

FINAL REPORT

FATALITY OF STEVEDORE ON BOARD CAROLINE MAERSK IN PORT OF BUENAVENTURA, COLOMBIA ON 16 JULY 2019

MIB/MAI/CAS.069

**Transport Safety Investigation Bureau
Ministry of Transport
Singapore**

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The Transport Safety Investigation Bureau

The Transport Safety Investigation Bureau (TSIB) is the air and marine accidents and incidents investigation authority in Singapore. Its mission is to promote aviation and marine safety through the conduct of independent investigations into air and marine accidents and incidents.

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SYNOPSIS

On 16 July 2019, when the Caroline Maersk was conducting cargo operations at the Terminal de Contenedores de Buenaventura, Colombia, a stevedore fell into a cargo hold and succumbed to injuries.

The TSIB classified the occurrence as a very serious marine casualty and launched an investigation.

The investigation revealed that prior to the stevedore's fall, a container which was being discharged using the gantry crane fell into the cargo hold. The stevedore had likely leaned on a safety railing on the cross deck to check the condition of the container when the safety railing gave way.

The investigation found that the corroded condition of the safety railing had been identified by the Company at the time of takeover of the vessel's safety management. The repairs were planned to be carried out progressively in about four months' time, when the vessel was due for dry-docking. There were no risk mitigating measures put in place in the interim, such as temporary railings, cordoned or notices to warn users in the vicinity.

This incident reiterates the importance of prioritising repairs for ensuring personnel safety.

VIEW OF VESSEL



MV Caroline Maersk

DETAILS OF VESSEL

Name	CAROLINE MAERSK
IMO Number	9214903
International Call Sign	9V6220
Flag	Singapore
Classification Society & ISM RO	American Bureau of Shipping (Ship)/ DNV-GL (ISM)
Ship type	Container
Year Built	2000
Owner	SEA 42 LEASING CO. LIMITED (Hong Kong)
ISM Company¹	ZEABORN SHIP MANAGEMENT GMBH & CIE. KG (HAMBURG) ²
Gross tonnage	92198
Length Overall (LOA) / Breadth	346.98 m / 42.80 m
Terminal Information	
Name	Terminal de Contenedores de Buenaventura (TCBUEN) S.A.
Operator	APM Terminals (part of A.P. Moller-Maersk Group)
Location	West coast of Colombia

¹ In accordance with ISM Code – SOLAS Chapter IX, IMO Res.A.741(18) as amended thereof

² Zeaborn Ship Management Pte Ltd took over the safety management of Caroline Maersk from Maersk Line A/S and was issued the interim SMC on **21 June 2019** and changed flag from Denmark to Singapore on the same date.

1 FACTUAL INFORMATION

All times used in this report is Colombia Time (UTC -5.0H)

1.1 Sequence of events

1.1.1 On 16 July 2019 at about 1600H, MV Caroline Maersk (CRM) arriving from the Port of Balboa, Panama, came alongside the container terminal TCBUEN.

1.1.2 Between 1610H and 1915H, several shore personnel boarded the vessel for various purposes, i.e. immigration, quarantine matters, security checks, as well as operational matters, i.e. agents, cargo planners and stevedores³. Two stevedores embarked at about 1913H as cargo watchmen for the terminal crane operators and for assisting the terminal's cargo planner. One of them was at Bay 10 (cargo hold no. 3) to assist the crane operator for discharging the cargo. Four gantry cranes were in use for carrying out discharging and loading operations, at the respective bays (see **Figure 1**).

1.1.3 At about 2155H, an able seafarer deck (ASD), performing deck watchkeeping duties (2000H-2400H) and the Third Officer (3O) being the duty officer, came out from bay 62 (cargo hold no.16 - aft of the accommodation) after inspecting the cargo stowage and closed the manholes. Thereafter, the ASD went to bay 46 (cargo hold no.12) together with the reefer technician to attend to the reefer containers, while the 3O went to the gangway (at the accommodation) after being informed (at about 2203H) through the walkie-talkie, that the cargo planner came onboard and was looking for the duty officer.

1.1.4 At the gangway, the cargo planner informed the 3O that one of the containers being discharged had fallen from the gantry crane's spreader back into the no. 3 cargo hold at bay 10 (see **Figure 2**).

³ The stevedores were contracted by the terminal (APM-TCBUEN S.A.) operators.

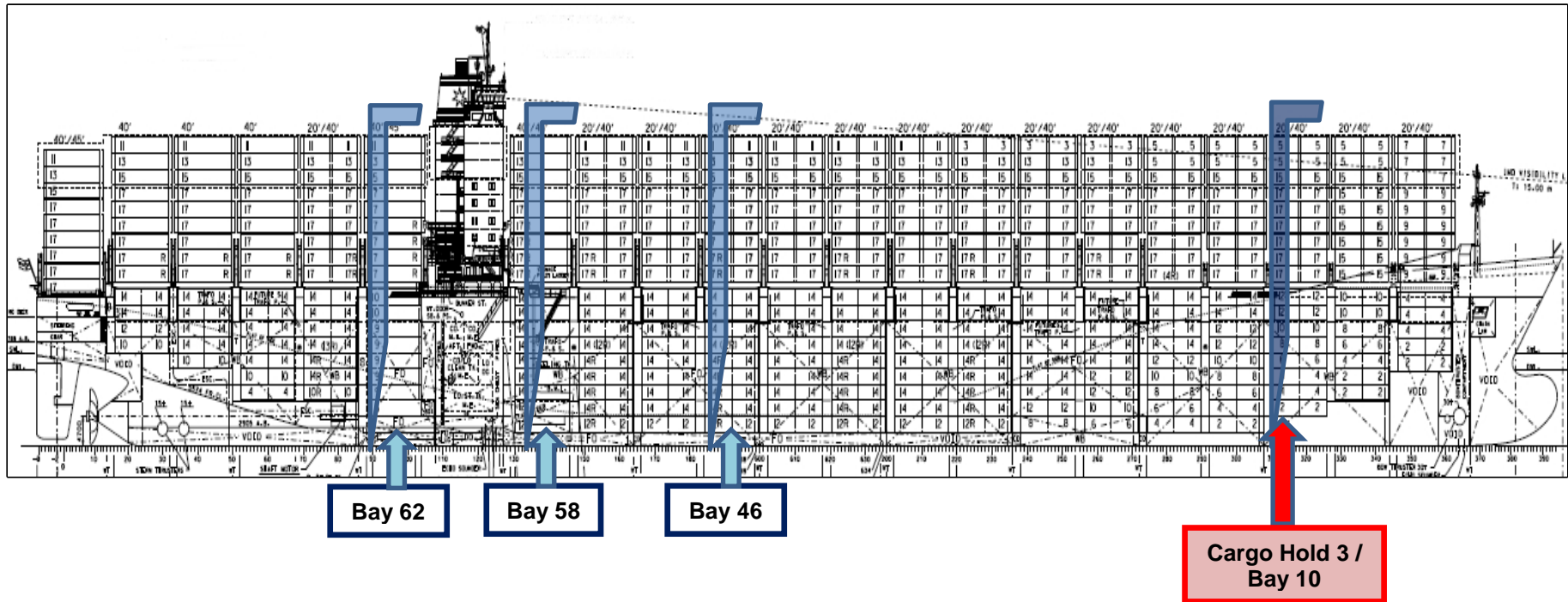


Figure 1: Starboard profile of CRM from the G.A. Plan. The positions of the gantry cranes (in blue) and the locations of the bay/ cargo holds where the incident occurred indicated in red (annotated by TSIB)

- 1.1.5 The 3O took a camera from the gangway area and walked towards the bay together with the cargo planner to inspect. At about 2207H on arriving the location, the 3O noted⁴ that at the bottom of the cargo hold was a motionless body of a stevedore (indicated by a yellow arrow). A broken section of a railing was observed on top of another container, lying next to a clipboard with some papers.



Figure 2: Photograph taken on site indicating the fallen container and the approximate location where the stevedore was found

- 1.1.6 The 3O went back to the accommodation and informed the Master and the Chief Officer (CO) of the occurrence. The cargo planner too informed the terminal manager. While waiting for the terminal's rescue team to arrive, the ship's crew started to open the manholes⁵ for no. 3 cargo hold.
- 1.1.7 The rescue team arrived at about 2225H and the stevedore was evacuated from the cargo hold on a stretcher using a rescue cage being lifted by the gantry crane. Cargo operations had been suspended at about 2240H, i.e. five minutes after evacuation, pending local authorities to board for investigation. The stevedore was pronounced dead at the local hospital⁶.

⁴ Prior to this, there was no indication of any accident taking place on board CRM.

⁵ The Master sought confirmation from the ASD that the manholes for Bay 9 and 10 were closed prior to the occurrence, i.e. entry into the cargo hold was not possible.

⁶ The autopsy report and post mortem report was not made available to the investigation team

- 1.1.8 Together with the local authorities, the Master and CO went to the cargo hold. The railing that was noted to be on top of the container, was established to be from the cross-deck walkway, vertically in-line with the dropped container (See **figure 3**). The clipboard was confirmed belonging to the deceased. There were no witness accounts to the stevedore's fall. The height from the main deck to the location where the clipboard and railing was found was estimated to be 4 metres and to where the stevedore was found was estimated to be 20 metres.
- 1.1.9 According to the gantry crane operator when the container had fallen, the deceased was seen leaning on a railing presumably to check on the condition of the container. The crane operator then shifted the crane away from the bay. From the shifted position, the crane operator could not visually sight the location where the stevedore was last seen.
- 1.1.10 The damaged container was removed from the cargo hold and the vessel's cargo operations continued till the early hours of 17 July 2019. CRM departed the terminal on 18 July 2019 at about 0700H bound again for the Port of Balboa, Panama.

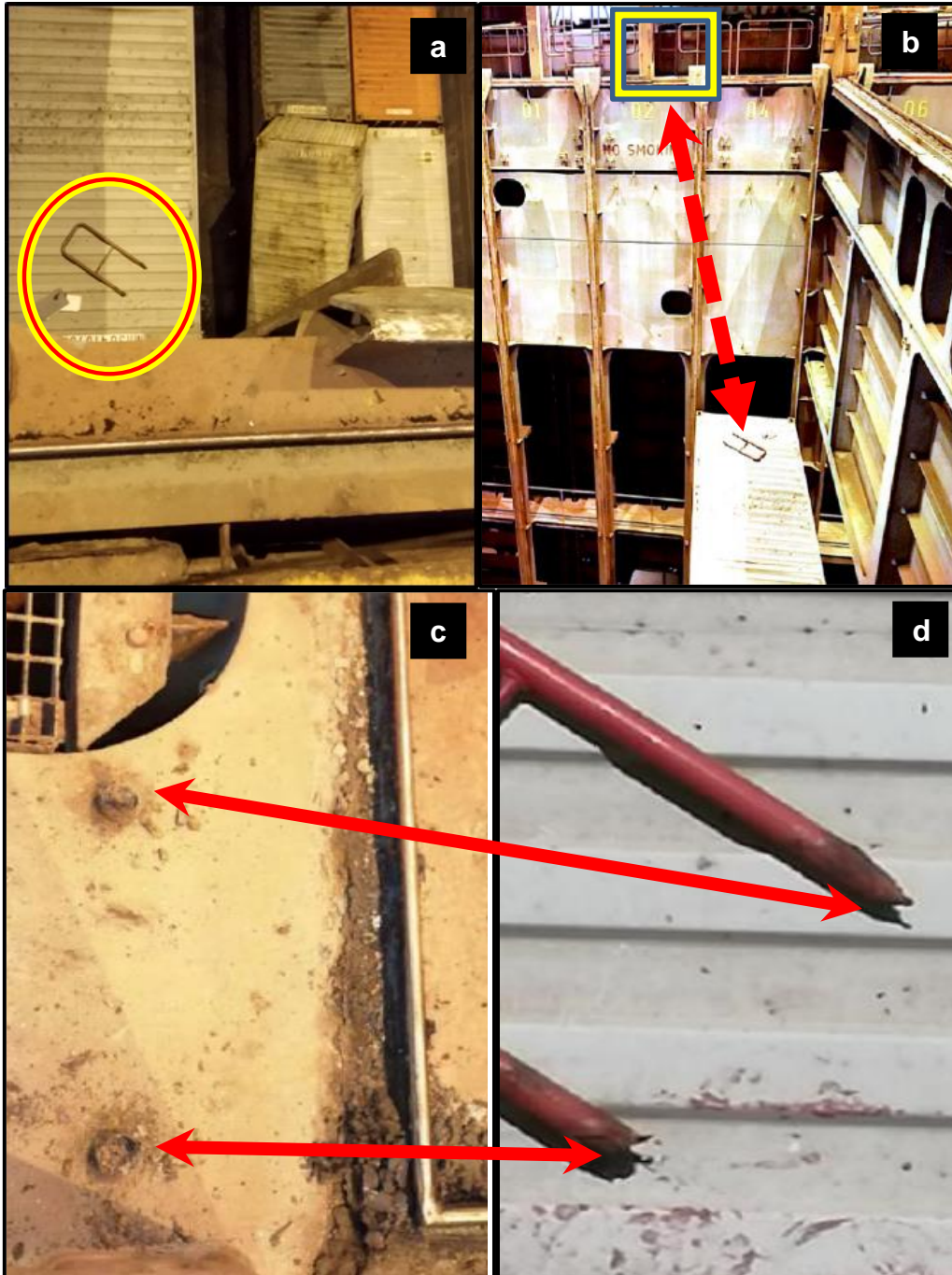


Figure 3: (a) The location of the discovered clipboard and broken railing, with the fallen container in no. 3 cargo hold.
(b) The original position of the broken railing along the cross deck.
(c) and (d) the remaining parts of the broken railing on the cross deck

1.2 Crew Experience and Watchkeeping Schedule

- 1.2.1 CRM was manned by a crew of 24 officers and ratings. The Master and CO were resting in their respective cabins when the incident took place. At the time of the incident, three persons were on deck, a gangway watchman⁷, a cargo watchkeeper⁸ and the 3O.
- 1.2.2 The cargo planner was employed by the terminal operator and the deceased, a Colombian national, was a contract employee belonging to a company providing stevedoring work for the terminal. There was no information on the deceased's work experience, rest hours or post-mortem or toxicology reports available to the investigation team.

Designation	Master	3 rd Officer	ASD
Qualification	Master STCW II/2 Issued 2015	Deck Officer STCW II/1 Issued 2016	Deck Rating STCW II/4 Issued 2016
Certification Authority	IMMARBE, Ukraine	IMMARBE, Ukraine	MARINA, Philippines
Nationality	Ukraine	Ukraine	Filipino
Age	46	25	34
Experience in Rank	3 years 10 months	3 years 5 months	2 years
Period with Company	10 years	5 years 8 months	9 years 7 months
Period on board	36 days	27 days	27 days
Harbour Duty Schedule	N/A	0600 – 1200 1800 - 0000	0800 – 1200 2000 - 0000

⁷ Ordinary Seaman was performing assigned security duties.

⁸ Was with the shore reefer technician.

1.3 SMS Maintenance⁹ and inspection requirements

- 1.3.1 The Company took over the management of CRM on 21 June 2019, about three weeks prior to the occurrence. According to records, the former Company of CRM had engaged a marine consultancy company¹⁰ for a condition inspection on CRM on 25 November 2018.
- 1.3.2 The report predominantly stated the condition of deck fittings, deck machinery lifting gears, accommodation, ventilation, machinery spaces and cargo spaces including catwalks. There was scattered corrosion on the catwalk and lashing bridges with visible rust patches and deformation of some railings. The report recommended for repairs and renewal of the railings to be carried out. These records were documented in the planned maintenance system (PMS) of the vessel managed by the former Company and provided to the current Company.
- 1.3.3 A superintendent's inspection report before taking over the safety management, stated that the repairs were to be carried out by October 2019. Relevant details were transferred to the vessel's PMS.
- 1.3.4 According to the SMS the CO is responsible for the proper maintenance of the deck and related areas and to record these activities in the PMS. The Company's superintendents are responsible to monitor these activities as per the due dates and provide adequate technical support.
- 1.3.5 According to the SMS (Cargo Operation), before loading or unloading, the CO is to ensure cargo worthiness of the vessel. Among the items listed to be checked are the safety railings at cargo holds and lashing bridges. There was no recorded evidence of such an inspection being carried out.
- 1.3.6 Being a cargo ship involved in the carriage of container cargo on deck, the provisions of the Cargo Stowage and Securing (CSS) Code¹¹ applied to CRM. Section-7 of Annex 14 of the CSS code provides for periodic maintenance of walkways, ladders, stairways and fencing to prevent corrosion and subsequent collapse. The CSS code states that such corrosion should be addressed at the earliest practicable opportunity or immediately if such a corrosion prevents safe operations.

⁹ As per ISM Code Chapter 10 – The Company should establish procedures to ensure the ship is maintained in conformity with the provisions of the relevant rules and regulations and with any additional requirements which may be established by the Company.

¹⁰ Seatac UK Ltd.

¹¹ IMO MSC.1/Circ.1352/Rev.1 (2014) – Amendments to the Code of Safe Practice for Cargo Stowage and Securing (CSS Code) – Updated.

1.4 Occasional Survey

1.4.1 On 19 July 2019, three days after the incident, the classification society conducted an occasional survey on board CRM for the main deck, outfitting and handrails.

1.4.2 The surveyor's report listed several similar conditions of the railings at other cargo holds onboard CRM indicating localised corrosion (see **Figure 4**). The report concluded with the recommendation¹² for the broken railing to be repaired by 13 October 2019.



Figure 4: Some of the corroded and holed railings found along the catwalks and cross decks

¹² The Class surveyor noted that, as there is no mandatory requirement for the railings, the repairs were to be conducted to the Owner's/ Company's satisfaction

2 ANALYSIS

2.1 The cause of the fall

2.1.1 The investigation team attempted to establish how and when the deceased entered the cargo hold. The manholes for the cargo hold were confirmed to be closed by the ship's crew. Hence, it is unlikely that the stevedore had entered the cargo hold. The only person to have seen the deceased prior to the incident was the crane operator. Correlating the location where the body of the deceased was discovered, the location of the broken railing on top of the container and the clipboard, it was reasonably established that the stevedore had fallen from the location of the broken railing. It is likely that when the container fell¹³ from the gantry crane spreader in the cargo hold, the stevedore might have leaned over the railing to assess the condition in the cargo hold.

2.1.2 Noting the poor condition of the railing and that there were no warning signs (relating to the condition) or temporary safeguards put in place to warn personnel in the vicinity, it was plausible that the stevedore was unaware of the structural condition of the railing. The stevedore's action to lean over the railing would have likely caused the railing to give way, resulting in the fall into the cargo hold.

2.2 Maintenance and Safety Measures

2.2.1 The poor condition of the railing was first recorded in November 2018 by the previous Company. As there were no repairs being carried out on the railing, the condition had likely further deteriorated over time. While the existing Company was aware of the poor condition of this railing prior to taking over, it had planned for repairs to be carried out within four months of taking over the vessel's safety management.

2.2.2 There is no standard guideline on how the severity of the corrosion should be prioritised for repair works, but the CSS code recognises that such repairs should be done immediately if such a corrosion prevents safe operations (see paragraph 1.3.6). Considering that corrosion assessment can be subjective, it would be desirable for criteria to be specified within the SMS with pictorial conditions warranting the timeliness of the repairs, so that responsible personnel ashore and the ship's crew are better equipped to assess and plan for the repairs.

¹³ The cause of the fall of the container from the gantry spreader could not be established.

2.2.3 The railings were located next to a cargo hold of above 20m deep and would be accessed by ship's crew and shore personnel. The railings served as a safety barrier preventing personnel from falling into the cargo hold. Hence, it is of utmost importance that the railing be properly maintained to ensure their structural integrity. The poor condition of the railing posed a significant risk to the safety of the personnel working in its vicinity. Even if repairs were not done immediately, recognising that the fundamental intent of the safety railing was to prevent falling from height (into the cargo holds), proper safeguards such as warning signs, cordoning off the area or fitting of temporary railing should have been put in place to ensure the safety of personnel working in the vicinity.

3 CONCLUSIONS

From the information gathered, the following findings, should not be read as apportioning blame or determining liability to any particular organisation or individual.

- 3.1 The fatal occurrence was highly likely due to the stevedore leaning on a corroded safety railing which gave way, while looking into the cargo hold to assess the condition of a fallen container.
- 3.2 The poor condition of the safety railing, had been identified in the Company's PMS upon taking over from the previous management, and planned for repairs when the vessel was due for dry-docking about four months later.
- 3.3 In the interim, there were no other safety barriers such as temporary railing, warning signs or cordon put in place to caution personnel of the poor condition of the safety railing and prevent personnel from falling into the cargo hold.
- 3.4 Despite the guidance that repairs of corroded parts should be done immediately if such a corrosion prevents safe operations, corrosion assessment can be subjective as there is no standard guidance on how to assess the severity of the corrosions and to prioritise the corrosion parts for immediate repairs.

4 SAFETY ACTIONS

During the course of the investigation and through discussions with the investigation team, the following preventive / corrective action(s) were taken by parties involved.

4.1 Taken by the Company of CRM

- 4.1.1 Revised the scope and priorities of repair plans in accordance with condition reported for considerations of deploying riding repair teams. Repair works reflected in the occasional survey report were completed on 19 November 2019.
- 4.1.2 Safety campaign fleet-wide on work areas involving stevedores and in accordance with the requirements stated in the CSS code, in verifying safety arrangements and scheduling necessary repair works by the technical managers. Temporary safeguards by installing rail wires or isolation from access to identified unsafe areas.
- 4.1.3 Reviewing of PMS for inspections on the condition and effectiveness of the infrastructure of cargo areas for safe access. Including a timely and risk-based maintenance schedule.
- 4.1.4 Inclusion of a checklist in the SMS (Fleet-Instruction-Cargo operations - Safety Conditions for Cargo Operations) for the responsible deck officer when carrying out the safety checks prior to cargo operations, where conduct of such is to be recorded in the "Port Log Book" on board.
- 4.1.5 All the corroded safety railings at the cargo bays onboard CRM replaced.



Figure 6: New installation of railing at cargo hold no.3
(Source: ZEABORN SHIP MANAGEMENT GMBH & CIE. KG)

5 SAFETY RECOMMENDATION

A safety recommendation is for the purpose of preventive action and shall in no case create a presumption of blame or liability.

5.1 For the Company of CRM

- 5.1.1 To provide corrosion related guidance within the PMS to minimise the subjective interpretation of severity of corrosion for repairs to be prioritised.
[TSIB-RM-2020-014]

- End of Report -