



SAFETY INVESTIGATION REPORT

201711/040

REPORT NO.: 23/2018

November 2018

The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

NOTE

This report is not written with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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MV EUGENIA B **Fatal fall of a stevedore inside cargo hold no. 2** **in the port of Iskenderun** **30 November 2017**

SUMMARY

The cargo discharge operation was uneventful until the day of the accident. Following the lunch break on 30 November 2017, the stevedores boarded the vessel at 1300 and discharging operations resumed. The shift had to terminate at 1600.

During the cargo operations, at about 1545, the duty officer heard a sudden loud sound, followed by a yell. On the tanktop inside cargo hold no. 2, he observed one stevedore lying motionless.

A few hours after being admitted in hospital, the

stevedore company was informed that the injured stevedore had succumbed to his injuries.

The MSIU determined that the immediate cause of the accident was the failure of the corroded cargo hold access cover while the stevedore was descending the cargo hold.

The MSIU has issued recommendations to the flag State Administration and the Company designed to ensure that the company addresses the maintenance of critical fittings inside the cargo holds of vessels under its fleet.



FACTUAL INFORMATION

Vessel

Eugenia B, a 26,778 gt, geared bulk carrier was built in 1997 in Japan and was registered in Malta¹. She was owned by Eugenia B. Navigation Ltd., managed by AB Maritime Inc., Athens and was classed by Bureau Veritas (BV)². *Eugenia B* had a length overall of 187.30 m, a moulded breadth of 32.20 m and a moulded depth of 16.10 m. The vessel had a summer draught of 11.36 m, corresponding to a summer deadweight of 46,750 mt.

Propulsive power was provided by a 6-cylinder Sulzer 6RTA 48T, slow speed, direct drive, two-stroke diesel engine, producing 7,207 kW at 110 rpm. This drove a single, fixed pitch propeller to reach a service speed of 14.5 knots.

The vessel was fitted with five cargo holds and McGregor folding type hatch covers and four cargo deck cranes (30 mt SWL). The cargo hatch openings measured 20.8 m by 18.3 m and the total cargo holds' capacity was 59,764.2 m³ (grain).

Access to the cargo hold

The accident happened in cargo hold no. 2, which is fitted between frames 143 and 179. Access to the cargo hold is down a combination of vertical and spiral ladders fitted against the forward corrugated, transverse bulkhead³. The total height from the main deck down to the tanktop was 16.0 m. The ladder (Figure 1) was constructed in sections:

- A vertical ladder of two meters in length (access from the main deck booby-hatch), leading to the upper landing;
- A step to the side on the upper landing, leading to the second vertical ladder, through a hatchway (65 cm by 65 cm), of three meters in length and leading down to the middle landing; and
- A spiral ladder, six metres in length followed by a lower vertical ladder, which was four meters long and which led down to the cargo hold's tanktop.

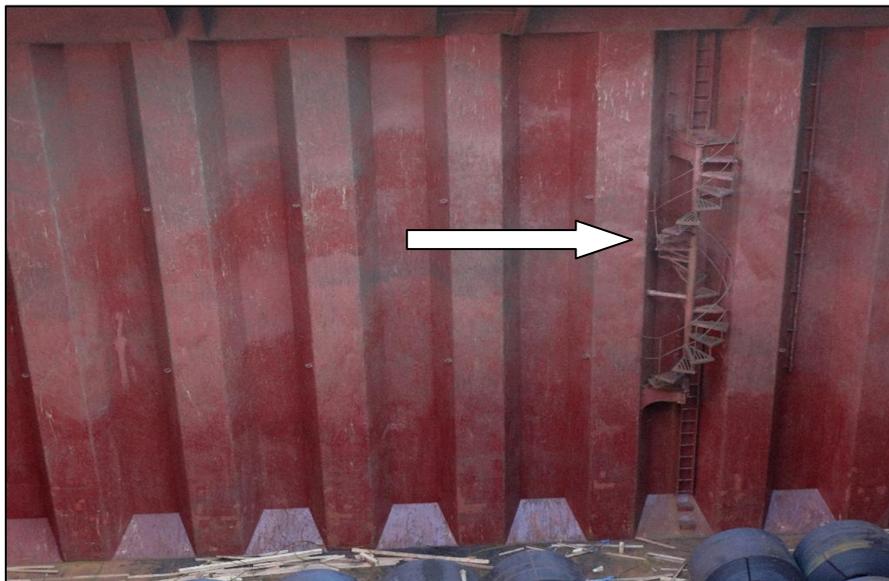


Figure 1: Access to cargo hold no. 2

¹ The vessel was deleted from the Malta Registry on 13 March 2018.

² Class had been withdrawn by BV since 16 April 2018.

³ A detailed drawing of the ladder arrangement was not available on board.

Crew members and the injured stevedore

The vessel was complying with the Minimum Safe Manning Certificate issued by the flag State Administration. The crew comprised of 22 crew members, *i.e.*, four deck officers, three engine-room officers, and 15 ratings.

All crew members were Filipino nationals, bar for the chief mate, second officer, the fourth engineer and four ratings, who were all from India. The official communication language on board was English.

The deceased stevedore was 33 years old at the time of the accident. As reported by his employers, he had 10 years of experience with various stevedore companies.

Environment

The accident happened during daylight and there was adequate natural light at the upper platform level of the ladder. The cargo operations had been in progress for five days prior to the accident and the space was therefore well ventilated.

The wind was Northerly force 3, and the sea state was calm inside the port area. Visibility was good with overcast weather and some rain. Evidence from the ship indicated that there were no sudden movements of the vessel, which could have contributed to a loss of balance, footing or holding.

Narrative⁴

Eugenia B arrived at Iskenderun Roads, Turkey on 25 November 2017 early in the morning to discharge 654 steel coils from cargo holds nos. 2 and 4.

At about 0910 on the same day, the vessel berthed port side alongside at Isdemir Terminal. After completing the usual formalities, the vessel commenced

discharging the cargo at around 1700 by means of the ship's deck cargo cranes from both cargo holds.

The cargo discharge operation was uneventful until the day of the accident. Following the lunch break on 30 November, the stevedores boarded the vessel at 1300 and discharge operations resumed. The shift had to terminate at 1600.

It was during the cargo operations, at about 1545, when the duty officer heard a sudden loud sound, followed by a yell. He immediately hurried towards cargo hold no. 2 to enquire on the happenings. At the time of accident, the vessel had a one metre trim by the stern and was upright.

As soon as he arrived on the scene, he observed one of the stevedores lying motionless at the bottom of the cargo hold. It was immediately evident that the stevedore was seriously injured. Both the master and the chief mate were alerted. The vessel's stretcher was carried at the scene although the stevedores insisted that first aid should not be administered unless the shore medical services are on board.

Meanwhile, it was observed that the injured stevedore had not regained consciousness and his breathing was also shallow. At about 1550, the shore medical service arrived at the scene. Subsequently, the injured stevedore was shifted and secured into a cage and lifted up and out of the cargo hold.

At about 1605, the stevedore was transferred to the ambulance and driven to the nearest hospital. A few hours later, the stevedore company was informed that the injured stevedore had succumbed to his injuries.

⁴ Unless otherwise stated, all times in this safety investigation report are local.

ANALYSIS

Aim

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, and to prevent further marine casualties or incidents from occurring in the future.

Immediate cause of the accident

An inspection of the cargo hold access cover indicated it was also designed to help a person climb the vertical ladder. A stopper pin was fitted to keep the cargo hold access cover secured and in a vertical and open position. The MSIU found that the cargo hold access cover's stopper pin had been totally dislodged and the hinges had failed (Figure 2), in all probability while the stevedore was climbing out of cargo hold no. 2⁵.



Figure 2: Broken stopper (green arrow) and broken hinges (blue arrow)

Condition of the cargo hold access cover

The cargo hold access cover had signs of general corrosion. Material wastage was evident, suggesting that it had not been maintained over the months prior to the accident (Figure 3).



Figure 3: Cargo hold access cover as found at the bottom of the cargo hold.

Medical fitness of the stevedore

The safety investigation did not have access to medical records belonging to the stevedore. However, on the basis of the evidence collected from the vessel, the safety investigation did not have indications that the stevedore was not fit for duty. Medical fitness is therefore not considered to be a contributing factor to the accident.

Language barrier

The evidence gathered during the onboard visit after the accident did not suggest that language may have been an issue among the stevedores and crew members. Language barrier was therefore not considered to be a contributing factor to the accident.

Impaired behaviour

The MSIU was not privy of the autopsy and toxicological tests results. However, the available evidence did not indicate behaviour traits which were suggestive of the stevedore being under the influence of alcohol, medicines or drugs. Alcohol, drugs and medicines were not considered to be factors which influenced in any way the dynamics of the accident.

⁵ The access hatch cover and the pin were found on the tank top, close to where the injured stevedore was found.

Personal protective equipment

According to the stevedores' reports, the deceased person was wearing the appropriate Personal Protective Equipment (PPE) for the kind of his tasks and responsibilities assigned to him. The safety investigation was informed that throughout the performance of his duties, he had been wearing an overall, safety boots, a safety helmet and his high-visibility vest.

Although the failure of the cargo hold access cover had, of course, not been foreseen, going down the ladder into the cargo hold carries the risk of a fall from a height. The evidence available to the MSIU indicated that the stevedore was neither wearing a fall preventer nor a fall arrester. The safety investigation is aware that fall preventers / arrestors are seldom used, if ever, by crew members and / or stevedores to either access or leave the cargo holds. Moreover, this practice is not regulated through international requirements, although ladder fall arrest systems do exist ashore.

It was very probable that the repetitive and numerous (successful) ascends and descends into cargo holds on numerous ships by stevedores and crew members alike may suggest that the use of a fall preventer / arrester is actually not required; not to mention that they are time consuming to use.

Accepting risk

The MSIU has investigated a significant number of fatal accidents involving falls from a height. In one of its more recent safety investigation reports⁶, the safety investigation addressed risk perception and how this may be influenced by psychometric paradigm.

It may be stated that going down the cargo hold ladder without a fall preventer / arrester may be seen as a risk which had been

⁶ Vide [MSIU Safety Investigation Report No. 08/2018](#).

accepted by the stevedore. As much as this constitutes a missing protective barrier system, it may also be submitted that other alternatives may have been rejected because they were considered less attractive, perhaps even less practicable; equivalent to an efficiency-to-thoroughness trade off.

Going down a ladder, with a fall preventer / arrester which has to be released every couple of metres or less (*i.e.* holding to the ladder with one hand), may have been considered as one impracticable alternative which the stevedore was not willing to accept⁷.

Then again, considering that the stevedore may have gone down similar ladders on countless of times, the safety investigation did not exclude that the risk may have been more readily acceptable because it was perceived to be under control.

Condition of the cargo hold access covers on board

Corrosion is the process where metal wears away, dissolves or is oxidized due to chemical reactions, mainly oxidation. Thus, corrosion causes chemical damage to the material, resulting in its physical deterioration and its mechanical properties. Failure due to corrosion is a major safety concern.

The safety investigation estimated that the back side of the cargo hold access cover had a 70% uniform loss of the metallic surface (Figure 4).

⁷ This does not apply to the ladder fall arrest systems fitted ashore. Such systems would not require the user to interfere with the attachment, irrespective of whether s/he is ascending or descending the ladder.



Figure 4: Material wastage signs and failed of hinges

It was clear to the safety investigation that the hinges and stopper failed while the stevedore was climbing his way up from the cargo hold. Moreover, the most logical sequence of events was for the stopper pin to fracture first, followed by the hinges (unless the hinges had already corroded away prior to the accident).

An additional cargo hold access cover was inspected during the course of evidence collection on board. The cargo hold access cover fitted in cargo hold no. 4 was found in a similar (poor) condition to that in cargo hold no. 2 (Figure 5).



Figure 5: Cargo hold access cover in way of cargo hold no. 4

A closer, visual inspection revealed that the stopper and the hinges were rusty and broken (Figures 6 and 7).

Taking into consideration the condition of all the inspected cargo hold access covers, the safety investigation concluded that the covers had not been thoroughly inspected as part of a maintenance regime applied on board and may have even been missed, given that they were rarely used and always kept in the open position.



Figure 6: Broken hinge



Figure 7: Broken stopper

Considering that the use was very limited and taking into consideration that there was no thorough knowledge of the physical condition of the grain hatch cover, the safety

investigation concluded that in all probability, neither the vessel nor the Company were aware of the hazard and related consequences. Communication of the risks involved was therefore compromised.

Safety Management System

According to Company procedures Q303 (Chapter 1, Paragraph 1.2), a maintenance plan for the deck is prepared by the master, covering a period of six months.

In the Q700 Form BO 63, the master's six monthly inspection form dated June 2017, the booby hatch covers had been recorded in average condition whereas the last superintendent's visit report (dated 01 July 2017) did not indicate any remarks on the condition of booby and grain hatch covers.

It would appear to the safety investigation that the safety management system on board, in particular the area addressing planned maintenance systems on board, may have not adequately elicited the importance of these fittings among crew members, taking also into consideration that crew members did not raise any particular concerns with the Company on the subject matter.

Flag State inspections and hull surveys

The last flag State inspection prior to the accident had been carried out at Piraeus Roads in Greece on 14 January 2016, *i.e.*, about 22 months before the accident happened.

During the inspection, eight deficiencies were identified by the inspector, related to documents on board, bridge equipment, general upkeep of the vessel, the emergency generator and mooring rope conditions on the poop deck.

Although the wastage on the grain hatch covers was significant and covered a large area, the safety investigation found no reference to this condition and therefore was not in a position to determine whether these had been missed by the flag State inspector or deemed acceptable at the time of the flag State inspection.

Bureau Veritas has also confirmed that the matter had not been recently raised during surveys carried on board the ship. However, during a hull survey on 01 August 2012, the surveyor had noted that the forward ladder inside cargo hold no. 5 had to be permanently repaired. A limit date up to 01 September 2012 had been determined.

Following a subsequent survey carried out between 06 and 09 August 2012, the surveyor confirmed that the forward ladder and hand rails inside cargo hold no. 5 had been permanently repaired (cropping and renewal of damaged parts).

The survey report did not make reference to the grain hatch cover and therefore the safety investigation was unable to determine the exact parts of the ladder (assembly) had been repaired.

CONCLUSIONS

1. The grain hatch cover stopper pin had been totally dislocated and the hinges had failed;
2. The grain hatch cover had signs of general corrosion and material wastage was evident;
3. The grain hatch cover had not been maintained over the months prior to the accident;
4. The absence of either a fall preventer or a fall arrester was considered a missing barrier system;

5. The lack of requirements for the use of either a fall arrestor or a fall preventer was considered a missing corporeal barrier system;
6. The repetitive and numerous (successful) ascends and descends into cargo holds on numerous ships by stevedores and crew members alike may suggest that the use of a fall preventer / arrestor is actually not necessary;
7. Going down the cargo hold ladder without a fall preventer / arrestor may be seen as a risk which had been accepted by the stevedore;
8. Other alternatives may have been rejected because they were considered less attractive, perhaps even less practicable, equivalent to an efficiency-to-thoroughness trade off;
9. Considering that the stevedore may have gone down similar ladders on countless of times, the safety investigation did not exclude that the risk may have been more readily acceptable because it was perceived to be under control;
10. The covers had not been thoroughly inspected as part of a maintenance regime applied on board and may have been even missed, given that they were rarely used and always kept in the open position;
11. Neither the vessel nor the Company were aware of the hazard and related consequences. Communication of the risks involved was therefore compromised;
12. The safety management system on board, in particular the area addressing planned maintenance systems on board, may have not adequately elicited the importance of these fittings among crew members, taking also into consideration that crew members did not raise any particular concerns with the Company on the subject matter;

13. Language barrier was not considered to be a contributing factor to the accident;
14. Alcohol, drugs and medicines were not considered to be factors which have influenced in any way the dynamics of the accident.

RECOMMENDATIONS⁸

A. B. Maritime Inc. is recommended to:

23/2018_R1 review its planned maintenance regime within the safety management system of the Company, to ensure that critical fittings inside the cargo holds are also thoroughly inspected and maintained, as necessary;

The Merchant Shipping Directorate is recommended to:

23/2018_R2 review its ship inspection checklist form to ensure that cargo hold access covers are structurally sound;

23/2018_R3 bring the matter to the attention of all recognised organisations.

⁸ **Recommendations shall not create a presumption of blame and / or liability.**

SHIP PARTICULARS

Vessel Name:	<i>Eugenia B</i>
Flag*:	Malta
Classification Society**:	Bureau Veritas
IMO Number:	9166883
Type:	Bulk Carrier
Registered Owner:	Eugenia B
Managers:	A. B. Maritime Inc.
Construction:	Steel
Length Overall:	187.30 m
Registered Length:	180.41 m
Gross Tonnage:	26,778
Minimum Safe Manning:	14
Authorised Cargo:	Solid bulk

VOYAGE PARTICULARS

Port of Departure:	Beirut, Lebanon
Port of Arrival:	Iskenderun (Isdemir), Turkey
Type of Voyage:	Short International
Cargo Information:	654 steel coils
Manning:	22

MARINE OCCURRENCE INFORMATION

Date and Time:	30 November 2017 at 15:45 (LT)
Classification of Occurrence:	Very Serious Marine Casualty
Location of Occurrence:	Iskenderun, Turkey
Place on Board	Cargo hold
Injuries / Fatalities:	One fatality
Damage / Environmental Impact:	None reported
Ship Operation:	Alongside / moored / discharging cargo
Voyage Segment:	Arrival
External & Internal Environment:	Northerly Force 3 wind and calm sea. It was daylight with adequate light inside the open cargo hold
Persons on board:	Not available

* The vessel was deleted from the Malta Registry on 13 March 2018.

** The Classification Society was withdrawn by BV since 16 April 2018.