



SAFETY INVESTIGATION REPORT

202106/029

REPORT NO.: 12/2022

June 2022

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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This safety investigation has been conducted with the assistance and cooperation of the Federal Bureau for the Investigation of Maritime Accidents, Belgium.

MV *Ketter* **Serious injury of a crew member during cargo hatch cover operations in the port of Antwerp, Belgium** **28 June 2021**

SUMMARY

On 28 June 2021, the crew on board MV *Ketter* were opening her hatch covers in preparation of discharging a cargo of marble chips in bulk, at the port of Antwerp.

The hatch covers were being opened by the chief mate who was operating the gantry crane with the master and an able-bodied seafarer (AB) assisting the chief mate with the positioning of the gantry hooks and hatch covers.

All three persons were in radio

contact and the opening of the five aft hatch covers went smoothly.

During the positioning of the final forward hatch cover, the (AB) became momentarily trapped between the forward bulwark and the gantry crane resulting to serious crush injuries to his chest.

Considering the actions taken by the Company, one recommendation has been made by the MSIU, addressing gantry crane safe operations.



FACTUAL INFORMATION

The vessel

Ketter was a Maltese-registered general cargo vessel of 2,998 GT. She was built in Netherlands in 2000 by Damenshipyard Hoogezand & Holland Shipyard. The vessel's registered owners were HS Ketter OU, and she was managed by Hansa Shipmanagement OU based in Estonia. The vessel's management had recently been taken over on 07 June 2021 and she was classed by Bureau Veritas.

The vessel had a length overall of 94.99 m, a breadth of 13.17 m, and a displacement of 6,497 tonnes. Propulsive power was provided by an 8-cylinder MAK GmbH & C, medium speed direct drive internal combustion diesel engine, producing 2,200 kW at 199 rpm. This drove a single, controllable pitch propeller to reach a service speed of 11.5 knots.

Manning

The Minimum Safe Manning Certificate (MSMC) of *Ketter* stipulated a crew of nine. However, a condition was imposed on the MSMC that if either the UMS or the bridge control systems were not operational, an engineering watchkeeping officer (STCW Reg. III/1) and an engine rating (STCW Reg. III/4) had to be engaged in addition to the stipulated minimum number of crew members.

At the time of the occurrence, the vessel was manned by a crew of nine. The crew members were Russian and Ukrainian nationals. The working language on board was English.

The injured person

The AB was a 54-year-old Russian national, holder of a valid STCW A/II and AII/5 certificate that had been issued by the Russian Federation.

He had been working on all type of small and large vessels for about 33 years. Since 2017, he had predominantly worked for the present managers and had worked five contracts on similar type and size of vessels like the *Ketter*. In port and at sea, the AB was assigned the 0800-1200 and the 2000-2400 watches.

The AB was medically fit and a large person with a height of 187cm and a weight of 100kg. At the time of the accident, he was wearing a high visibility overall, safety boots and helmet, and equipped with a VHF radio.

The hatch covers

The vessel had two cargo holds with a moveable bulkhead between them. The hatch covers were of the pontoon type that could be stacked up on one another in various configurations. The lifting and shifting of the pontoon were undertaken by a gantry crane that had a SWL of 14 tonnes. The hatch covers could be operated when the trim of the vessel did not exceed 1.5 m and the heel did not exceed 1°. There were 11 panels, numbered 1 to 11, starting from forward.

The gantry crane was fitted with audio and visual alarms and were automatically operated when the gantry was in motion. It also had three emergency stop buttons, one located at the main control panel, and one on either side of the crane, just forward of the aft wheel (Figure 1).



Figure 1: Location emergency stop

The gantry crane operator would stand on the upper horizontal beam of the gantry crane. From the control station, he had an overview of the hatch covers and the walkways on deck. However, he did not have a full view of the track and hatch covers below him when a cover was lifted by the gantry crane (Figures 2 and 3). For this reason, a crew member had to be posted on either side of the gantry to monitor and report to the controller the hoisting and moving of the hatch cover, while remaining in communication over a VHF radio.

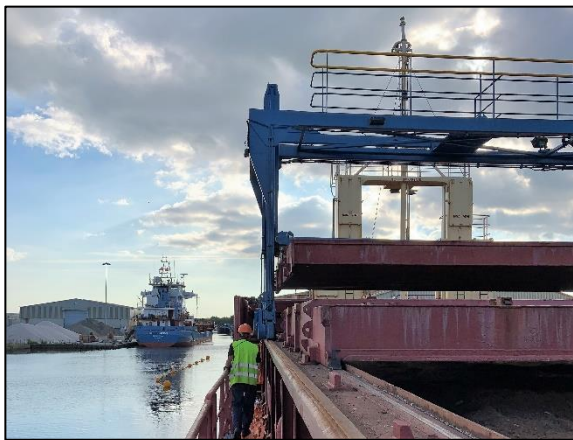


Figure 2: View from port side



Figure 3: View from starboard side

At the forward location of hatch cover stack, the deck walkway turned into a staircase that led to the forward deck, at the same time becoming narrower (Figure 4).

It must be remarked that during the operation of the gantry, there was space between the

gantry and main deck walkway railings for a person to pass the gantry, although this was not advisable; towards the forward end, there was no space for someone to pass between gantry and the bulwark (Figure 4).

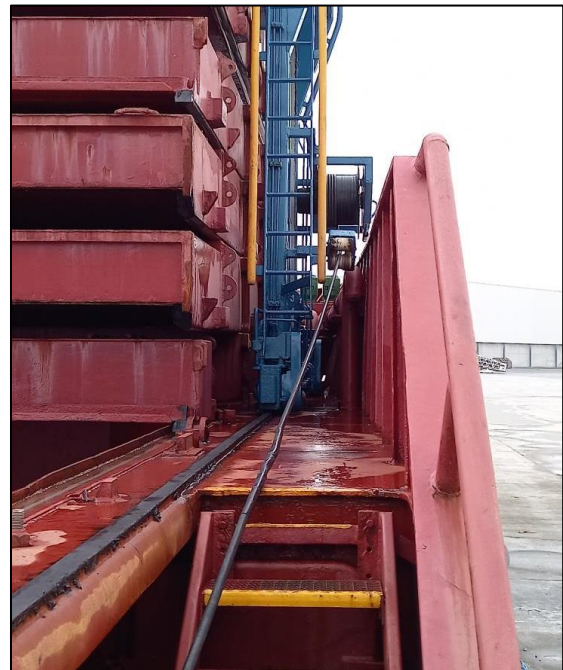


Figure 4: View facing forward

Course of events

The master, chief engineer and AB joined the vessel on 04 June 2021 at Istanbul anchorage, for the purpose of taking over the vessel from the existing crew at the time. The vessel was then named *Taha*. The remaining crew joined on 07 June when the managers became officially responsible for the operation of the vessel, which was renamed *Ketter*.

At 2245 on 09 June, the vessel departed Istanbul anchorage for Saraylar, Turkey, berthing at 1840 on 10 June. Loading operations started soon afterwards. *Ketter* departed Saraylar at 2235 on 11 June with 4,800 mt of marble chips in bulk, destined for Antwerp, Belgium.

The vessel stopped briefly at Malta offshore port limits to take on bunkers, before arriving and berthing at Antwerp at 2120 on 27 June.

Discharging was scheduled to start the next day.

At about 0345 on 28 June, the second mate, along with two ABs, started opening the hatch covers in preparation of discharging operations that were to start at 0600. The second mate was on the controls, with two ABs posted on the port and starboard side of the trackway, reporting the gantry's progress to him.

They opened panels nos. 8 and 10 successfully but in the process of opening panel no. 9, the aft port side wheel of the gantry derailed. The second mate informed the chief mate and the master but as the vessel did not have heavy lifting equipment, they waited for the stevedores to arrive at 0600 to seek their assistance with a shore crane.

Eventually, with the assistance of a shore crane, the gantry was restored to its position on track and by 0720, the master, chief mate and an AB resumed the opening of the hatch covers. This time, it was the chief mate on the controls, with the master minding the port trackway and the AB on the starboard side, communicating with VHF radios.

The remaining aft hatch covers were opened first, followed by the forward ones. At about 0740, when the last forward panel (no. 5) was lifted and being shifted forward, the chief mate stopped the operations, established visual contact with the AB and reprimand him for not maintaining radio contact as the panel opening progressed. The AB acknowledged this, and the operations resumed.

Before the chief mate lowered the last hatch cover panel on to the forward stack of hatch covers, he asked the AB if the panel was in position to be lowered but received no response. A few moments later, he heard loud groans from the AB who was about 4.0 m aft of the gantry, clutching his chest. Both the master and chief mate rushed to the

AB and inquired on what had happened. The AB told them that he had been in contact with the gantry's motor.

The master asked the terminal personnel to call for the emergency services to attend. The ambulance arrived at about 0800 and after an initial assessment, the AB was transferred from the vessel to the ambulance with specialised equipment used by the emergency services.

Extent of injuries

It was reported that the AB broke six ribs and his sternum. In hospital, he underwent an operation to have four of his ribs and sternum joined to a plate. He was reported to have been discharged after spending about two weeks in hospital.

Environment

At the time of the accident, the vessel was moored in port. There was a Northerly light air, and the sea was calm glassy. The accident occurred in daylight. The sky was clear, and a visibility of six nautical miles was reported. The air temperature was 20 °C.

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.

Cause of the gantry crane derailment

The derailment of the gantry crane was caused by the unequal tension in the driving chains fitted to both sides. This unequal tension led to one wheel moving faster than the other, thus causing a moment to offset the

aft wheel from the rail. The crew were unaware of this issue as they had not been advised by the previous crew members. Then, on the two previous occasions when the hatch covers were opened, they had not encountered such a problem.

It was not excluded that the previous derailment of the gantry was likely to have contributed to the anxiety of the crew members in preparing the (recently handed over) vessel for discharging operations. Concerned that there may be a repeat, it was not excluded that crew members may have wanted to closely observe the movement of the hatch covers on the rails.

Cause of the accident

The chief mate last sighted the AB when he addressed him directly and reprimanded him just before the accident. At the time, the AB was aft of the gantry crane.

It is likely that soon after talking with the chief mate, the AB moved forward of the gantry crane in an area, which was obscured by the suspended hatch cover. The AB's recollection of events was not clear as to how and why the accident occurred, but it was plausible for the safety investigation to hypothesize that the AB was not standing aft of the gantry; otherwise, he would not have come in contact with the motor, which was moving forward.

Therefore, the only way for the accident to have occurred was for the AB to walk forward of the gantry crane, without the knowledge of the chief mate.

As seen in Figure 5, with the gantry coming towards him, to be in a safe location, because of the obstructions, the AB had to either go forward of the breakwater (from where this photo was taken) or go aft of the gantry before it reached him. In any case, he had to take up a position aft of the gantry as it was the place where he could direct the chief

mate on the positioning of the hatch cover when it was to be lowered

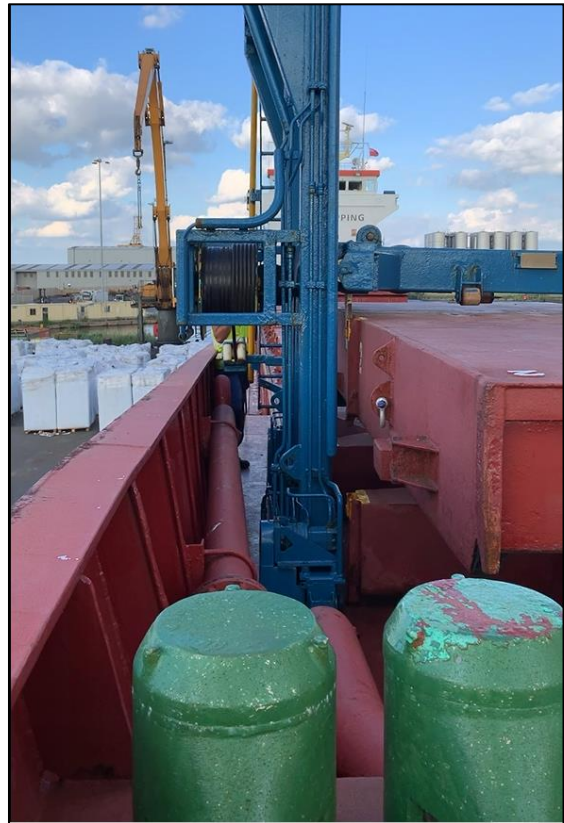


Figure 5: View facing aft

The safety investigation did not exclude the possibility that when the AB noticed the gantry approaching him in the narrower part of the forward structure, either some element of his clothing snagged, or he lost his footing because of the obstructions, which delayed him in clearing the gantry before it became unsafe to pass, and thus sustained the injury.

The investigation could not determine whether the injuries sustained by the AB was of him contacting the gantry motor or the power cord guide that is smaller in size but still approximately in line with the height of the motor.

Procedures

As per the ISM Code, the Company provided the vessel with procedures on cargo operations. The Company's procedures did

not contain instructions on hatch cover operations but were contained in the hatch cover manual and contained a warning to “ensure that all personnel are clear of the hatch and its tracking. Position crewmembers to observe both sides of the hatch”.

These instructions were not explicit on the safety of crew while undertaking this operation and it is not known whether they were accessible to the deck crew at the time.

Records indicated that the crew were provided with familiarisation training soon after they joined the vessel on 07 June and before the vessel sailed for her next port on 09 June. Although the deck crew did not operate the hatch covers at the anchorage, they safely operated them twice at Saraylar before the incident. Besides, most of the crew had worked on similar size vessels with similar hatch covers and were comfortable operating them.

Human factors and safety barriers

The actions of the AB (including the entrapment) did not happen in a vacuum. The safety investigation was not aware of any installed safety barriers to prohibit access to the port and starboard walkways when the gantry crane was in operation.

Moreover, the safety investigation was convinced that the AB had an objective to achieve, albeit that objective had not been identified during the safety investigation process. However, it was considered legitimate to believe that the risk taken by the AB must have been a compromise which had to be made, even if initially, the AB may have not been aware that his actions / inactions were a compromise.

Safety barrier system crossings (be it physical, functional, symbolic, or incorporeal), happen when there is a performance variability; the designed operational use vs. the actual operational use.

Academic literature identifies three classifications of constraints, which may lead to safety barrier crossings¹.

‘Safety constraints’ appeared to apply to this accident. A safety barrier crossing due to a safety constraint, happens when equipment in operation (moving gantry crane), poses a threat to persons when they interact with it. This issue became more critical as the gantry crane moved towards the forward end and where there was absolutely no space for a person to pass safely between the gantry and the bulwark.

Emergency stop

The safety investigation also identified an inherent accessible constraint. Forward of the gantry crane, and with the latter positioned towards the forward end of the vessel, access to the emergency stop button (located on the gantry’s sides), was not possible. Without visual contact and no communication on the VHF, the only way to stop the moving gantry crane in an emergency, was by pressing the emergency stop button. This was only possible, subject that there was enough space between the gantry crane and the bulwark and / or the person was positioned aft of the crane.

CONCLUSIONS

1. The derailment of the gantry crane was caused by the unequal tension in the driving chains fitted to both sides.
2. The crew were unaware of this issue as they had not been advised by the previous crew members.
3. The derailment of the gantry may have contributed to the anxiety of the crew members, who may have wanted to

¹ Polet, P., Vanderhaegen, F., & Wieringa, P. A. (2002). Theory of safety-related violations of system barriers. *Cognition, Technology & Work*, 4(3), 171-179.

closely observe the movement of the hatch covers on the rails.

4. The AB to walk forward of the gantry crane, without the knowledge of the chief mate.
5. It was not excluded that when the AB noticed the gantry approaching him in the narrower part of the forward structure, either some element of his clothing snagged, or he lost his footing because of the obstructions.
6. The design of the gantry crane and its installation on board created a safety constraint.
7. Forward of the gantry crane, and with the latter positioned towards the forward end of the vessel, access to the emergency stop button (located on the gantry's sides), was not possible.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION²

Following an internal review of the events, the vessel updated its 'Risk Assessment' on gantry crane operations. It also adopted a formal operations procedure that was based on the outcome of the accident with the AB. This procedure was implemented through a safety meeting with a copy placed on the notice board of the ship's office.

RECOMMENDATIONS

Taking into consideration the safety actions taken Hansa Ship Management OU is recommended to:

12/2022_R1 analyse the implementation of effective means to prevent crew members from coming in proximity of the moving gantry crane and whether this could be achieved in conjunction with the relocation / installation of additional emergency stops.

² **Safety actions and recommendations shall not create a presumption of blame and / or liability.**

SHIP PARTICULARS

Vessel Name:	<i>Ketter</i>
Flag:	Malta
Classification Society:	Bureau Veritas (BV)
IMO Number:	9195860
Type:	General Cargo
Registered Owner:	HS Ketter OU
Managers:	Hansa Ship Management OU
Construction:	Steel
Length Overall:	95.16 m
Registered Length:	90.25 m
Gross Tonnage:	2,998
Minimum Safe Manning:	9
Authorised Cargo:	General cargo

VOYAGE PARTICULARS

Port of Departure:	Saraylar, Turkey
Port of Arrival:	Antwerp, Belgium
Type of Voyage:	International
Cargo Information:	4,800 mt of marble chips in bulk
Manning:	9

MARINE OCCURRENCE INFORMATION

Date and Time:	28 June 2021 at 07:40 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of Occurrence:	Antwerp, Belgium
Place on Board	Forecastle deck (starboard side)
Injuries / Fatalities:	One serious injury
Damage / Environmental Impact:	None reported
Ship Operation:	Alongside moored
Voyage Segment:	Arrival
External & Internal Environment:	Calm glassy sea and a northerly light air. Clear sky and good visibility.
Persons on board:	9