resulting from this incident.

Table of contents **Page**

Summary

At about 1530 hours on 18 January 2021, a fatal accident happened on board the Hong Kong registered bulk carrier "*Bao Run*" (*the* vessel) at sea at approximate position 17°29.3'N 058°07.0'E, during her voyage from Bin Qasim, Pakistan to King Abdullah, Saudi Arabia for loading clinker cargo.

In the accident, the Second Engineer (*the 2/E*) without wearing a safety belt fell from the Permanent Means of Access *(PMA)* platform at the height of about 15 metres onto the tank top while he was carrying out cargo hold cleaning operation in the No.4 cargo hold (*the cargo hold*).

The Wiper saw *the 2/E* lying on the bottom of *the cargo hold* adjacent to the bilge well having a serious head injury with bleeding. Subsequently, *the 2/E* was lifted out from *the cargo hold* with a stretcher and transferred to the outside of the port accommodation area for first aid treatment. The Master altered *the vessel's* course to the Salalah port about 251 nautical miles away to evacuate *the 2/E* for medical treatment ashore. However, *the 2/E* did not show any vital signs at about 1710 hours on the same day and *the vessel* resumed her voyage later.

The investigation revealed that the work of cargo hold cleaning was carried out without sufficient site supervision; lack of safety awareness and underestimating the risk of falling from the *PMA* platform by not strictly following the requirements of the "General Safe Working Practice" of the shipboard Safety Management System (*SMS)* to wear fall preventive equipment when working at height.

The investigation also identified that the preparation work for the cargo holds cleaning did not completely meet the requirements of Chapter 14 "Permit to Work System" and Chapter 17 "Working at Height" of the Code of Safe Working Practices (*the Code*) for Merchant Seafarers.[1]

[1] Section 4 of Cap.478M "Merchant Shipping (Seafarers) (Code of Safe Working Practices) Regulation" refers.

1. Description of the vessel

Ship name	:	*Bao Run* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9698599
Type	:	Bulk carrier
Year built, shipyard	:	2014, Chengxi Shipyard Co., Jiangyin, China
Gross tonnage	:	36,317
Net tonnage	:	21,608
Summer deadweight	:	63,319.2 tonnes
Length overall	:	199.9 metres
Breadth	:	32.26 metres
Engine power, type	:	8050 kW, MAN-B&W 5S60ME-C8.2
Classification society	:	Bureau Veritas
Registered owner	:	Bao Run Shipping Co., Limited
Management company	:	HTM Shipping Co., Ltd

Figure 1 *The vessel*

2. Sources of evidence

2.1 Information provided by the Master, the crew and the shipping management company (the Company) of *the vessel*.

3. Outline of events

(All times were local time UTC + 4 hours)

3.1 On 16 January 2021, *the vessel* fully completed the discharging of coal cargo departed from Bin Qasim, Pakistan heading to King Abdullah, Saudi Arabia for loading clinker cargo.

3.2 The deck crew members were assigned to clean Nos. 1, 2 and 3 cargo holds and the engine crew members were assigned to clean Nos. 4 and 5 cargo holds. The Bosun briefed the cargo hold cleaning procedures to the crew members before the cleaning, and the engine crew members were assigned to observe the cargo holds cleaning onsite while the deck crew members were carrying out the cargo holds cleaning.

3.3 On 17 January 2021, *the 2/E* completed a site risk assessment of the cleaning of Nos. 4 and 5 cargo holds following the shipboard risk assessment procedure.

3.4 On 18 January 2021, six engine crew members were assigned to clean *the cargo hold*. *The 2/E* accompanied the Motorman 1 in one team to wash *the cargo hold* with a mixture of chemical and fresh water by using the spray lance inside the hold. The Wiper and Engine Cadet 1 (*the E/C 1*) were assigned in one team to wash *the cargo hold* by sea water after the wash by *the 2/E* and Motorman 1. The Motorman 2 and Engine Cadet 2 (*the E/C 2*) were assigned to mix chemicals with fresh water into drums on the main deck.

3.5 *The cargo hold* was planned to wash by the engine crew members by mixed chemical waters in the afternoon of 18 January 2021. *The 2/E* and Motorman 1 wore a chemical suit and full-face mask proceeded to the *PMA* platform to wash the upper part of *the cargo hold* after cleaning the lower part (Figure 2).

Figure 2 The aft bulkhead of *the cargo hold* including the *PMA* platform

3.6 At about 1530 hours, *the vessel* was approximate at position 17°29.3'N 058°07.0'E. Noting that his position at the *PMA* platform could not reach the stain area on the portside hopper, *the 2/E* asked Motorman 1 to bring a pipe extension of the spray lance for him in order to extend it to clean the cargo stain on the portside hopper (Figure 3). *The 2/E* was working alone on the *PMA* platform. Before the Motorman 1 went back to *PMA* platform to bring the pipe extension to *the 2/E*, the Wiper suddenly heard an abnormal sound coming from his backside when he was washing at forward tank top of *the cargo hold*. He then turned around and saw *the 2/E* lying on the tank top adjacent to the bilge well having a serious head injury with bleeding.

Figure 3 The view of the topside tank bottom of *the cargo hold*

3.7 The Wiper realized the seriousness of the accident and shouted for help. He asked *the E/C 2* to seek assistance outside *the cargo hold*. In the meantime, when the Motorman 1 saw *the 2/E* lying inside *the cargo hold*, he rushed to the aft poop deck to inform the Bosun of the incident. The Bosun relayed the message to the duty officer on the bridge via his portable radio. The duty officer mustered the crew for emergency rescue operation through the public address (*PA*) system.

3.8 The crew and the security guard on board mustered at the scene for the rescue operation after hearing the casualty on the *PA* system. Subsequently, *the 2/E* was lifted out from *the cargo hold* with a stretcher and transferred to the outside of the port accommodation area for first aid treatment. In the meantime, the Master contacted the Company, local Rescue Co-ordination Centre, United Kingdom Marine Trade Operations and Chinese Warship seeking medical assistance. With the Oman Coast Guard response, the Master altered *the vessel's* course to the Salalah port which was about 251 nautical miles away.

3.9 Unfortunately, at about 1710 hours on the same day, *the 2/E* did not show any vital signs and his body was packed and shifted to the freezer. At about 1830 hours, *the vessel* resumed her voyage.

4. Analysis

The vessel's certificates and manning

4.1 The statutory trading certificates of *the vessel* were valid and in order. *The vessel* was manned by 21 crew members, including the Master.

4.2 The Master had worked in the Company for about 6 years and joined *the vessel* on 5 November 2020. He had more than 3 years of experience as a master. He possessed a Class I Certificate of Competency issued by China valid until 4 July 2023.

4.3 The Chief Officer had worked in the Company for about 6 years and joined *the vessel* on 5 November 2020. He had about 8 months of experience as a chief officer. He possessed a Class II Certificate of Competency issued by China valid until 19 August 2024.

4.4 *The 2/E* had worked in the Company for about 7 years and joined *the vessel* on 5 November 2020. He had about 8 months of experience as a second engineer. He possessed a Class II Certificate of Competency issued by China valid until 2 August 2024.

4.5 The Wiper had worked in the Company for about 9 months and joined *the vessel* on 5 November 2020. He had about 3 months of experience as a wiper.

4.6 The Motorman 1 had worked in the Company for about 7 months and joined *the vessel* on 5 November 2020. He had about 7 months of experience as a motorman.

4.7 There was no abnormality noted with regard to the certification and experience of the crew concerned.

Fatigue, alcohol and drug abuse

4.8 There was no evidence to show that any crew on board suffered from either fatigue at work or abuse of alcohol and drugs.

Weather and sea conditions

4.9 The weather was cloudy with a westerly wind of Beaufort Wind Scale force 3. The sea was calm and had a visibility of 7 nautical miles. The weather and the sea conditions were not considered to be the contributory factors to the accident.

Permanent Means of Access platform (PMA platform)

4.10 *The vessel* was fitted with elevated passageways forming sections of a *PMA* platform in *the cargo hold* for close-up inspections and routine maintenance purposes. The *PMA* platform at about 15 metres above the tank top was assembled with guardrails, stanchions and rectangle grating. The guardrails consisted of an upper rail at the height of 1.05 metres with an intermediate bar at the height of 0.5 metres and stanchions not more than 3 metres apart, the construction of which complied with the requirements of International Convention for the Safety of Life at Sea (SOLAS) regulation II-1/3-6[2] (Figure 4).

Figure 4 The Permanent Means of Access platform

Safe working at height for the cargo hold cleaning

4.11 The "General Safe Working Practice" of the shipboard *SMS* of *the vessel* stated that (i) a responsible person should be assigned for

[2] Paragraph 3.3 of the Annex to IMO Resolution MSC.158(78) as referred by paragraph 2.1 of SOLAS regulation II-1/3-6.

supervision, organization and command of the operation in the cargo hold; (ii) in a spot where falling is possible, reliable measures to prevent falling should be taken such as using safety ropes, safety belts or hanging safety nets; and (iii) safety belts shall be secured when working at the height of 2 metres or more if they have the potential to fall.

4.12 As a routine shipboard operation, the work of cargo hold cleaning is normally assigned to the deck and engine crew members of *the vessel*. Occasionally, the cargo hold will be cleaned by accessing the *PMA* platform which was about 15 metres above the tank top.

4.13 The Bosun demonstrated the cargo hold cleaning work to the engine crew members, including *the 2/E*, before the cleaning operation. Furthermore, the engine crew members had observed the cargo hold cleaning operation done by the deck crew members on 16 and 17 January 2021. Despite the abovementioned training was carried out, the 2/E did not wear any fall preventive equipment when working on the *PMA* platform. It was probably that the cargo hold cleaning operation training was ineffective causing the crew to ignore the risk of working at height.

4.14 Though the duty of the cargo hold cleaning had been assigned to each engine crew member, a responsible person was not assigned to supervise and take command of the work on 18 January 2021. The Chief Officer was the person in charge of the cargo hold cleaning, but he did not stay at the scene during the cleaning. Hence, the work was carried out without sufficient site supervision, which was against the "General Safe Working Practice" requirements stated in the shipboard *SMS*.

Probable cause of the accident

4.15 There was no eyewitness on how *the 2/E* fell onto the tank top of *the cargo hold*. It could be deduced that *the 2/E* overstretched his upper body out of the railing of the *PMA* platform to clean the cargo stain with the 4 metres spray lance causing him to lose his balance and fall from a height about 15 metres onto the tank top while he was concentrating on the cleaning work (Figure 5).

Figure 5 The spray lance

4.16 The investigation revealed that the work was carried out without sufficient site supervision, lack of safety awareness, and underestimating the risk of falling from the *PMA* platform by not strictly following the requirements of the "General Safe Working Practice" of shipboard *SMS* while working at height. The *SMS* required that *the 2/E* had to wear a safety belt while working on the *PMA* platform, and a responsible person had to be assigned to supervise onsite to ensure the crew members worked at height with proper safety protective measures. The fatal accident might be avoided if the requirements of the SMS were strictly followed.

Risk assessment and permit to work

4.17 *The Cod*e in its Annex 14.1 of Chapter 14 "Permit to Work System" and section 17.2.1 of Chapter 17 "Working at Height" states that:

(i) Permit to work would normally be required for working at height/over the side.

(ii) Where work must be carried out at height, the Company must ensure that such work is properly planned, appropriately supervised and carried out in as safe a manner as is reasonably practicable.

(iii) Planning should include carrying out a risk assessment, considering potential risks from falling objects or fragile surfaces and planning for emergencies.

4.18 The investigation revealed that the preparation work for the cargo hold cleaning did not completely meet the requirements of *the Code* stated in the above paragraph 4.17:

(i) The risk assessment had been carried out and working at height also was identified in the risk assessment report. However, there was no evidence to show that the permit to work was issued before the crew working on the *PMA* platform.

(ii) The Company understood that cargo hold cleaning was required after discharging the coal cargo but the Company did not provide sufficient safety guidelines or instructions to *the vessel* to ensure the work to be carried out in a safe manner.

(iii) The tank top and *PMA* platform would become wet and slippery during the cleaning operation. However, the approved risk assessment report did not identify the potential danger of "slippery and wet floor". There was no evidence showing that a safe working plan was established properly.

5. Conclusions

5.1 At about 1530 hours on 18 January 2021, a fatal accident happened on board *the vessel* at sea during her voyage from Bin Qasim, Pakistan to King Abdullah, Saudi Arabia for loading clinker cargo.

5.2 *The 2/E* fell from the *PMA* platform at the height of about 15 metres onto the tank top while carrying out *the cargo hold* cleaning without wearing a safety belt at *PMA* platform in *the cargo hold*. The Wiper saw *the 2/E* lying on the bottom of *the cargo hold* adjacent to the bilge well having a serious head injury with bleeding. Subsequently, *the 2/E* was lifted out from *the cargo hold* with stretcher and transferred to the outside of the port accommodation area for first aid treatment. The Master altered *the vessel's* course to the Salalah port which was about 251 nautical miles away to evacuate *the 2/E* for medical treatment ashore. Unfortunately, *the 2/E* did not show any vital signs at about 1710 hours on the same day and *the vessel* resumed her voyage later.

5.3 The investigation revealed that the work of cargo holds cleaning was carried out without site supervision, lack of safety awareness, and underestimating the risk of falling from the *PMA* platform by not following the requirements of the "General Safe Working Practice" of the shipboard *SMS* manual while working at height.

5.4 The investigation also identified that the preparation work for the cargo hold cleaning did not completely meet the requirements of Chapter 14 "Permit to Work System" and Chapter 17 "Working at Height" of *the Code.*

6. Recommendations

6.1 The management company should issue circulars informing all masters, officers and crew of its fleet of the findings of the investigation and lessons learnt from this accident and instruct them to:

(i) enhance safety culture onboard to ensure the permit to work system to be followed and wear safety belt before working at height; and

(ii) strictly follow the requirements of the Code and shipboard *SMS* manual when working at height.

6.2 A Hong Kong Merchant Shipping Information Note is to be issued to promulgate the lessons learnt from this accident.

7. Submission

7.1 The draft investigation report, in its entirety, was sent to the management company and the Master of the *vessel* for comments.

7.2 By the end of the consultation, there was no comment received from the above-mentioned parties.