Report of investigation into the fatal accident on board the Hong Kong registered multi-purpose dry cargo ship“Caribbean Harmony” at Onsan, Korea on 16 April 2021

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

05 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.

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Summary

On 14 April 2021, the Hong Kong registered multi-purpose dry cargo ship "Caribbean Harmony" (*the vessel*) berthed at the Onsan Zink terminal in Port of Onsan, Republic of Korea, and commenced cargo discharge on the same day.

At 0910 hours on 16 April 2021, the charterer's representative (*the representative*) boarded *the vessel* to check the lashing equipment (*the equipment*) located at the tween deck in the No.1 cargo hold (*the hold*) for unloading it ashore. The Chief Officer (*the C/O*) asked *the representative* to come back later because the crew members were shifting pontoons. However, *the representative* insisted on taking pictures and checking *the equipment* immediately. The Third Officer (*the 3/O*) then accompanied *the representative* to enter *the hold* as ordered by *the C/O* and warned *the representative* many times not to go near the edge of the tween deck of *the hold* because of the potential danger of falling but was ignored. At 0915 hours, *the representative* suddenly fell from the tween deck to the bottom of *the hold* from the edge of the tween deck opening. *The 3/O* reported the accident to *the C/O* immediately and performed Cardiopulmonary Resuscitation (*CPR*) on *the representative* at the spot. Afterwards, *the representative* was transferred to a local hospital for emergency medical treatment. Unfortunately, *the representative* was later declared dead on the same day.

The contributory factors leading to this accident as identified in the investigation were that the crew members failed to follow the safety procedures of the Code of Safe Working Practices for Merchant Seafarers[1](*the Code*) to carry out a risk assessment and the completion of a permit to work before entering *the hold*; to fit at the tween deck opening with secured guards or fencing of adequate design and construction to prevent the falling from there; and to provide adequate illumination inside *the hold*.

The investigation also identified that the emergency training and drill on the

[1] *the Code* is a publication required to be carried onboard Hong Kong ships pursuant to Section 4 of the Merchant Shipping (Seafarers) (Code of Safe Working Practices) Regulation (Cap. 478M).

enclosed space entry and rescue carried out every two months were ineffective.

1. Description of the vessel

Ship name	:	*Caribbean Harmony* (Figure 1)
Flag	:	Hong Kong, China
Port of registry	:	Hong Kong
IMO number	:	9458468
Type	:	Multi-Purpose Dry Cargo Ship
Year built, shipyard	:	2017, Huanghai Shipbuilding Co., Ltd.
Gross tonnage	:	22,362
Net tonnage	:	10,179
Summer deadweight	:	31,748.91 tonnes
Length overall	:	166.10 metres
Breadth	:	27.40 metres
Engine power, type	:	6,480 kW, MAN 6S46ME-B8.3
Classification society	:	DNV.GL
Registered owner	:	Digital Epoch Limited
Management company	:	Istanbul Denizcilik ve Deniz Tasimaciligi A.S.

Figure 1 *The vessel*

2. Sources of evidence

2.1 Information provided by the Master, the crew and the management company of *the vessel*.

3. Outline of events

(All times were local time UTC + 9 hours.)

3.1 On 14 April 2021, *the vessel* berthed at Onsan Zink terminal in the Port of Onsan, Republic of Korea, and commenced discharging operation on the same day. *The equipment* belonging to the charterers was planned to unload upon completion of cargo operation since the charter between the charterers and the shipowner would be ended in Onsan.

3.2 On 15 April 2021, *the representative* boarded *the vessel* to arrange the discharging of *the equipment*. The crew informed him to come back the next day at around 1400 hours because *the equipment* was not ready for unloading.

3.3 At 0910 hours on 16 April 2021, *the representative* boarded *the vessel* again and requested to check *the equipment* located at the tween deck in *the hold*. *The C/O* asked *the representative* to come back at 1100 hours because the crew members were shifting pontoons. However, *the representative* insisted on taking pictures and checking *the equipment* immediately.

3.4 As ordered by *the C/O,* the *3/O* holding a torchlight escorted *the representative* wearing a safety helmet, safety shoes, and a retroreflective safety vest entered *the hold*. The hatch covers of *the hold* were closed, and the space was dark. The tween deck of *the hold* was partially opened (Figure 2). *The 3/O* warned *the representative* many times not to go near the edge of the tween deck of *the hold* because of the potential danger of falling during his taking pictures and checking *the equipment* but his warning was ignored.

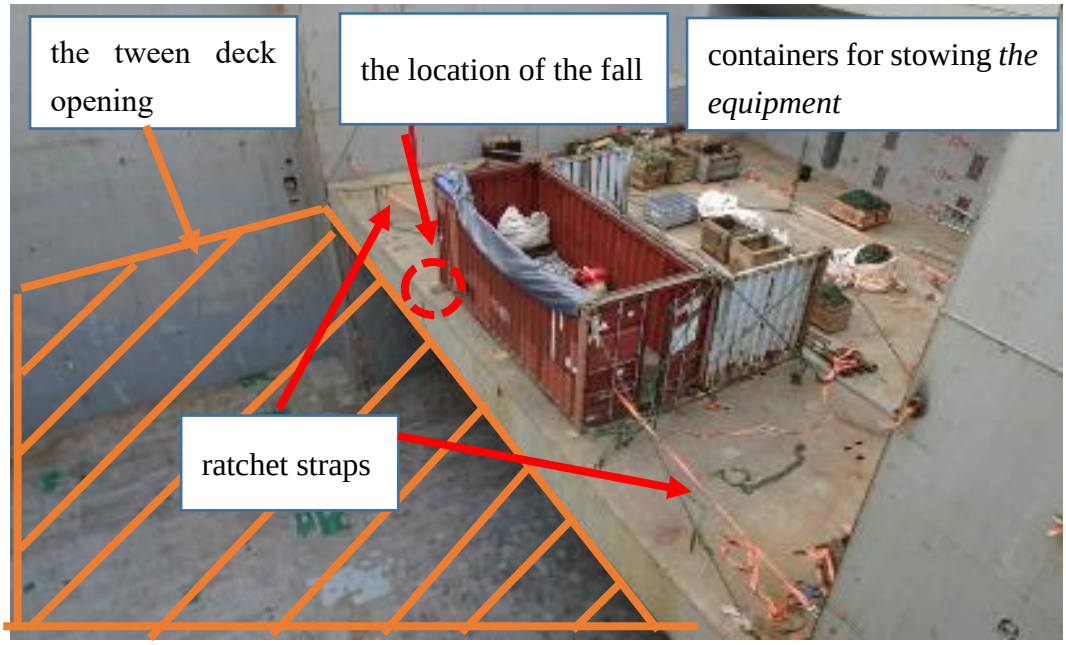

Figure 2 The No.1 cargo hold layout

3.5 At 0915 hours, *the representative* fell from the tween deck to the bottom of *the hold. The 3/O* reported the accident to *the C/O* and proceeded to the tank top of *the hold* immediately to check the injury status of *the representative.*

3.6 At 0916 hours, *the C/O* informed the Master of the accident, and *the 3/O* immediately performed *CPR* on *the representative* who was unconscious and not breathing.

3.7 At 0917 hours, the local agent was informed of the accident and an ambulance was arranged.

3.8 At 0920 hours, the Onsan Port terminal was informed of the accident by *the C/O* for medical assistance. At 0930 hours, *the representative* was lifted from *the hold* to the berth by the ship crane for further first aid treatment.

3.9 At 0935 hours, the ambulance arrived and an emergency medical treatment was furtherly provided to *the representative*. At 1010 hours, he was transferred to the hospital by ambulance and was declared dead later.

4. Analysis

Certification and experience of the crew

4.1 The statutory trading certificates of *the vessel* were valid and in order. *The vessel* was manned by 18 crew members, including the Master. The manning scale of *the vessel* complied with the Minimum Safe Manning Certificate issued by the Hong Kong Marine Department (*HKMD*) on 22 February 2017.

4.2 The Master had worked in the management company for 20 years and joined *the vessel* on 15 March 2021. He had about 13 years of experience as a master. He possessed a Class 1 Certificate of Competency issued by the Government of Ukraine valid until 20 June 2024 and held a Class 1 Licence (Deck Officer) issued by the *HKMD* on 11 March 2021.

4.3 *The C/O* had worked in the management company for 10 years and joined *the vessel* on 27 February 2021. He had about 5 years of experience as a chief officer. He possessed a Class 1 Certificate of Competency issued by the Government of Ukraine valid until 05 October 2022 and held a Class 1 Licence (Deck Officer) issued by the *HKMD* on 02 March 2021.

4.4 *The 3/O* had worked in the management company for 7 years and joined *the vessel* on 19 December 2020. He had about 3 years of experience as a third officer. He possessed a Class 3 Certificate of Competency issued by the Government of Philippines valid until 23 February 2023 and held a Class 3 Licence (Deck Officer) issued by the *HKMD* on 17 December 2020.

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 Master and crew were affected by either fatigue at work, or abuse of alcohol or drugs.

Weather and sea condition

4.7 The weather was overcast with southerly wind of Beaufort Wind Scale force 2 with light breeze. The sea was slight and the visibility was about 6 nautical miles. The weather and sea conditions should not be contributory factors to the accident.

Safe entry of the cargo hold and permit to work

4.8 Chapter 11.2.2 of *the Code* stated that an adequate lighting level should be provided in areas for transit, loading or unloading of cargo or other work processes. However, *the 3/O* and *the representative* accessed *the hold* with only a torchlight and phone's light respectively for illumination while the hatch covers of *the hold* were closed, resulting in complete darkness inside. The inadequate illumination might increase the risk of tripping, slipping, or falling of personnel in *the hold*.

4.9 Chapter 11.2.4 of *the Code* stated that any opening, open hatchway, or dangerous edge into, through, or over which a person may fall should be fitted with secure guards or fencing of adequate design and construction. At the time of the accident, the tween deck of *the hold* located at the height of about 7.85 metres from the bottom was partially opened. The clearance between the outer container stowing *the equipment* and the edge of the tween deck pontoon was about 0.4 meter. The secure guard was simply provided by 2 ratchet straps of about 1 meter away from the edge of the tween deck connecting between the end sides of the outer container to the port and starboard side bulkheads (Figure 3 & 4). Such arrangement was considered a contributory factor to the accident.

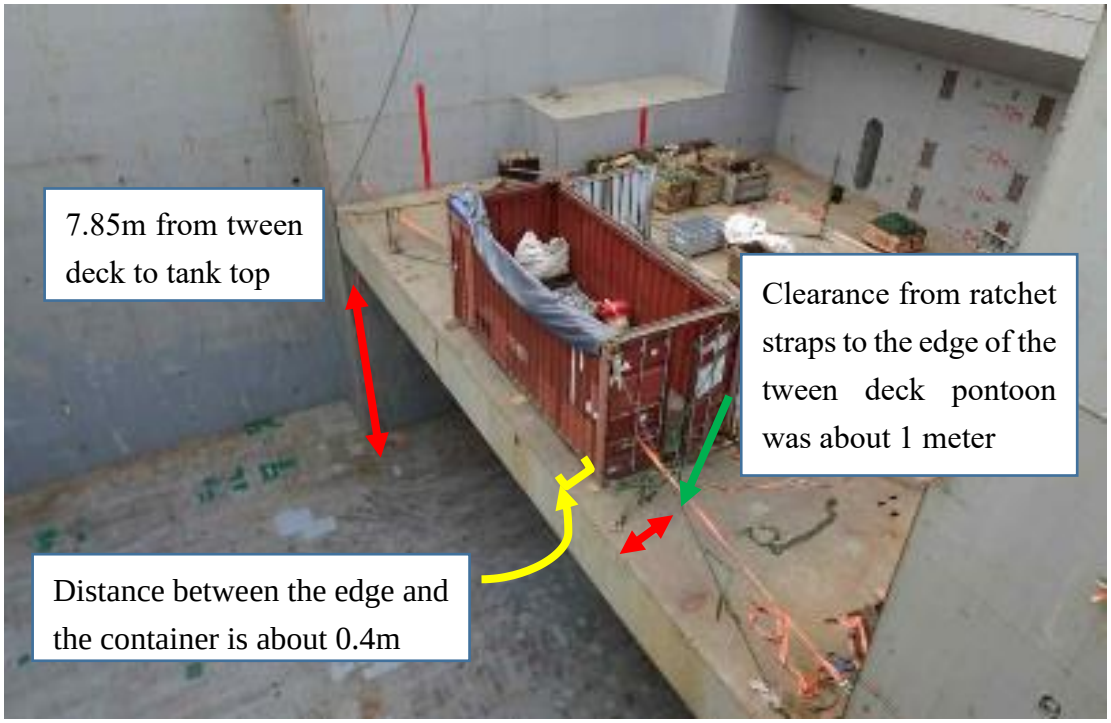

Figure 3 The distances measurements

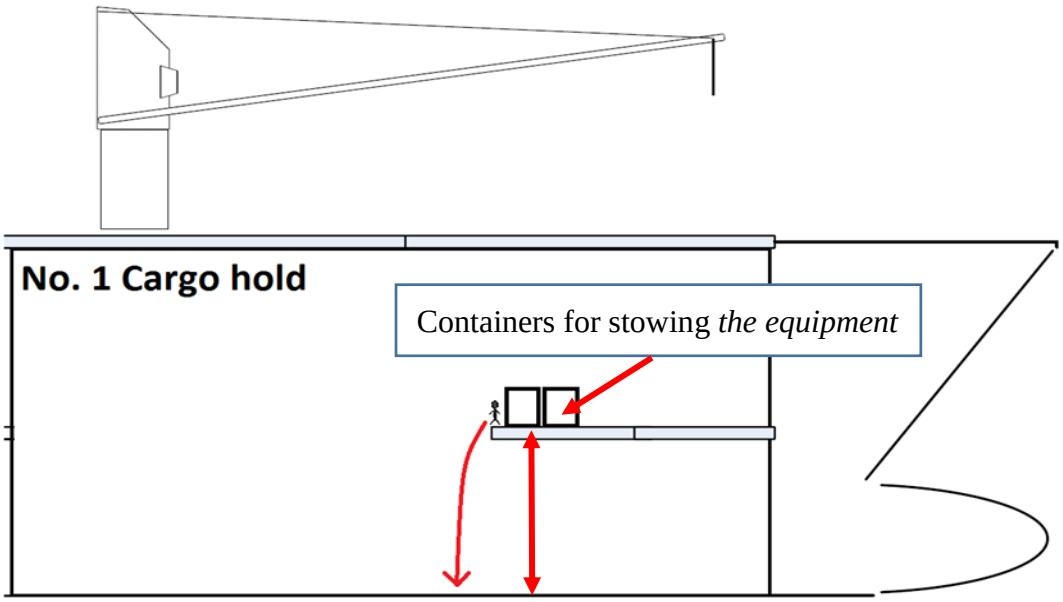

Figure 4 Sketch of the profile view of *the hold* and the fall

4.10 Chapter 16.7.1 of *the Code* states that entry to cargo spaces should only be undertaken on the authority of a responsible ship's officer and

with all appropriate pre-entry precautions, including a risk assessment and the completion of a permit to work before entering the cargo spaces that have not been opened for some time. Although *the 3/O* accompanied *the representative* to enter *the hold*, a risk assessment and permit to work were not carried out before the entry.

4.11 If the risk assessment and permit to work for entering *the hold* were well completed, and that necessary precautions were taken on board properly before the entry, such as providing adequate illumination, fitting proper secure guards, or adequate fencing, the accident might be prevented.

Training of enclosed spaces entry

4.12 Chapter 12, Enclosed Spaces Entry, of the Shipboard Management System (*SMS)* requires the determination of whether any spaces which are dangerous by applying a risk assessment in accordance with *the Code*.

4.13 Chapter 15, Entering dangerous (Enclosed) Space, of *the Code* defines that an enclosed space has limited openings for entry and exit, or has inadequate ventilation, or is not designed for continuous worker occupation, and states that personnel needs to exercise caution before entering any dangerous space onboard a ship that has not been opened for some time, which includes the cargo spaces.

4.14 *The hold* has limited access points and its hatch covers were closed from the last port, which was considered an enclosed space as the requirement of *the Code.*

4.15 The shipboard annual drill and training plan of 2020 and 2021 (*the training and drill plan*) scheduled to carry out the "person rescue from enclosed space drill" was conducted every two months. According to *the training and drill plan* record, all crew members attended only one or two drills since joining the ship, including the *C/O* and *3/O*. If the crew members could be trained well on entry of enclosed spaces and familiarize with the relevant requirements of *the Code,* it might prevent the accident from happening.

Actions taken by the company after the accident

4.16 After the accident, the company inserted the additional requirements in the "Cargo Handling Procedure" in Sections 2 and 13 of Chapter 3 of the *SMS*. The revised requirements on the "Cargo Handling Procedure" specify that before entering the cargo holds, the content of oxygen and toxic gas is to be checked, adequate illumination inside *the hold* and proper communication are to be provided, railing for the tween deck free edge is to be fixed, visitors are not allowed to enter *the hold* when hatch cover is closed, etc.

4.17 The above requirements enhance the safety of shore visitors and crew members when entering the cargo hold by imposing additional safety precautiously measures with regard to the control measures and preventive actions for the potential hazards inside cargo hold.

5. Conclusions

5.1 On 16 April 2021, a fatal accident happened on board *the vessel* at Onsan, Korea. *The representative* boarded *the vessel* to check *the equipment* located at the tween deck in *the hold* prior to unloading it ashore. At 0915 hours, *the representative* suddenly fell from the edge of the tween deck opening at the height of about 7.85 metres to the bottom of *the hold*. Despite the *CPR* being applied to *the representative* who was later sent to a local hospital for emergency medical treatment, he was later declared dead on the same day.

5.2 The investigation identified the contributory factors leading to this accident as follows:

(a) the crew failed to carry out a risk assessment and the completion of a permit to work before entering *the hold*;

(b) the crew failed to fit the tween deck opening with secured guards or fencing of adequate design and construction to prevent the fall from the tween deck;

(c) the crew failed to provide adequate illumination inside *the hold*.

5.3 The investigation also revealed that the emergency training and drill provided to the crew members on the enclosed space entry and rescue held every two months were ineffective.

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 and instruct them to:

(a) ensure the necessary precautions, including a risk assessment and the completion of a permit to work, to be followed before entering enclosed spaces or any spaces suspected as dangerous;

(b) ensure the secure guards or fencing of adequate design and construction to be fixed on the tween deck opening for preventing the fall;

(c) ensure adequate illumination to be provided inside the cargo holds before entering; and

(d) enhance the training and drill on enclosed space entry.

6.2 The management company should conduct an internal audit on *the vessel* to ensure that the crew members follow the safety requirements strictly when entering the enclosed spaces.

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 ship management company and the Master of *the vessel* for their comments.

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