Report of investigation into the fatal accident on board the Hong Kong registered bulk carrier "*Shandong Hai Yao*" at Port Dickson, Malaysia on 19 August 2020

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

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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.

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Summary

On 16 August 2020, the Hong Kong registered bulk carrier "*Shandong Hai Yao"* (*the vessel*) arrived at Port Dickson, Malaysia for discharging coal transported from Newcastle, Australia.

In the afternoon of 18 August 2020, the Master of *the vessel* was enquired by the Charterer about the condition of the cargo holds as the next cargo might be grain. To answer the Charterer, the Master through the Chief Officer (C/O) instructed the Bosun to check the extent of coal stain in cargo holds. Afterwards, the Bosun was then last seen on the deck near the accommodation. Anyhow, the Master did not receive any reply from the Bosun and the Bosun was not seen during the dinner on that day.

At around 0940 hours on 19 August 2020, the Bosun was found missing when the C/O called the Bosun for some routines. After no response was received through the public address announcement, deck crew members were mustered to search for the Bosun. Eventually, at around 1040 hours, the C/O and the Third Officer (3/O) found that the hatch of No.7 cargo hold forward access (*the forward access*) was opened, and they saw the Bosun lying on the first landing platform about 2.5 metres under the hatch. The Bosun's body was taken out from the hatch and was found dead.

The investigation had identified that the main contributory factors to the accident were non-compliance with the permit to work system when entering enclosed spaces; ineffective training on entering enclosed spaces; and insufficient communication when carrying out work orders on *the vessel*.

1. Description of the vessel

Ship name	:	*Shandong Hai Yao* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9591533
Type	:	Bulk Carrier
Year built, shipyard	:	2014, Jiangsu Rongsheng Heavy Industries Co., Ltd.
Gross tonnage	:	41,605
Net tonnage	:	26,095
Summer deadweight	:	75,503 tonnes
Length overall	:	224.9 metres
Breadth	:	32.25 metres
Engine power, type	:	9,500 kW, 5RT-flex58T-D
Classification society	:	China Classification Society
Registered owner	:	Minsheng Jiahe (Tianjin) Shipping Leasing Company Ltd.
Management company	:	Shandong Fleet Management Limited

Figure 1 *The vessel*

2. Sources of evidence

2.1 Statements of the crew of *the vessel*.

2.2 Information provided by the management company of *the vessel*.

3. Outline of events

(All times were local time UTC + 8 hours.)

3.1 On 16 August 2020, *the vessel* arrived at Port Dickson, Malaysia, fully laden with coal from Newcastle, Australia. The cargo discharge operation commenced at 0330 hours on 17 August 2020.

3.2 On 18 August 2020, the Bosun was observed to do his daily routine without being assigned to any special tasks.

3.3 At around 1445 hours, the Master was communicating with the Charterer for the next voyage. Since the next cargo would potentially be grain, the Charterer enquired about the cargo holds' condition. The Master then informed the C/O through portable radio to check the extent of coal stain on the internal surface of the cargo holds.

3.4 At 1500 hours, the C/O acknowledged the order from the Master and instructed the Bosun through the fixed internal communication system to visually check the extent of coal stain on the internal surface of the cargo holds. The C/O told the Bosun to report directly to the Master since he had to look into the records of cargo holds' photographs. At that time, the Bosun was in his cabin.

3.5 The Second Officer (2/O), as the duty officer at that moment, heard the conversation between the Master and the C/O through his portable radio. Through No.7 cargo hold hatch opening, he saw plenty of coal still inside the cargo hold and could hardly tell the cargo hold condition. Without reporting or getting involved in the conversation between the Master and the C/O, the 2/O resumed his port watch duty.

3.6 At around 1540 hours, one of the able bodied seamen saw that the Bosun came out from the accommodation area and walked towards the No.7 cargo hold. They had a little chat nearby the accommodation ladder. The Bosun was seen wearing overall, a safety helmet and safety shoes. Since then, the Bosun had not been seen anywhere onboard.

3.7 During dinner time, nobody saw the Bosun dinning in the crew mess room. A crew entered the crew mess room at around 1900 hours for his late dinner and he saw the Bosun's meal was left untouched on the table. The crew proceeded to his watch after dinner.

3.8 In the morning of 19 August 2020 at around 0940 hours, the 3/O required assistance to lower the embarkation ladder. The C/O called the Bosun's cabin but there was no response. The C/O then proceeded to check the ship draughts without much speculation. The 3/O then made a public announcement to call the Bosun, but there was still no response. The Master decided that the missing of the Bosun was of high importance and the C/O then mustered all deck crew members to search for the Bosun.

3.9 Accommodation area and the Bosun's cabin were searched without findings. At around 1040 hours, when the C/O and the 3/O searched the main deck area, they found *the forward access* was opened and they saw the Bosun lying on the first landing platform about 2.5 metres under the hatch (Figure 2).

Figure 2 The first landing platform where the Bosun's body was found

3.10 An enclosed space rescue team was summoned and successfully lifted the Bosun's body out of the cargo hold. In the rescue, it was observed that the safety helmet chin strap was still in place on the Bosun's chin, but the safety helmet was broken and partly fell off. There was an open wound on the Bosun's forehead and the Bosun's body was cold and rigid.

3.11 Although first aid treatment was applied, the Bosun did not show any vital signs. Eventually, his body was permitted to land ashore on 21 August 2020.

4. Analysis

Certification and experience of the crew

4.1 *The vessel* was manned by a total of 21 Chinese crew members. The manning scale complied with the Minimum Safe Manning Certificate issued to *the vessel* on 7 December 2018. The certificates of *the vessel* were valid and in order.

4.2 The Master had served in the current rank for 13 months. He held a certificate of competency as a master on ship issued by the People's Republic of China valid until 6 September 2021. He signed on *the vessel* as the Master for about one and a half months before the accident.

4.3 The C/O had served in the current rank for about one and a half months. He held a certificate of competency as chief officer on ship issued by the People's Republic of China valid until 31 July 2023. He signed on *the vessel* as the C/O for about one and a half months before the accident.

4.4 The Bosun had served in the current rank for about 25 months. He held a certificate of proficiency to support navigation and ship operations issued by the People's Republic of China on 13 October 2016 and was valid until 13 February 2037. He signed on *the vessel* as a Bosun about 9 months before the accident.

4.5 There were no abnormalities noted with regard to the certification and experience of the crew concerned.

Fatigue, alcohol and drugs abuse

4.6 There was no evidence showing that the crew on board had suffered from fatigue, alcohol and drugs abuse.

Weather and sea condition

4.7 At the time of the accident, the wind was southerly of force 3 and the sea was calm. Weather and sea conditions should not be the contributory factors to the accident.

Cause of death

4.8 The death certificate issued by a local hospital showed that the main death cause was asphyxia. No indication of bone fracture was stated on the death certificate.

Enclosed type spiral ladder

4.9 The ladders of *the forward access* comprised a vertical ladder linking between the access hatch and the first landing platform inside No.7 cargo hold. Then a spiral ladder led from the first landing platform to reach the lower landing platform fitted on the lower stool. Connecting the lower landing platform to the cargo hold bottom was an inclined straight ladder (Figure 3).

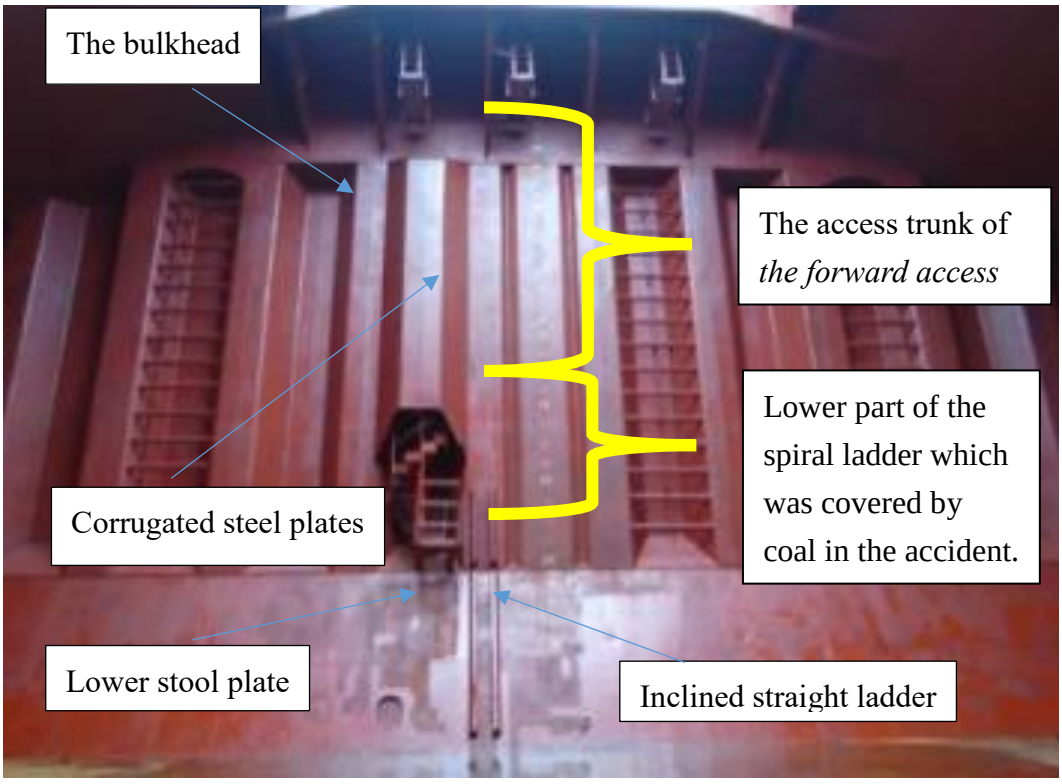

Figure 3 *The forward access*

4.10 When the Bosun entered the No.7 cargo hold through *the forward access*, the cargo hold was fully loaded and the access trunk bottom was completely blocked by coal. As such, the inside of the access trunk was an enclosed space.

Procedures and training on enclosed space entry

4.11 Given the access trunk of *the forward access* was an enclosed space, any entry should be planned to follow the permit to work system in accordance with Annex 14.1 of the Code of Safe Working Practices for Merchant Seafarers (COP)[1]. However, this had not been followed resulting in the occurrence of the accident.

4.12 The Safety Management System (SMS) of *the vessel* had stated that fully loaded or partially loaded cargo holds were enclosed spaces. Under the SMS, enclosed space entry procedures and checklist were provided for *the vessel* to follow strictly. However, there was no evidence to indicate that the requirements of the SMS had been followed.

4.13 All cargo hold access hatches were padlocked and the keys were kept by the C/O and the Bosun. As such, the Bosun had the key to open *the forward access* hatch without notifying anyone for the entry. This indicated that *the vessel* had a flaw when implementing the required enclosed space entry procedures.

4.14 According to the crew training records on board, training on entry into enclosed spaces was provided to all crew monthly. The topics covered in each training were generally as follows:

(a) enclosed space entry procedures;

(b) responsibilities of persons entering an enclosed space;

(c) hazards associated with entry into dangerous spaces and the precautions to be taken;

[1] the COP is a publication required to be carried on board Hong Kong ships pursuant to the Merchant Shipping (Seafarers) (Code of Safe Working Practices) Regulation (Cap. 478M).

(d) the use and maintenance of equipment and personnel protective aids required for entry into enclosed space;

(e) the use of the atmosphere testing equipment;

(f) the use of rescue harness; and

(g) calibration procedures of the atmosphere testing equipment.

The training records showed that all crew on board had signed for their attendance in each training. However, the accident indicated that the training was a formality and ineffective.

4.15 In accordance with Chapter 15.12.1 of the COP, the requirements on training, instruction, and information of enclosed space entry should include recognition of the circumstances and activities likely to lead to the presence of a dangerous atmosphere. However, such requirements were not covered in the shipboard enclosed spaces entry training.

4.16 In fact, the letters "ENCLOSED SPACE" and "LACK OF OXYGEN" were painted in yellow on the hatch of *the forward access* (Figure 4). However, the painting had faded and hence was difficult to draw the crew attention to it. The Bosun might therefore consider that *the forward access* was safe for entry as the cargo hold was fully opened without realizing that the access trunk was still an enclosed area. As a result, the Bosun opened the padlock and entered the access trunk of *the forward access* without seeking a work permit from the C/O or the Master, resulting in his death.

Figure 4 The hatch of *the forward access*

Communication on board

4.17 According to Chapter 1.2.2 of the COP, effective communications and workforce involvement are critical to ensure a safe living and working environment.

4.18 The investigation revealed that the general communication was inadequate on board *the vessel*, according to the following findings:

(a) The C/O did not ensure that the job assigned to the Bosun had been acted upon properly.

(b) The 2/O realized that the No.7 cargo hold was still too full to determine the cargo hold condition, but he did not provide feedback to concerned people.

(c) The Bosun failed to notify anyone on board prior to his entry into cargo hold.

With better communication in encouraging feedback, promoting alternative suggestions and safety observations, the fatal accident to the Bosun could potentially be avoided.

5. Conclusions

5.1 In the afternoon of 18 August 2020, when *the vessel* was discharging coal in Port Dickson, Malaysia, the Bosun received an order from the Master through the C/O to check the extent of coal stain on the surface of cargo holds. Afterwards, the Bosun was then last seen on the deck near the accommodation. Anyhow, the Master did not receive any feedback reply from the Bosun and the Bosun was not seen even during the dinner on that day.

5.2 At around 1040 hours on 19 August 2020, the Bosun was found lying on the first landing platform inside *the forward access*. He was taken out from *the forward access* and was found dead.

5.3 The investigation identified the following contributory factors:

(a) the permit to work system for entry into enclosed space had not been followed;

(b) training on entry into enclosed space was ineffective; and

(c) insufficient communications when carrying out work orders on *the vessel*.

6. Recommendations

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

(a) enhance enclosed space entry control and strengthen its monitoring to ensure that all crew strictly follow enclosed space entry procedures of the SMS and the COP;

(b) enhance the training on enclosed space entry to improve their safety awareness, the understanding of enclosed space definition, and the ability to identify all enclosed spaces on board; and

(c) enhance effective communications between the person in charge of work and the working crew.

6.2 The management company should:

(a) review the shipboard safety procedures on enclosed space entry;

(b) review the contents of the shipboard training on enclosed space entry; and

(c) conduct an internal audit on *the vessel* to confirm the conformance of the shipboard safety procedures on enclosed space entry.

6.3 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* as well as the Ship Registration and Quality Branch of the Marine Department for their comments.

7.2 By the end of the consultation, no comment was received from the parties mentioned in paragraph 7.1.