Report of investigation into the fatal accident on board the Hong Kong registered bulk carrier "*Clearwater Bay*" at sea on 1 January 2022

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

7 October 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

A fatal accident happened on board a Hong Kong registered bulk carrier "Clearwater Bay" (*the vessel*) at 1545 hours on 1 January 2022 when *the vessel* was en route from Pyeongtaek, the Republic of Korea (South Korea) to Port Hedland, Australia for loading cargo of salt in bulk with an estimated time of arrival (ETA) of 3 January 2022.

On 1 January 2022, the deck crew of *the vessel* was engaged with the main deck cleaning and cargo hold coating work. At 1330 hours, one able seafarer (AB), one ordinary seafarer (OS), and one deck cadet (D/C) conducted the lime-coating[1] operation in the No. 5 cargo hold (*the cargo hold*). The bosun and other deck crew cleaned the lime residues between No.4 and No.5 cargo holds on the main deck. The Chief Officer (C/O) coordinated the lime-coating operation on the main deck. At around 1545 hours, while the C/O was checking *the cargo hold* condition and taking photos through the partially opened hatch cover with his upper body placed underneath, the hydraulic operated hatch cover suddenly closed crushing the C/O to death on the spot. At the time of the accident, the hydraulic hose of the hatch cover hydraulic operation system *(the operating system*) was ruptured at the coupling area leaking the hydraulic oil of *the operation system*, resulting in the sudden closure of the hatch cover.

The investigation revealed that the main contributory factors to the accident were that the C/O was lack of safety awareness of the safe operation of the hatch cover, and the requirement of having a valid permit to work aloft, ; the crew members failed to carry out the maintenance of the hydraulic operating system in compliance with the requirements of the shipboard manual, namely, "Operating and maintenance manual of the hydraulic operated folding hatch cover" (*the manual*); the shipboard Safety Management System (SMS) failed to identify the hydraulic system as an item that required maintenance to comply with the requirements of *the manual*; and the crew members failed to follow the requirements of "Code of Safe Working Practices for Merchant Seafarers" (*the Code*)[2] and *the manual* when operating the hatch cover.

[1] The function of lime-coating is to protect cargo holds.

[2] *The Code* is a publication required to be carried onboard Hong Kong ships pursuant to the Merchant Shipping (Seafarers) (Code of Safe Working Practices) Regulation (Cap. 478M).

1. Description of the vessel

Ship name	:	*Clearwater Bay* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9606534
Type	:	Bulk Carrier
Year built, shipyard	:	2010, Yangzhou Nakanishi Shipbuilding Co, Ltd.
Gross tonnage	:	18,465
Net tonnage	:	10,368
Length overall	:	164.170 meters
Breadth	:	27.00 meters
Depth	:	14.20 meters
Engine power, type	:	5730 kW, MAN B&W 5S50Mc
Classification society	:	Lloyd's Register Group Limited
Registered owner	:	Imperial Bulkship S.A.
Management company	:	Wealth Ocean Ship Management (Shanghai) Co., Ltd.

Figure 1: Clearwater Bay

2. Sources of evidence

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

3. Outline of events

(All times were local time UTC + 8 hours)

3.1 At 1800 hours on 21 December 2021, *the vessel* departed the port of Pyeongtaek, South Korea, in ballast condition and bound for Port Hedland, Australia, for loading cargo of salt in bulk with an ETA of 3 January 2022.

3.2 On 1 January 2022, a toolbox meeting was held by the C/O from 0800 to 0815 hours. The tasks of washing and removing residues on the main deck and applying lime coating to the upper part of *the cargo hold* were specified in the toolbox meeting. The risks and preventive measures of working aloft, opening and closing the hatch cover, and removing residues by mixing water with acid were also identified.

3.3 At 1330 hours, the AB, the OS, and the D/C continued to carry out the lime-coating in *the cargo hold* (Figure 2). The bosun and other deck crew members cleaned the lime residues between the No.4 and No.5 cargo holds on the main deck. The C/O was responsible for coordinating the lime-coating operation on the main deck (Figure 3).

Figure 2: lime-coating operation in *the cargo hold*

Figure 3: Cleaning the lime residues on the main deck

3.4 Approaching the completion of the lime-coating to *the cargo hold*, the C/O checked *the cargo hold* condition and took photos on the main deck that were required to be reported to the charterer of *the vessel.*

3.5 At around 1545 hours, the AB and the OS in *the cargo hold* heard a sound of *the hatch cover* moving and an expression of grief was also heard from the C/O, followed by *the hatch cover* being closed quickly.

3.6 Afterwards, the crew members working in *the cargo hold* climbed out to the main deck and asked the Bosun why *the hatch cover* was closed. The Bosun responded that no crew was operating *the hatch cover* at the time of the accident.

3.7 The AB found that the oil return hydraulic hose ruptured at the coupling between the oil pipe and the hose of *the operating system*, and the leaked hydraulic oil was found underneath the control box. The upper body of the C/O was crushed under the hatch cover when he was checking *the cargo hold* condition at the time of the accident (Figures 4 & 5).

Figure 4: Rupture of the hydraulic oil returning hose

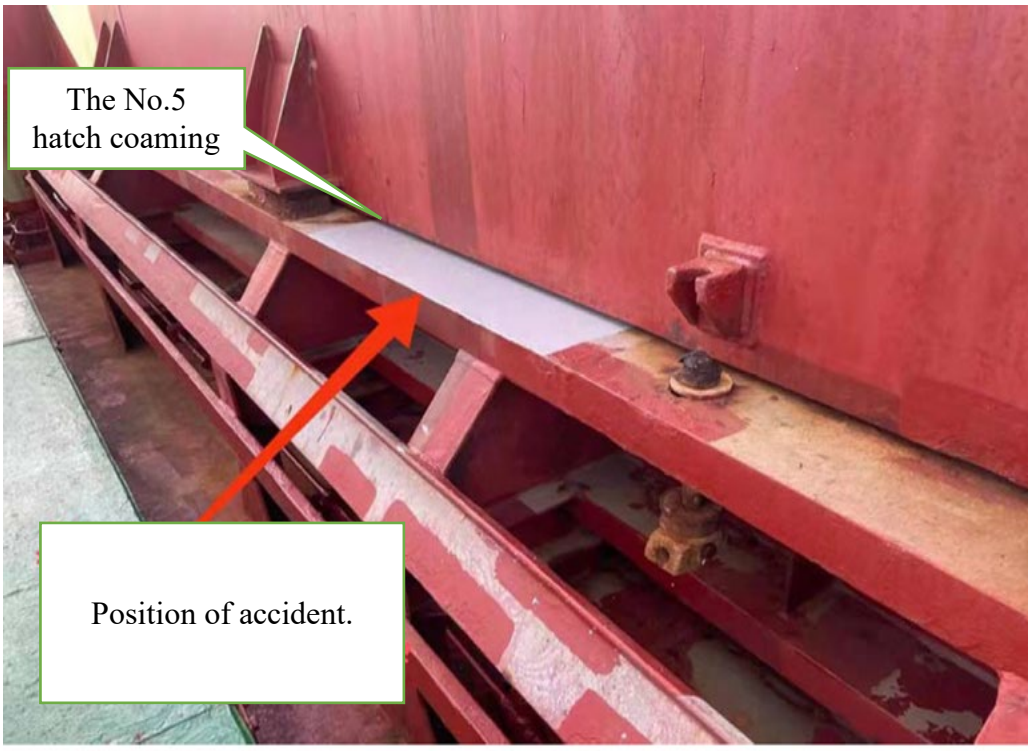

Figure 5: The No. 5 hatch coaming where the accident occurred

3.8 The Master proceeded to the accident scene to organise an emergency rescue operation when he received the report. Around 1605 hours, the accident was reported to the Designated Person

Ashore of *the Company*.

3.9 At 1626 hours, the engine crew members replaced the defective hydraulic hose, and *the hatch cover* was partially opened again. Afterwards, crew members removed the body of the C/O that had no vital signs from the hatch coaming and shifted it to a suitable place for proper preservation.

3.10 On 3 January 2022, *the vessel* arrived at the anchorage of Port Hedland and the dead body of the C/O was transported to a local hospital in Port Hedland.

4. Analysis

Certificates and manning

4.1 The statutory trading certificates of *the vessel* were valid and in order. *The vessel* was manned by 19 crew members, including the Master. The Minimum Safe Manning Certificate of *the vessel* was issued by the Hong Kong Marine Department (HKMD) on 25 November 2016, and the manning of *the vessel* fulfilled the requirements.

4.2 The Master joined *the vessel* on 14 December 2021. It was his first time serving as a master. The Master possessed a Master Certificate of Competency issued by China, valid until 16 May 2024.

4.3 The C/O joined *the vessel* on 18 September 2021. He had about 15 months of experience as chief officer. The C/O possessed a chief officer Certificate of Competency issued by China, valid until 11 July 2024.

4.4 The Second Officer (2/O) joined *the vessel* on 18 September 2021. He had about 3 months of experience as a second officer. He possessed a Class III Certificate of Competency (Deck Officer) issued by China, valid until 20 May 2026.

4.5 The D/C joined *the vessel* on 14 December 2021. He had less than 1 month of experience as a deck cadet.

4.6 The bosun joined *the vessel* on 18 September 2021. He had about 1 year of experience as a bosun.

4.7 The AB joined *the vessel* on 3 April 2021. He had 15 months of experience as an able seafarer deck.

4.8 The Chief Engineer (C/E) joined *the vessel* on 18 September 2021. He had around 11 years of experience as a chief engineer. The C/E possessed a chief engineer Certificate of Competency issued by China, valid until 13 July 2023.

4.9 There was no abnormality onboard with regard to the certification

and qualification of the crew concerned.

Fatigue, alcohol and drugs abuse

4.10 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

4.11 On the day of the accident, the weather was cloudy with westerly wind of Beaufort wind scale Force 4. The sea and swell were moderate. The visibility was good, and *the vessel* was rolling at about 5 degrees. The sea and swell conditions might be an underlying contributory factor to the accident because the hatch cover was not permitted to operate in this rolling range according to the instruction of the hatch cover manufacturer.

Operation of the hatch cover

4.12 Sections 1.1 and 2.4 of *the manual* stated that the hatch covers are to be kept closed, locked and cleated when *the vessel* is sailing. *The operating system* was designed to operate the cargo hold hatch cover with a maximum ship's heel of 3 degrees and trim of 2 degrees.

4.13 *The hatch cover* was partially opened under the condition that *the vessel* was rolling at about 5 degrees when it was underway. The investigation revealed that the hatch operating condition did not follow the instructions of *the manual* as it should not be operated while underway.

4.14 Chapter 16.3.1 of *the Code* stated that the instructions of the manufacturer for the safe operation of the type of mechanical hatch cover fitted should always be followed. According to Section 3.2.1 of *the manual*, the hatch cover should be rested on the rail end and the tilting stoppers (port and starboard) should be locked when the hatch cover is opened.

4.15 However, *the hatch cover* was partially opened when the crew members carried out the lime-coating operation in *the cargo hold* (Figure 6). It did not follow the requirements of *the Code* and *the*

manual to operate *the hatch cover*.

Figure 6: the partially opened hatch cover

Safety Management System (SMS)

4.16 According to Chapter 16.3.1 of *the Code,* the instructions of the manufacturer for maintenance and repair of the type of mechanical hatch cover fitted should always be followed. Sections 4 and 5 of *the manual* stated that *the operating system* maintenance should include the pipelines of the hydraulic equipment, the pump unit, rubber sealings, lubricating, etc. The periodic inspection of *the operating system* should be carried out and recorded, including inspection of hydraulic pipes, hose, and coupling every three months.

4.17 The investigation revealed that a periodical inspection of the hydraulic piping system of *the operating system* was not identified as an inspection item in Section 10.2 for "Cargo Holds & Hatch Covers" of the Bulk Carrier Manual (BC manual)[3] of the shipboard SMS. The shipboard SMS manual failed to refer to *the manual* for the periodic inspection of the hydraulic operating system of the hatch cover.

[3] This manual is part of the shipboard SMS for bulk carrier.

Shipboard Maintenance

4.18 Sections 4 and 5 of *the manual* stated that the maintenance of *the operating system,* including its piping system, should be carried out from time to time and re-tightened if necessary, and the related records of the inspections should be carried out.

4.19 According to shipboard maintenance records of the Planned Maintenance System, *the hatch cover* was required to be inspected every two weeks, quarterly and annually according to the scope of the inspection, and properly recorded. However, there was no evidence to show that *the operating system* was inspected following the requirements of *the manual* in the past year before the accident happened, especially the piping system, including the flexible hose connection coupling.

Safety awareness

4.20 The C/O held the shipboard toolbox meeting before the lime-coating operation in *the cargo hold* and cleaning of lime residues on the main deck on the day of the accident. The tasks to be conducted on that day were specified, and related risks and preventive measures were identified, including the risks and preventive measures on the hatch cover operation.

4.21 At the time of the accident, the hatch cover was partially opened. The C/O leaned over the hatch coaming under the partially opened hatch cover, which was merely held by the hydraulic pressure, to check the condition of *the cargo hold* and take photos. It was deduced that the C/O did not realize that he was in a dangerous working condition when carrying out the above work.

4.22 An approved shipboard permit to work aloft for the job of lime-coating and cleaning of lime residues valid from 0800 to 1730 hours was cancelled by the C/O at 0815 hours on the day of the accident with unknown reasons. Technically speaking, the lime-coating and cleaning of lime residues carried out by the crew members on the day could be deemed as the job conducted without a valid permit to work aloft.

4.23 The investigation revealed that the C/O was lack of safety

awareness on the safe operation of the hatch cover, and requiring a valid permit to work aloft.

Cause of death

4.24 The accident was caused by the rupture of the hydraulic pipe, which led to the loss of the hydraulic pressure of *the operating system* resulting in the hatch cover being closed suddenly by its weight. The C/O could not escape when he leaned over the hatch coaming under the hatch cover to check the condition of *the cargo hold*. The accident resulted in the upper body of the C/O being crushed by *the hatch cover*.

4.25 According to the Death Certificate issued by Registrar of Births, Deaths and Marriages, Western Australia, the cause of death was injured when a malfunctioning hydraulic hatch cover crushed him.

5. Conclusions

5.1 A fatal accident happened on board *the vessel* at 1545 hours on 1 January 2022 when she was en route from Pyeongtaek, South Korea to Port Hedland, Australia for loading cargo of salt in bulk with an ETA of 3 January 2022.

5.2 On 1 January 2022, the deck crew of *the vessel* was engaged with the work of washing and removing lime residues on the main deck and applied the lime-coating to *the cargo hold*. At 1330 hours, the AB, the OS, and the D/C conducted the lime-coating operation in the cargo hold. The bosun and other deck crew cleaned the lime residues between No.4 and No.5 cargo holds on the main deck. The C/O coordinated the lime-coating operation on the main deck. At around 1545 hours, while the C/O was checking *the cargo hold* condition and taking photos through the partially opened hatch cover with his upper body placed underneath, the hydraulic oil hose of *the operating system* of *the hatch cover* was ruptured. The hydraulic operated hatch cover was suddenly closed as a result of the loss of the hydraulic pressure and crushed the C/O to death on the spot.

5.3 The investigation revealed that the main contributory factors led to the accident were as follows:

(a) the C/O was lack of safety awareness on the safe operation of the hatch cover, and the requirement of having a valid permit to work aloft;

(b) the crew members failed to carry out the maintenance of *the hydraulic operating system* in compliance with the requirements of *the manual*;

(c) the shipboard SMS failed to identify *the hydraulic system* as an item that required maintenance to comply with the requirements of *the manual*; and

(d) the crew members failed to follow the requirements of *the Code* and *the manual* to operate the hatch cover.

6. Recommendations

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

(a) enhance safety awareness and training onboard in conducting the safe operation for the hatch cover including its effective risk assessment, and requiring a valid permit to work aloft;

(b) strictly follow the requirements of *the manual* to carry out the maintenance of the hydraulic operating system of the hatch cover; and

(c) strictly follow the requirements of *the Code* and *the manual* to operate the hatch cover.

6.2 The management company should consider revising the shipboard SMS to ensure the hydraulic operating system of the hatch cover is included in the shipboard maintenance manual and conduct an internal audit on *the vessel* to ensure that the crew members strictly follow the requirements of *the manual* to carry out maintenance onboard.

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 Company and the Master of the vessel for comments.

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