Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201505/011 REPORT NO.: 08/2016 May 2016

This safety investigation has been conducted with the assistance and cooperation of the Estonian Safety Investigation Bureau.

MV *Kadri*
Fatal injury to a crew member at Tallinn Shipyard
19 May 2015

SUMMARY

On 19 May 2015, an able seaman on board the Maltese registered cargo vessel *Kadri* was found fatally injured on the quay. The vessel was alongside a layby berth undergoing repairs at a shipyard in Tallinn, Estonia.

At the time of the accident the able seaman was reportedly standing on the cargo hatch cover, checking the hatch cleats prior to repairs by the shipyard. He was alone and no one witnessed the events leading to his fall. However, it was not excluded that he may have stumbled, lost his footing and fell over.

A shipyard employee found him on the quay, unresponsive and bleeding from the head. He was administered first aid and transported to the local hospital for further treatment. However, he died the following morning as a result of his injuries and hypovolemic shock.

On the basis of the safety actions communicated to the MSIU, no recommendations were issued to the Company.

MV *Kadri*

FACTUAL INFORMATION

Vessel

Kadri, a 3117gt multi-purpose dry cargo vessel was built in 1996 and is registered in Malta. She is owned by Hansa Shipping Ltd., Malta, managed by Hansa Ship Management OU. of Estonia and classed with Bureau Veritas (BV).

The vessel has a length overall of 99.86 m. She has one cargo compartment with a number of lift on / lift off hatch covers for the stowage of containers. With a deadweight of 4506 tonnes, she is capable of carrying 148 TEU on deck and 124 TEU in the cargo hold (Figure 1).

Propulsive power is provided by an eight-cylinder Stork-Wartsila Diesel BV 8SW280, medium speed four-stroke diesel engine, producing 2400 kW at 900 rpm. This gives a service speed of about 13.0 knots.

Ship's Crew

Kadri had a crew complement of 9 from Ukraine, Russia and Latvia. The crew at the ship repair yard included a master/mate, a navigation officer and four seamen with STCW A-II/4 watch keeping certificate, the chief engineer, second engineer and an engine rating with STCW A-III/4 qualification.

At the time of the accident, the ship had on board a Company superintendent.

The able seaman who was fatally injured was a 59 year old Ukraine national. He had been working with the present company for the past 15 years. He had joined *Kadri* on 07 January 2015.

Environmental Conditions

At the shipyard the sea was calm glassy and visibility was about six nautical miles. There

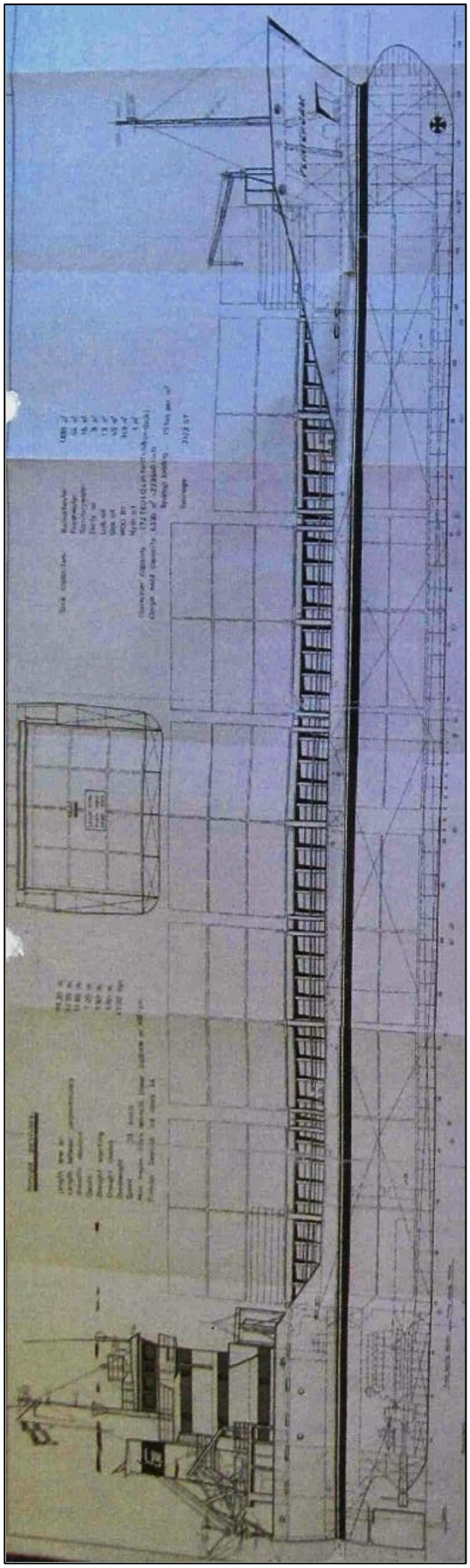

Figure 1: *Kadri* GA Plan

was a light to moderate Northwesterly breeze and no precipitation. The air temperature was about 8°C.

Narrative[1]

Kadri arrived at Tallinn, Estonia, where she was scheduled to undergo repairs. She berthed starboard side alongside, at the Yard's layby berth. She was in ballast drawing 3.90 m forward and 4.10 m aft.

On 30 April 2015, a safety meeting was held by the master and all crew members were instructed on safety, SMS procedures and safe working practices. Work planned for the crew at the shipyard was also reviewed. Personal protective equipment was checked and risks to crew working on deck were assessed. The hatch covers were cleared of obstructions and an 8 mm galvanised steel safety line above the hatch coaming was fitted for use by the crew with safety harness and fall arrestor device (Figure 2).

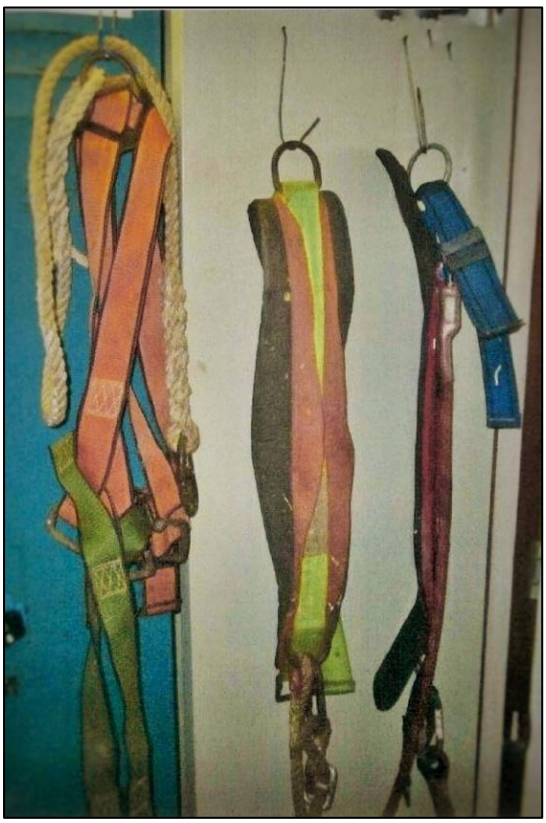

Figure 2: Safety harness and fall arrestor device.

[1] Unless otherwise stated, all times are ship's time (UTC+3).

At about 0730 on 19 May 2015, work planned for that day by the crew was discussed between the Company superintendent, the master and the chief engineer. The deck and engine crew were mustered, a safety briefing was conducted, and the day's tasks were assigned to them.

At about 0800, an able seaman along with an engine-room rating entered the cargo hold. They were tasked to close the water ballast tank covers. Before long, the able seaman left the space, informing the engine-room rating that he was going on deck to check the cargo hatch cover cleats for repairs by the yard.

At the time, the hatch covers were closed and the able seaman was reportedly standing on one of them, located between frame 60 and 61. At about 0900, one of the shipyard's worker reported that a crew member had fallen down from the ship to the quay.

The master rushed to the quay and found the able seaman facing down and bleeding from the head. He provided first aid and called the Yard's Rescue Centre for medical assistance. An ambulance soon arrived and at 0932, the injured crew member was admitted to a local hospital. Notwithstanding the medical assistance received, the following morning the hospital reported that the able seaman had succumbed to his injuries.

Cause of Death

The autopsy report revealed that the injured seaman had arrived at the hospital unconscious. He had multiple and very severe injuries including skull and skeletal fractures. All these fractures were consistent with a fall from a height on to a hard surface. The autopsy report concluded that death had resulted from cerebraloedema, cerebral contusion with haemorrhages under membranes and hypovolemic shock.

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.

Cooperation

During the course of this safety investigation, MSIU received all the necessary assistance and cooperation from the Estonian Safety Investigation Bureau.

Fatigue

Analysis of the able seaman's record of hours of rest and work showed that during the days preceding the accident, the able seaman had daily rest periods of 16 hours. Considering that the MSIU did not have any evidence which suggested that the behaviour of the crew member reflected fatigue, the latter was not considered to be a contributing factor to this accident.

Drug and Alcohol

The autopsy report confirmed that the able seaman was not intoxicated and therefore alcohol and drugs were not considered to have contributed to the accident.

Probable Cause of the Fall

Documentary evidence showed that the able seaman was wearing his PPE consisting of working overall, safety shoes, gloves and helmet. Moreover, it was stated that there was nothing unusual in his behaviour that morning to suggest that he was unfit to work in any way.

Evidence also showed that neither the superintendent nor the master had called him up on deck. The MSIU did not find any explanation in the evidence submitted to the MSIU, as to why the able seaman had possibly left the cargo hold when the checking of the cargo hatch cleats was not planned or intended for him.

It therefore appears that the able seaman acted on his own accord. Even more, no one recalled either seeing him on the cargo hatch cover or falling over[2]. Nonetheless the serious injuries suffered by the able seaman were comparable with that of a fall from a height. The photographs submitted by the vessel indicated a fall of about three metres from the hatch cover/coaming (Figure 3).

Figure 3: Area of the accident and approximate position of the area where the AB landed

Considering that no credible evidence was available to the MSIU, the safety investigation did not exclude the possibility of the able seaman standing on the ship's rails in order to reach for the cleats. It was considered probable that his movements, whether standing near the edge of the hatch cover or on the ship's rails, faltered, lost his footing and fell down on the hard surface of the quay. The able seaman was not wearing a safety harness with a fall arrestor device attached to the safety line.

[2] An analysis of the video footage from a security CCTV camera installed nearby indicated that the accident was not captured because the camera was blocked by a crane.

The Acceptance of (Unacceptable) Risks

The fact that a safety line had been fitted on the cargo hold hatch cover was indicative of a falling hazard. That must have been visible to any one on the cargo hatch cover. It has to be appreciated that the safety line was intended to reduce the risk of falling overboard but the hazard remained there.

Irrespective of what happened on the main deck and which led to the death of the crew member, the risk of falling overboard had been accepted by the crew member. It was a risk which materialised in an accident. Risk *per se* is about uncertainty, the degree of which determines whether it is accepted or not.

Surely, seafarers have numerous opportunities to engage in risky behaviour on a daily basis – the ship is not a safe place. Risk acceptance / tolerance are a key concept which eventually impinges on the actions taken. Academic research suggests a link between risk tolerance, the person's characteristics and the perceived value of the goal of the particular situation.

To this extent, some goals may be perceived to be worth of the higher risk levels than others. This comes at a price – the willingness to accept risk may lead to unnecessary exposure to hazards. Thus, risk perception is a cognitive function which may bias the intrinsic risk within a system, affecting the accuracy of his risk appraisal. The biased view may actually lead to an underestimation of the actual risk and / or an overestimation of one's personal capacity.

The fact that any ship offers numerous opportunities to risky behaviour (out of necessity) is very important when seen in the light of the outcome of academic research, which revealed negative correlations between measures from risk-perception – self and experience of hazardous events[3].

Safety Culture

This was the second tragic accident on *Kadri*[4]. Scholars claim that although risk perception and appraisal are influenced by individuals' experiences and characteristics, they are also part of an organisational factoring.

The prevalent safety culture within a shipping organisation does not only involve the ship or her crew members. Moreover, decisions taken by the crew members (including the crew member involved in the accident) are not taken in a vacuum. Rather, there is a dynamic reciprocal relationship between the organisation's components, which reflects the organisational culture[5].

The safety line on top of the cargo hatch cover was indicative of an 'occupational safety management' strategy, focussing on 'safety-mindedness'. However, although risks were assessed at the start of the day, the MSIU did not have evidence of an applied 'risk management culture', which focussed on system safety with the application of various engineering techniques to identify hazards and, if possible, quantifies risks in an objective manner.

The accident *per se* suggested a culture which did not reflect effective sharing of corporate values – values which influence attitudes and behaviours.

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[3] Studies in the aviation domain (no similar studies were carried out in the maritime domain; both domains, however, are safety critical) suggested that those who had been involved in hazardous events tended to rate the scenarios as lower in risk and had a more inaccurate estimate of safety.

[4] *Vide* MSIU Safety Investigation Report No. 03/2013.

[5] This reflects Bandura's model of reciprocal determinism.

CONCLUSIONS

1. The serious injuries suffered by the able seaman were comparable with that of a fall from a height.

2. The safety investigation did not exclude the possibility of the able seaman standing on the ship's rails in order to reach for the cleats.

3. It was considered probable that the able seaman's movements, whether standing near the edge of the hatch cover or on the ship's rails, faltered, lost his footing and fell down on the hard surface of the quay.

4. The able seaman was not wearing a safety harness with a fall arrestor device attached to the safety line.

5. The risk of falling overboard had been accepted by the crew member.

6. It was not excluded that the risk perception of the crew member may have biased the intrinsic risk within the system, affecting the accuracy of his risk appraisal.

7. The crew member may have either underestimated the actual risk and / or overestimated his personal capacity.

8. There was no evidence of an applied 'risk management culture', which focussed on system safety with the application of various engineering techniques to identify hazards and, if possible, objectively quantifies risks.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION[6]

In the wake of the accident, the Company took the following safety actions:

- A Company Circular on the risk of crew member injuries was issued and circulated to all vessels, requesting a discussion among crew members. An extraordinary briefing / training on safety at work was also requested, focusing mainly on the Code of Safe Working Practice for Merchant Seamen and the Company's SMS procedures. It was also required that special attention had to be paid to crew members working at a height, workplace arrangements and personal protective equipment;
- The safety investigation report, together with supporting documents was discussed internally during the Company's management reviews. The SMS procedures related to safety at work were evaluated and amended as necessary. Moreover, safety audits carried out by the Company's superintendents are now mandatory during each visit on board;
- The Ship's Plan of Internal Audit in the SMS was revised and updated with items related to the safety audit. The Company's Safety Manager is now required to conduct an additional safety audit, including a risk assessment of the ships' routine work and checking of the crew's personal protective equipment.

[6] **Safety actions should not create a presumption of blame and / or liability.**

SHIP PARTICULARS

Vessel Name:	*Kadri*
Flag:	Malta
Classification Society:	Bureau Veritas
IMO Number:	9114725
Type:	General cargo
Registered Owner:	Hansa Shipping Ltd.
Managers:	Hansa Ship Management OU, Estonia
Construction:	Steel
Length Overall:	99.86 m
Registered Length:	92.95 m
Gross Tonnage:	3117
Minimum Safe Manning:	9
Authorised Cargo:	Dry cargo

VOYAGE PARTICULARS

Port of Departure:	Kalmar, Sweden
Port of Arrival:	Tallinn, Estonia
Type of Voyage:	Short International
Cargo Information:	In ballast
Manning:	9

MARINE OCCURRENCE INFORMATION

Date and Time:	19 May 2015 at 0900 (LT)
Classification of Occurrence:	Very Serious Marine Casualty
Location of Occurrence:	Tallinn Shipyard
Place on Board	Cargo & tank areas - Other
Injuries / Fatalities:	One fatality
Damage / Environmental Impact:	None
Ship Operation:	Other (Repairs in shipyard)
Voyage Segment:	Alongside
External & Internal Environment:	Calm sea. Visibility was about six nautical miles. There was light to moderate Northwesterly breeze and no precipitation.
Persons on board:	10