Report of investigation into the fatal accident on board the Hong Kong registered bulk carrier "*Great Century*" at sea on 22 April 2022

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

17 November 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 1148 hours on 22 April 2022, the Hong Kong registered bulk carrier "Great Century" (*the vessel*) departed Lanshan, China (*the discharging port*) for Guiuan, Philippines to load a cargo of nickel ore in bulk with an estimated time of arrival (ETA) of 30 April 2022.

At about 1330 hours, the deck crew carried out cargo hold cleaning (*the hold cleaning*) in the No.1 cargo hold (*the hold*). The bosun and one deck cadet (*the D/C*) were assigned as a group to clean the upper part of the starboard side lower slope of *the hold* by means of a portable ladder (*the ladder*). At about 1440 hours, when the bosun climbed up *the ladder* to clean *the hold* with the assistance of *the D/C* holding it, he suddenly fell from *the ladder* and dropped to the tank top of *the hold*. He was found bleeding from his ears but with normal respiratory and heart rates. His safety helmet was damaged and was away from his head by about 0.2 to 0.5 meters. The bosun was then transferred to the ship's hospital for emergency medical treatments under the medical guidance of the International SOS (Beijing). *The vessel* was steered back to *the discharging port* after the incident to disembark the injured bosun to shore hospital. At 1712 hours, the bosun was transferred to a local hospital for medical treatments. Unfortunately, the bosun was declared dead at 2005 hours at the hospital.

The investigation identified that the contributory factors leading to the accident were: the deck crew were lack of shipboard training on the cargo hold cleaning, including working at height; the Chief Officer (C/O) did not hold the toolbox meeting before the cargo hold cleaning and not supervise the cargo hold cleaning on-site as a supervisor in accordance with the requirements of the shipboard Safety Management System (SMS); the approval of a permit to work at height and risk assessment for the cargo hold cleaning onboard were not carried out effectively; and the crew did not follow the requirements of the "Code of Safe Working Practices for Merchant Seafarers"[1](*the Code*) on the use of portable ladder and securing of lifeline connected to the safety harness when working at height.

[1] 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	:	*Great Century* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9796999
Type	:	Bulk Carrier
Year built, shipyard	:	2017, Dalian COSCO KHI Ship Engineering Co., Ltd., China
Gross tonnage	:	34,590
Net tonnage	:	20,201
Length overall	:	199.90 meters
Breadth	:	32.24 meters
Depth	:	18.60 meters
Engine power, type	:	8130 kW, MAN B&W 6S50 ME-B9.3
Classification society	:	China Classification Society
Registered owner	:	SEA 17 LEASING CO. LIMITED
Management company	:	Hong Kong Ming Wah Ship Management Company Limited

Figure 1: *Great Century*

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 0920 hours on 22 April 2022, *the vessel* completed the cargo discharge operation at the port of Lanshan, China. At 1148 hours, *the vessel* departed the port for Guiuan, Philippines, to load a bulk cargo of nickel ore.

3.2 Being affected by COVID-19, no stevedore was arranged *at the discharging port* to remove the cargo residue in the cargo holds. As such, the crew of *the vessel* were assigned to do it after departure.

3.3 At about 1330 hours, the deck crew started *the hold cleaning*. The bosun and *the D/C* were assigned as a group to clean the upper starboard side lower slope of *the hold* using *the ladder* of 6 meters in length.

3.4 When carrying out *the hold cleaning*, the bosun stood on *the ladder* to clean cargo residue left on the bulkhead (Figures 2 & 3) with the assistance of *the D/C* holding *the ladder*.

Figure 2: Cargo residue in *the hold*

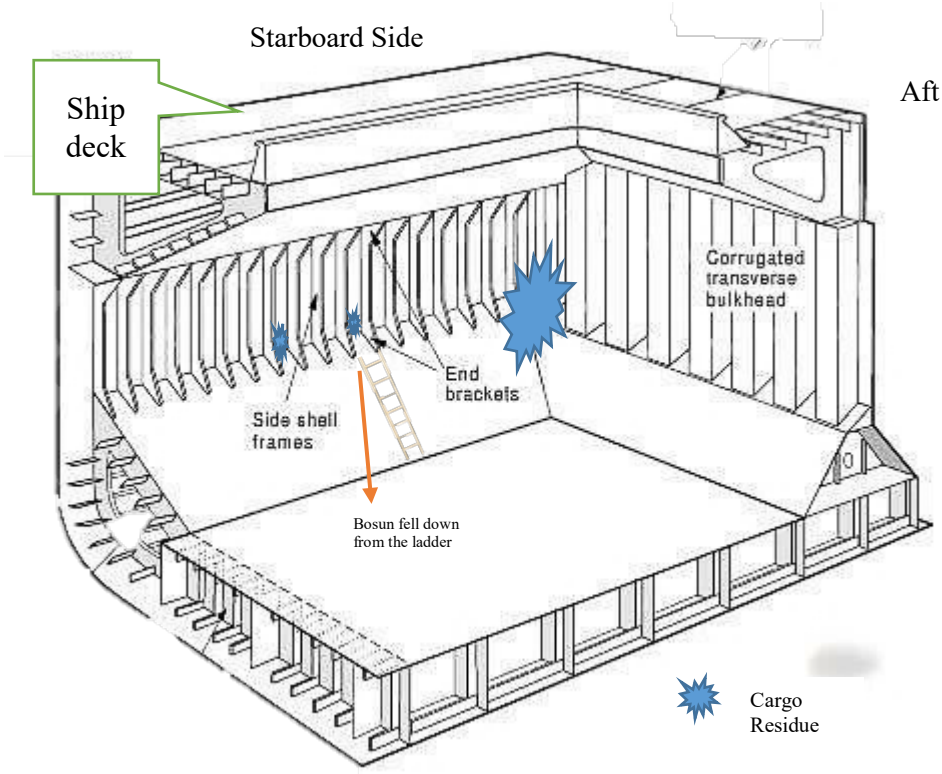

Figure 3: Schematic diagram of the No. 1 cargo hold

3.5 At about 1440 hours, *the D/C* and the bosun shifted *the ladder* to the position between frame No. 200 and No. 201 with a slope gradient of about 45°. The bosun climbed up *the ladder* to clean the upper part of *the hold* with *the ladder* being held by *the D/C* who was facing downwards to the tank top to protect his eyes from the falling cargo residue (Figure 4).

Figure 4: Simulated scenario of climbing ladder

3.6 Whilst holding the ladder, *the D/C* suddenly felt *the ladder* shaking abnormally and heard a sound. He then saw the bosun lying on the tank top, bleeding from his ears but still having normal respiratory and heart rates. His safety helmet was damaged and was away from his head about 0.2 to 0.5 meters (Figure 5 & 6).

3.7 The deputy bosun in *the hold* reported the accident to the Master by portable walkie-talkie via the duty second officer on the bridge. After receiving the report, the Master immediately organized the crew to apply the emergency medical treatments to the bosun and contacted the nearby Vessel Traffic Services for emergency assistance. The Master steered *the vessel* back to *the discharging port* and contacted the local agent for emergency medical treatment for the bosun.

Figure 5: Spot of the accident

Figure 6: Placement of *the ladder* at the time of the accident

3.8 At 1445 hours, the C/O arrived at the accident scene. He found that the bosun was conscious. The back of the bosun's head was vaguely red and swollen with no obvious trauma on the body. However, bosun's consciousness gradually blurred after a few minutes.

3.9 At 1458 hours, the Master reported the accident to *the Company.* Afterwards, the bosun was transferred to the ship's hospital for emergency medical treatments under the medical guidance of the International SOS (Beijing).

3.10 At 1712 hours, the bosun was transferred to a local hospital at *the discharging port* by a local tug boat for medical treatments.

3.11 Unfortunately, the bosun was declared dead at 2005 hours at the hospital.

4. Analysis

Certificates and manning

4.1 The statutory trading certificates of *the vessel* were valid and in order. *The vessel* was manned by 23 crew members, including the Master and fulfilled the requirements stipulated in the Minimum Safe Manning Certificate of *the vessel*.

4.2 The Master joined *the vessel* on 27 March 2022. He had 2 years of sea experience as a master. The Master possessed a Master Certificate of Competency issued by China, valid until 21 February 2027.

4.3 The chief engineer joined the vessel on 11 January 2022. He had about six years of sea experience as a chief engineer. The C/E possessed a chief engineer Certificate of Competency issued by China, valid until 27 August 2023.

4.4 The C/O joined *the vessel* on 11 January 2022. He had about one year of sea experience as a chief officer. The C/O possessed a chief officer Certificate of Competency issued by China, valid until 17 September 2026.

4.5 The 2/O joined *the vessel* on 11 January 2022. He had about 2 years of sea experience as a second officer. The 2/O possessed a second officer Certificate of Competency issued by China, valid until 2 December 2026.

4.6 The bosun joined *the vessel* on 11 January 2022. He had about 28 months of sea experience as a bosun.

4.7 The deputy bosun joined *the vessel* on 11 January 2022. He had about 3 months of sea experience as a deputy bosun.

4.8 D/C joined *the vessel* on 27 March 2022. He had about 8 months of sea experience as a cadet.

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 the 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 easterly wind of Beaufort wind scale Force 3. The sea was smooth, and *the vessel* was not rolling. The visibility was about 2 miles. The weather and the sea conditions were not considered to be the contributory factors to the accident.

Cause of death

4.12 According to the information provided by *the Company*, the bosun fell to the tank top of *the hold* when he climbed *the ladder* to remove the cargo residue left on the upper part bulkhead of *the hold* (Figure 3). His head struck the tank top of *the hold* while falling from *the ladder*, resulting in vague redness, swelling at the back of his head, and gradual loss of consciousness.

4.13 The death certificate of the bosun issued by the hospital in *the discharging port* stated that the cause of death was respiratory and cardiac arrest.

Shipboard training

4.14 Paragraph 4.3.4.1 of Chapter 4.1.5 of the shipboard SMS stated that the Master should organize training of the professional skills and knowledge of the crew as required relating to the operation of *the vessel*.

4.15 *The Company* instructed the Master on 11 January 2022 to organize training on the cargo hold cleaning on board *the vessel* after crew change, including work at height, using proper personal safety equipment, identifying and assessing safety risks, and taking preventive safety measures.

4.16 The shipboard professional skill training was planned and covered in the annual training plan for 2021 and 2022. However, there was no evidence to show that the cargo holds cleaning training,

including working at height, had been carried out onboard after 14 crew members were changed on 11 January 2022. The investigation revealed that the requirement to have shipboard training had not been seriously followed on board.

Operation of the cargo hold cleaning

4.17 Paragraph 4.2 of Chapter 2.2.5.6 of the shipboard SMS stated that a toolbox meeting should be carried out properly, and a permit to work at height should be sought before working at height.

4.18 According to the shipboard daily work plan, the toolbox meeting of "Departure Work" and "Anti-COVID19" was carried out on the day of the accident, i.e. 22 April 2022 but no hold cleaning of the No.1 and No.5 cargo holds, including work at height was covered. The toolbox meeting did not comply with the requirement of Chapter 2.2.5.6 of the shipboard SMS.

4.19 A shipboard permit to work at height before *the hold cleaning,* valid from 0800 hours to 1730 hours on the accident day, was issued by the C/O. The approved permit to work at height required the presence of an on-site safety supervisor, and lifeline to be attached to a strong point when working at height had to be carried out before *the hold cleaning*.

4.20 However, the investigation revealed that the lifeline of the harness was not secured to a strong point while the bosun was climbing *the ladder* in *the hold* (Figure 4), and that the C/O, as a supervisor, did not supervise *the hold cleaning* on-site. It was deduced that the approval of a permit to work at height for the cargo holds cleaning onboard was only for the formality without executing the permit in a professional and responsible manner.

4.21 Paragraphs 4.3 and 4.5 of Chapter 2.3.3.1 of the shipboard SMS stated that the C/O should carry out a risk assessment on work at height before the cargo hold cleaning and supervise on-site during the cargo hold cleaning.

4.22 The risk assessment on *the hold cleaning* was carried out on board *the vessel* on 22 April 2022. Personnel protective equipment, weather condition, communication, illumination in the cargo holds, etc., were identified but not the risk of working at height especially the risk of climbing *the ladder.* It revealed that the risk assessment on the cargo hold cleaning was incomplete with the most important part of working at height being neglected.

4.23 If the toolbox meeting, permit to work at height, and the risk assessment for *the hold cleaning* were carried out properly in accordance with the shipboard SMS, the accident might have been avoided.

Work at height

4.24 Chapter 17.3.4 of *the Code* required that portable ladder when in use be pitched at 75° from the horizontal (Figure 7), be secured from slipping at the bottom, and have at least 150 millimeters of clearance behind the rungs.

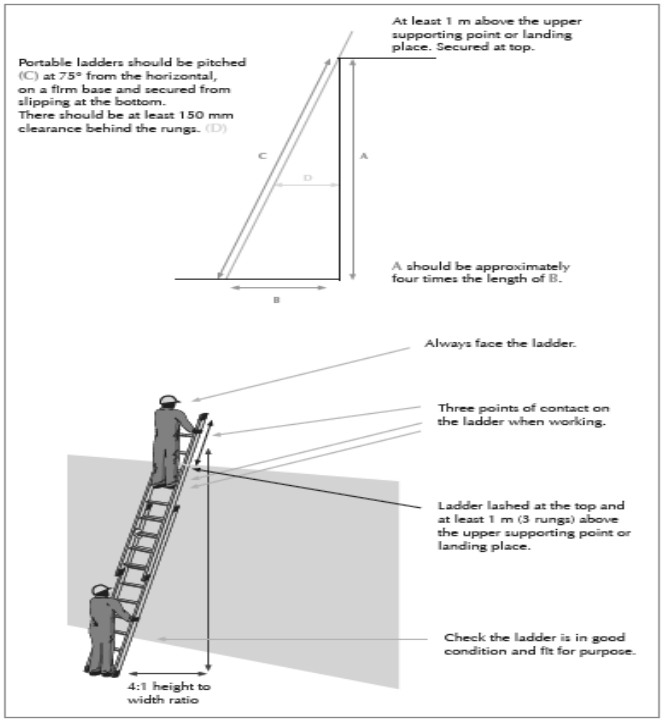

Figure 7: Requirements of using portable ladder

4.25 Chapter 17.3.1 of *the Code* stated that working from portable ladder should be avoided as far as possible but, where necessary, personnel should use a safety harness with a lifeline secured above the work position where practicable.

4.26 *The ladder* used in *the hold* for *the hold cleaning* was pitched at about 45° from the horizontal (Figure 4) with no clearance behind the rungs. The bosun did not properly secure the lifeline connected to his safety harness while he was climbing *the ladder* during *the hold cleaning* (Figure 3), which did not comply with the requirements of *the Code.*

5. Conclusions

5.1 At 1148 hours on 22 April 2022, *the vessel* departed *the discharging port* for Guiuan, Philippines to load a cargo of nickel ore in bulk with an ETA of 30 April 2022.

5.2 At about 1330 hours, the deck crew carried out *the hold cleaning* in *the hold*. The bosun and *the D/C* were assigned as a group to clean the upper part of the starboard side lower slope of *the hold* by means of *the ladder*. At about 1440 hours, when the bosun climbed up *the ladder* to clean *the hold* with the assistance of *the D/C* holding it, he suddenly fell from *the ladder* and dropped on the tank top of *the hold.* He was found bleeding from his ears but with normal respiratory and heart rates. His safety helmet was damaged and was away from his head about 0.2 to 0.5 meters. Afterwards, the bosun was transferred to the ship's hospital for emergency medical treatments under the medical guidance of the International SOS (Beijing). *The vessel* was steered back to *the discharging port* after the incident to disembark the injured bosun to the shore hospital. At 1712 hours, the bosun was transferred to a local hospital for medical treatments. Unfortunately, the bosun was declared dead at 2005 hours at the hospital.

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

(a) the shipboard training on the cargo hold cleaning, including working at height as instructed by *the Company*, was not carried out after the crew change on 11 January 2022;

(b) the C/O did not hold the toolbox meeting before the cargo hold cleaning and did not supervise on-site as a supervisor in accordance with the requirements of the shipboard SMS;

(c) the approval of a permit to work at height and risk assessment for the cargo hold cleaning onboard had not been carried out properly;

(d) the crew did not follow the requirements of *the Code* on using the portable ladder and proper securing of the lifeline connected to the safety harness when working at height.

6. Recommendations

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

(a) enhance the shipboard training in the cargo hold cleaning by conducting an effective risk assessment including the approval of a permit to work at height for the cargo hold cleaning;

(b) ensure a toolbox meeting is held before cargo hold cleaning, with a designated officer to supervise the cargo hold cleaning on-site in accordance with the requirements of the shipboard SMS; and

(c) strictly follow the requirements of *the Code* on using the portable ladder and proper securing of the lifeline connected to the safety harness when working at height.

6.2 The management company should conduct internal audits on its vessels to ensure that the crew on board to strictly follow the company's instructions and the requirements of the shipboard SMS.

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 period, comments from the Company were received and the report had been amended as appropriate.