

Report on the investigation into the
Marine Casualty
on board the LPG Carrier mts “EUPEN”



with the loss of life of a crew member, at
PORT KHALIFA, ABU DABI on
12 February 2016



Independent Unit
Rue du Progrès 56
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Extract from the European Directive 2009/18/EC

(26) Since the aim of the technical safety investigation is the prevention of marine casualties and incidents, the conclusions and the safety recommendations should under no circumstances determine liability or apportion blame.

Extract from IMO resolution A.849(20) “CODE FOR THE INVESTIGATION OF MARINE CASUALTIES AND INCIDENTS”

The objective of any marine casualty investigation is to prevent similar casualties in the future. Investigations identify the circumstances of the casualty under investigation and establish the causes and contributing factors, by gathering and analysing information and drawing conclusions. Ideally, it is not the purpose of such investigations to determine liability, or apportion blame. However, the investigating authority should not refrain from fully reporting the causes because fault or liability may be inferred from the findings.

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1 Glossary of abbreviations and acronyms

mts: motor tank ship

NV: Naamloze Vennootschap

PS: Portside

SB: Starboard

DPA: Designated Person Ashore

BVBA: Besloten Vennootschap met Beperkte Aansprakelijkheid

IOPP: International Oil Pollution Prevention Certificate

2 Synopsys

2.1 Factual Information

The mts "EUPEN" was safely moored at the PORT KALIFA, berth #6 at ABU DHABI, United Arab Emirates, on 12 February 2016, for some technical interventions. At the same time, deck and engine stores were taken on board, amongst which metal plates as part of the engine room stores.

Some engine stores had been secured on deck, after being taken on board, due to the imminent departure of the vessel for a 3 to 4-day voyage.

The forward draught was 5,25 metres and the aft draught was 6,45 metres, the vessel's trim was 1,20 metres by the stern at that moment.

When the vessel had been informed that departure was delayed by 1,5 hours it was decided to shift the engine stores to the appropriate locations.

A toolbox meeting was held and the shifting of metal plates was subsequently commenced.

The metal plates were initially shifted to an area under the stores hatch in the engine room. Two crew members were given the task of stowing the metal plates in the appropriate location, i.e. a vertical stowage position against a forward bulkhead in the engine room, secured by means of an angle bar bolted to the bulkhead.



Figure 1 - Normal stowage position of steel plates in engine room

One crew member was tasked to release the angle bar, that was used to secure the metal plates in position, so that the metal plates could be stored with the rest of the metal plates already in place. The crewmember tasked with releasing the angle bar, proceeded alone to the stowage location and, removed the nuts holding the angle bar in position, as seen in Figure 1 on page 6.

Soon after the securing had been removed the plates fell towards the crewmember.

The crewmember was startled by the falling of the plates and subsequently flinched.

The crewmember lost his balance and landed onto a dismountable part of a railing, surrounding the platform in the engine room of the mts "EUPEN" were the metal plates were stowed.



Figure 2 - Fallen metal plates after securing nuts had been removed

Picture by Exmar Shipmanagement NV

The dismantlable part of the railing gave way and the crewmember fell down into the lower part of the engine room of the mts "EUPEN", onto a railing surrounding a lower platform in the engine room of the mts "EUPEN", some 10 metres below as seen in Figure 4 on page 8.



Figure 3 - Downward view of engine from platform

where crewmember fell off

Picture by Exmar Shipmanagement NV



Figure 4 - Area in lower part of engine room where crewmember fell onto

Picture by Exmar Shipmanagement nv

Immediately thereafter the on board response teams were mustered and the Port Authorities of Port Khalifa were informed about the incident. While the on board teams administered first aid an ambulance was called for.

The Master informed the vessel's DPA s per company instructions, while the on board teams immobilised, and stabilised the condition of, the fallen crewmember.

After the arrival of the ambulance, the paramedics from the ambulance transferred the fallen crewmember onto a stretcher from the ambulance and transported the fallen crewmember to a nearby hospital. The fallen crewmember was still alive when leaving the vessel.

The Master of the mts "EUPEN" was later informed that the unfortunate crew member had passed away.

2.1 Particulars of mts “EUPEN”



Figure 5 - mts "EUPEN"

Vessel's name (IMO number):	Mts "Eupen" (9177806)
Flag / Homeport	Belgian / Antwerp
Type of vessel (as described in Form A or Form B Q1.11 of the IOPP):	GAS
Registered owner	EXMAR Shipping BVBA De Gerlachekaai, 20 B- 2000 Antwerpen Belgium
Technical operator	EXMAR Shipmanagement nv De Gerlachekaai, 20 B - 2000 Antwerpen Belgium

Built	23/06/1998/ Mitsubishi Heavy Industries, Nagasaki, Japan
Call sign / MMSI:	ONCS / 205 543 000
Gross Tonnage	23,952
Length overall (LOA):	179.92 Metres
Length between perpendiculars (LBP):	172.02 Metres
Summer deadweight	29,121 Metric Tonnes

3 Marine Casualty Information

Date and time	12 February 2016;
Type of marine casualty or incident	Marine Casualty ¹
Location of incident	PORT KALIFA, berth #6 at ABU DHABI, United Arab Emirates
Vessel's name	<i>mts "EUPEN"</i>
Place on board	Engine room
Fatalities	One
Injuries	None
Ship operation	Berthed
Voyage segment	Technical stop
Meteorological conditions	Good

¹ Per IMO RESOLUTION A.849(20) adopted on 27 November 1997 CODE FOR THE INVESTIGATION OF MARINE CASUALTIES AND INCIDENTS 4.1 "Marine Casualty" means, amongst others, an event that has resulted in the death of, or serious injury to, a person that is caused by, or in connection with, the operations of a ship.

3.1 Narrative

3.1.1 Events leading up to the casualty

After the departure of the vessel had been delayed engine room crew members were given a task to store and stow metal plates, which had been previously secured on deck on PS in the vicinity of ballast tank # 4, into the engine room of the mts "EUPEN" on the second engine room deck against the forward bulkhead.

Subsequently a small tool box meeting was held.

First some metal plates were shifted to the engine room of the mts "EUPEN", through a provisions hatch at the rear of the vessel. Two engine room crew members subsequently started to arrange the metal plates already on location underneath the provisions hatch to allow for the additional metal plates to be lowered into the engine room.

A crewmember started to remove a bolted angle bar which is used to keep metal plates secured in place, as seen in Figure 1 on page 6.

The angle bar is secured by means of two threaded rods welded to the bulkhead onto which the angle was slid through two holes, one at each end of the angle bar. Threaded nuts were used to bolt and secure the angle bar tight to the metal plates.

The securing threaded nuts of the angle bar were removed. First the securing nut on SB side was removed, subsequently PS securing nut was removed.

In order to have full access to the threaded securing nuts the crewmember tasked with undoing the threaded securing nuts had to squat.

After having removed the PS threaded securing nut, the metal plates and angle bar fell towards the crewmember.

Consequently, the crewmember startled and flinched from its squatted position with his back onto the lower dismountable section of the railing surrounding the second engine room deck.



Figure 6 - Lower part of railing (loose) where crewmember fell onto

Picture by Exmar Shipmanagement nv

The lower section of the railing gave way under the impact from the crewmember's motion, and consequently the crew member fell onto a railing in the lower section of the engine room some 10 metres below the place of initial impact onto the dismountable railing.

The crewmember survived the fall, however, the injuries were to such extent that the crewmember passed away after having being evacuated from the vessel by ambulance to a local hospital.

4 Analyses

4.1 Aim

The aim of the analysis is to determine the circumstances of the marine casualty and the contributing factors as a basis for making recommendations to prevent similar accidents occurring in the future.

4.2 The Marine Casualty

The marine casualty occurred because the metal plates stowed on the second engine room deck, against the forward bulkhead of the engine room of the mts "EUPEN", fell toward the luckless crewmember, who startled and flinched as a consequence, and who fell onto a railing surrounding the said engine room deck. The railing gave way and consequently the crewmember fell some 10 metres lower onto a railing surrounding a lower engine room deck.

4.2.1 Contributing Factors

The crewmember fell onto the lower section of a dismountable railing that gave way under the motion of the crewmember, therefore the failing of the railing contributed to the incident with a loss of life as a consequence.

4.2.1.1 Construction and condition of railing

4.2.1.1.1 Construction of the railing

The fixed railings on the various platforms of the engine room of the mts “EUPEN” were all of similar construction. The fixed railing was built up with stanchions and two parallel rails. The top rail at the place of the incident consisted of a metal hollow tube of about 1 inch in diameter.

Both rails passed through holes in the various stanchions and were welded to the stanchions at said locations as seen on Figure 7 on page 6.



Figure 7 - Typical section of fixed railing in engine room of the mts “EUPEN”

At several locations in the engine room of the mts “EUPEN” the railing was of different dismantlable construction so that sections of the railing could be removed to allow for large parts of the engine room machinery to be removed or manoeuvred into place in the engine room of the mts “EUPEN” as it was the case on the second engine room deck on port side.

The dismantable sections of the railings surrounding several platforms in the engine room of the mts "EUPEN", were all very similar in the way they were built.

One side of the rails of the dismantable sections of the railing were hinged, with a threaded bolt and nut as pivot, where the other side of the section of the rail of the dismantable section of the railing was made up with a male/female connection both for the top rail as well as for the lower rail.

At the dismantable sections of the railing, the lower rail consisted of a solid rod, that was passed through holes in the stanchions of the railing and was tack welded to the stanchions in that positions.

4.2.1.1.2 Condition of the railing

At the location the crew member fell onto the railing, an undersized bolt was being used as spigot for the hinge of the bottom part of the railing, allowing for the bottom part of the railing to move horizontally while being secured. Reportedly the bolt used as spigot was 5 mm undersize in diameter allowing for a consequential movement of 5 mm in the vertical plane.



Figure 8 - Bolt used as spigot for section of railing

The tack weld, keeping the bottom rail in position had come loose, allowing for the bottom rail to move horizontally through the hole in the stangion over a distance of +/- 3,00 centimetres.



Figure 9 - Broken tack weld allowing for 30 mm horizontal movement

The combination of the usage of an undersized bolt as pivot and the free movement of the lower rod, part of the railing, due to the broken tack weld, allowed for the rod to come out of the male/female connection when the railing was pushed against and the consequential bending of the railing.



Figure 10 - Male/female connection of railing and maximum insert

4.2.1.2 Storing and securing of metal plates

The metal plates were stowed against the forward bulkhead of the engine room on the second engine room deck. The plates rested with their longest side onto the floor of the second engine room deck, and were leaning against the forward bulkhead of the second engine room deck.

The plates were held in their position by means of an angled steel bar. The steel bar was slid, through two holes, one at each end of the angled steel bar, over two threaded rods that were welded against the bulkhead. The thread, however, did not continue all the way to the bulkhead, as seen on Figure 11 on page 19.

The mts "EUPEN" always has a positive trim of about 1 metre in laden condition. The trim can increase up to 3 metres during cargo operations but remains positive all the time meaning that the aft draught will always be greater than the forward draught.

As a consequence, the forward engine room bulkhead will always have a slight angle, towards the aft of the vessel compared to the vertical plane. With a length between perpendiculars of the vessel of 172,02 metres and a trim of 1 metre aft, the bulkhead has a calculated angle of $0,3^\circ$ towards the aft of the vessel, resulting in the steel plates

always leaning aft, and consequentially falling over when the angled steel bar, normally securing the metal plates, is removed.



Figure 11 - Threaded rods that holds steel plates in position

5 Conclusions

5.1 Safety issues directly contributing to the accident

Steel metal plates on board the mts "EUPEN" are stowed against the forward engine room bulkhead which always leans towards the aft of the engine room, due to an always present trim towards the stern of the vessel.

The bolt used as spigot for the a section of the railing in way of the place where the metal plates were stowed was undersized, allowing movement of the railing.

The condition of the railing, i.e. the broken tack weld in way of the removable section of the railing, allowed for excessive movement of the removable section of the railing without same section being loosened for removal.

5.2 Other safety issues not directly related to the accident

Since the threaded rods are not threaded all the way till the bulkhead, in case only a limited amount of steel plates are stowed, to a thickness of less than the unthreaded part of the threaded rods, plates will move, when stowed, when the vessel is pitching, potentially creating a hazardous situation, especially when the angle bar keeping the plates in position is removed during adverse weather conditions.

6 Actions taken

- EXMAR Shipmanagement had issued a safety bulletin to have the integrity of the railings in the engine room of their managed ships assessed and where necessary repaired or brought back to their initial condition to prevent railings from giving way under the weight of a crewmember, i.e. accidental opening under.
- EXMAR Shipmanagement had the ways of stowing metal plates, on board their managed vessels, re-assessed and had necessary measures taken to prevent metal plates from falling over when being handled, considering the number of stowed plates, the size of the stowed plates, the location where metal plates are stowed and considering the orientation of the stowed plates and means of stowage

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