Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201905/036 REPORT NO.: 14/2020 May 2020

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 LEOPOLD STAFF

Damage to equipment leading to the inadvertent release of the FFLB in position 15° 59' S 019° 18' W 25 May 2019

SUMMARY

While the vessel was underway to Durban, South Africa, the crew members decided to carry out maintenance and test the free-fall lifeboat launching arrangement.

The lifeboat was lifted by the davits with her aft lashings still attached, and a test of the release hook was then carried out. Afterwards, to allow for maintenance works, the aft lashings were removed and the lifeboat was slid further down on the ramp.

However, as the lifeboat was off the ramp, the hoisting slings started to slide out from their ferrules, until the lifting block recoiled and the lifeboat slid to the water.

The swaging of the sheathed steel wires of the hoisting slings was considered to be the immediate cause of this occurrence.

The MSIU has issued one recommendation to the flag State Administration to highlight the dangers of sheathed steel wire ropes due to restricted access to the wire rope for a thorough inspection .

MV *Leopold Staff*

FACTUAL INFORMATION

The vessel

Leopold Staff was a 24,167 gt, Maltese registered general cargo vessel built by Shanghai Shipyard China JIMO in China, in 2004. The vessel had a length overall of 199.81 m, an extreme breadth of 27.80 m and a moulded depth of 15.50 m. She had a summer deadweight of 30,468.8 metric tonnes (mt), corresponding to a summer draught of 11.00 m.

Leopold Staff was owned by Muras Shipping Co. Ltd and managed by Chinese-Polish Joint Stock Shipping Company. At the time of occurrence, *Leopold Staff* was carrying a total of 16,518 mt of logs under deck. The vessel had four cargo cranes on deck with cranes 1 and 4 having a 50 mt SWL (Safe Working Load) and nos. 2 and 3 designed at 320 mt SWL.

Propulsive power was provided by an internal combustion, slow speed, diesel engine, Wartsila-Sulzer 7RT-Flex 60C, manufactured by Hyundai Heavy Machinery, South Korea. This produced a power of 16,520 kW at 114 rpm. This engine drove a right-handed, fixed-pitch propeller, to reach a service speed of 19 knots.

Crew

The vessel was manned by a crew of 25, well above what was required by the Minimum Safe Manning Certificate. All deck and engine officers were from Poland and most of the ratings from the Philippines. The working language on board was English.

The chief officer, who was a Polish national, had a total of 12 years of seagoing experience, serving as a chief officer for the last five years with the Company. He had joined the vessel in Shanghai, China, on 28 January 2019.

The third officer, who was also from Poland, had embarked on board *Leopold Staff* along with the chief officer from Shanghai, China. He had a total of 12 years at sea, six of which were spent in the rank of a third officer. He had obtained his Certificate of Competence from the Gdynia Maritime University in Poland.

The bosun had a total of 20 years experience at sea. He had been working in his present rank for 10 years and had been serving with the Company throughout this time. The bosun was a Polish citizen.

Environment

The weather was clear with visibility up to 14 nautical miles. The sea state was moderate and a moderate breeze was blowing from the Southeast. The swell was estimated as being three metre high and was noticed to be originating from the East, causing the vessel to roll slightly. The air temperature was measured to be 28 °C and the sea temperature recorded at 27 °C.

Narrative[1]

The vessel was on an ocean passage from the Port of Spain, Trinidad & Tobago to Durban, South Africa. Monthly maintenance jobs for the free-fall lifeboat (FFLB) were scheduled for the morning of 25 May 2019. The chief officer completed a ‘dangerous work permit’, which included a risk assessment, and had it approved by the master.

At 1030 before starting the maintenance works, the chief officer, the third officer and the bosun carried out a visual check on all the lashing arrangements and hoisting wires and found them in good condition. The chief officer asked the bosun to start the davit winch, to enable them to lower the floating beam unit and connect the hoisting slings to the lifeboat (Figure 1).

[1] Unless otherwise stated, all times is ship’s time (UTC-1).

Once the hoisting slings were connected, the bosun lifted the lifeboat a few centimetres off the ramp. Thereafter, the third officer boarded the lifeboat and activated the free-fall release handle to test the release of the release hook. Upon receiving a confirmation that the release hook was successfully activated, the third officer disembarked the lifeboat and disconnected the aft lashings and the power cable which were still attached to the lifeboat. At this stage, the lifeboat was only being held on board by the hoisting slings.

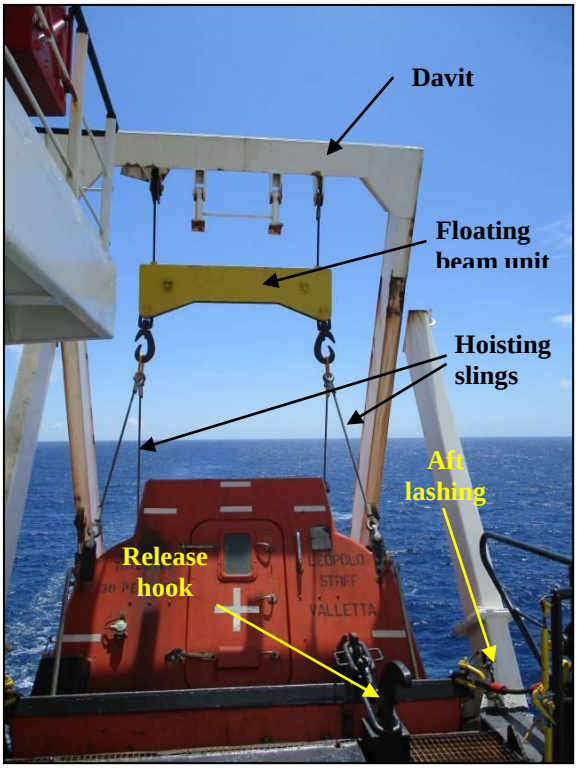

Figure 1: FFLB as seen from its stern

The chief officer instructed the bosun to lower the lifeboat back on the ramp and slide it down, to allow for maintenance works on the rollers. The bosun lowered the lifeboat to a distance of about two metres (Figure 2). As soon as the bosun stopped lowering, it was observed that the hoisting slings were slipping from their ferrule, one by one. In that moment, the floating beam unit recoiled and, at around 1040, the lifeboat slid down to the water.

The man overboard alarm was sounded and preparations were made to retrieve the lifeboat. The rescue boat was deployed and by 1054, the crew boarded the lifeboat.

Figure 2: Position of lifeboat when the hoisting slings started to slip

Due to the three metre swell that was rolling the vessel slightly and due to the absence of sound hoisting slings on board, the master assessed that the recovery of the lifeboat by using the lifeboat's davit, was dangerous[2]. In view of the situation, he decided to secure the lifeboat on deck by the use of the vessel's cargo crane (Figure 3).

Figure 3: FFLB secured on deck

[2] It later transpired that the hydraulic winch of the lifeboat's davit was damaged following the accidental release.

The hoisting slings

The hoisting slings in use on the day of occurrence were delivered to the vessel on 07 May 2018 and installed on the same day, while she was in Zhoushan Shipyard, China.

The hoisting slings consisted of two sets, each made up of two steel wires of different lengths, ending with hard eyes (Figure 4). The two steel wires were connected by a lifting ring. Each set of hoisting slings had a shackle on each end – one connected to the fore part of the lifeboat and the other to the aft part (Figure 1).

The steel wires were galvanised, had a rope construction of 18*7 with a steel core, and were of 16 mm diameter. The Minimum Breaking Load (MBL) of the steel wire was indicated to be 165 KN[3]. A pair of this assembly was connected on both port and starboard sides of the lifeboat, for hoisting.

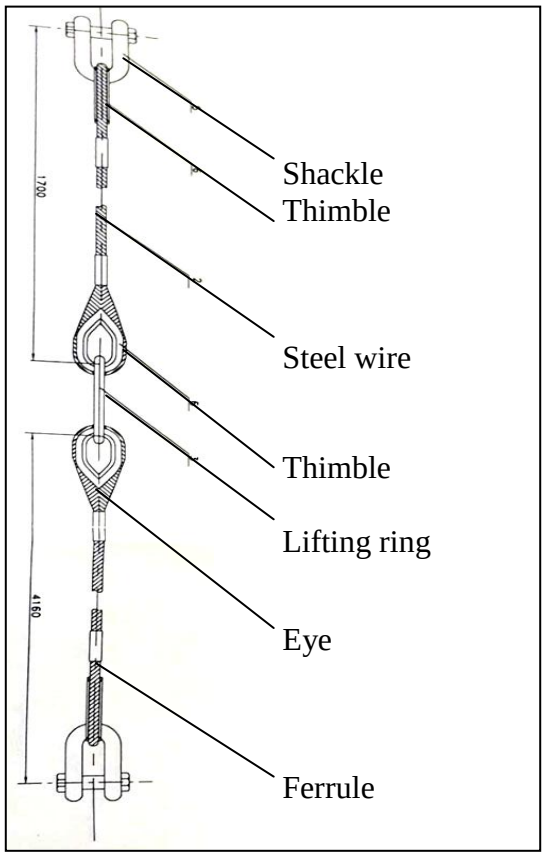

Figure 4: Assembly of hoisting slings

Adopted from Qingdao Beihai Shipyard FFLB dimensions of lifting appliances drawing

[3] 1 KN is equal to 101.9716005 Kg

Additionally, the steel wires of the hoisting slings on board *Leopold Staff* were covered with a flexible PVC[4] sheathing.

Damages

No damages to the FFLB were noticed following this occurrence. However, all four hoisting slings were found to be damaged in the same manner. The steel wires, which were turned in on themselves to form an eye and then clamped with a ferrule, had slipped from their ferrule (Figures 5 & 6).

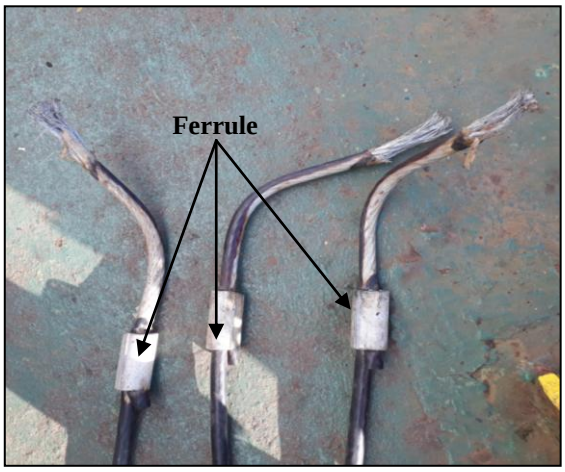

Figure 5: Showing three of four damaged hoisting slings that were connected on the FFLB

Figure 6: Showing three of four damaged hoisting slings that were connected to the floating beam unit

[4] Polyvinyl chloride is a solid plastic made from vinyl chloride.

Additionally, as a result of this occurrence, the FFLB davit's winch was rendered inoperable. Upon arrival at Durban, shore technicians were invited on board to investigate the matter. The technicians found that the hydraulic motor's shaft was broken. An attempt to repair the hydraulic motor was unsuccessful and the decision was taken to install a new one.

Figure 7: Sheathing passed through the ferrule in both directions

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 lifeboat release

The lifeboat's weight was being supported by the hoisting slings that were attached to the lifeboat's davit. The hoisting slings' failure was the direct cause of the inadvertent release of the FFLB into the water.

Hard eye assembly

The hard eyes of the hoisting slings consisted of an assembly of ferrules and thimbles. Steel wires were passed through the ferrule and then back-passed to create an eye. A thimble was inserted, to create a hard eye. These ferrules were then compressed (swaged) by means of a powerful clamping tool, which presses on the steel wires passing through and cause the ferrule and the wires to fuse together.

The hoisting slings were completely covered with PVC sheathing. This sheathing was also found to be covering the section of steel wire forming the eye and passing through the ferrule (Figure 7).

Evidence suggested that the steel wire had slipped from the ferrule. This further suggested that the ferrules and the steel wires passing through them were not fused together. The MSIU believes that this could have occurred due to:

- inadequate pressure applied during swaging; and/or
- the presence of sheathing inside the ferrule.

European Standard EN 13411-3+A1:2008 – "Terminations for steel wire ropes: Safety. Ferrules and ferrule-securing" specifies that if a rope end is to be pressed within the ferrule, the serving shall consist of only a strand or wire.

Inspections

The hoisting slings were received on board on 07 May 2018. A delivery note by the service company was presented to the ship which indicated the type of hoisting slings being delivered. No certificate was received for these slings.

Once on board, the new hoisting slings were used to replace the older ones, which were in use at that time. The older slings were also wrapped with PVC sheathing, however, the sheathing was not passing through the ferrule. The fact that both hoisting slings

were covered in PVC sheathing would not have raised an alarm to the crew that there was something amiss. Moreover, the hoisting slings were delivered by an authorised supplier, perhaps making the necessity of the crew's inspection of the new hoisting slings not a priority.

On 31 October 2018, an annual inspection for the FFLB was carried out by an authorised service provider. No remarks were made for the hoisting equipment of the FFLB, which was present on board.

Other findings

Since the steel wires of the hoisting slings were totally encased in a black coloured PVC sheathing, this would have prevented the wire from being thoroughly inspected and maintained. Furthermore, this may exacerbate the onset of corrosion as salt water may be retained in between the sheathing and the wire rope.

The Transport Accident Investigation Commission (TAIC) of New Zealand had published a safety investigation report[5], in 2015, of a FFLB lifting sling failure, which resulted in a serious injury to one of the crew members. The TAIC had discovered that the wire ropes parted under tensile overload because all of them had been significantly weakened by severe corrosion. The corrosion had gone undetected inside a plastic sheathing that the manufacturer of the lifting sling had placed around the wire pennants.

Similarly, but in a different context, the MSIU had also published a safety investigation report following an investigation into the failure of steel wire encased in plastic sheathing[6].

CONCLUSIONS

1. The failure of the hoisting slings was the direct cause of the inadvertent release of the FFLB;
2. The hoisting slings were completely covered with PVC sheathing;
3. The failure of the hoisting slings was attributed to:
   - potential, inadequate pressure applied during swaging; and/or
   - the presence of sheathing inside the ferrule.
4. No certificate for the hoisting slings had been received on board;
5. The PVC sheathing prevents the wire from being thoroughly inspected and may even entrap salty water in contact with the wire rope.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION[7]

During the course of the safety investigation, the Company requested all vessels in the fleet to verify that the composition of the hoisting slings did not clamp any insulation material into the ferrule. Furthermore, the Company requested the vessels to check the conditions of the swaging of the hoisting slings. The Company also reminded the fleet of the importance of carrying out maintenance on the slings and the safety concerning all operations involving davits / lifting slings of life boats, rescue boats and liferafts.

After this occurrence, the Company decided to henceforth procure from one specialized service provider hoisting slings that conform to design requirements and additionally to a recognised international standard.

[5] TAIC Inquiry MO-2014-202.

[6] MSIU Safety Investigation Report No. 19/2017.

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

RECOMMENDATIONS

The Merchant Shipping Directorate is recommended to:

14/2020_R1 Publish an information notice, highlighting the dangers of sheathed steel wires on board ships due to restricted access to the wire rope for a thorough inspection;

SHIP PARTICULARS

Vessel Name:	*Leopold Staff*
Flag:	Malta
Classification Society:	Polish Register of Shipping (PRS)
IMO Number:	9272228
Type:	General Cargo
Registered Owner:	Muras Shipping Co. Ltd
Managers:	Chinese Polish Joint Stock Shipping Co.
Construction:	Steel
Length Overall:	199.80 m
Registered Length:	190.88 m
Gross Tonnage:	24,167
Minimum Safe Manning:	15
Authorised Cargo:	Dry cargo

VOYAGE PARTICULARS

Port of Departure:	Port of Spain, Trinidad & Tobago
Port of Arrival:	Durban, South Africa
Type of Voyage:	International Voyage
Cargo Information:	16,518 mt of Logs
Manning:	25

MARINE OCCURRENCE INFORMATION

Date and Time:	25th May 2019 at 10:40 (LT)
Classification of Occurrence:	Less Serious Marine Casualty
Location of Occurrence:	15° 59’ S 019° 18’ W
Place on Board	Boat deck
Injuries / Fatalities:	None
Damage / Environmental Impact:	Minor
Ship Operation:	Passage
Voyage Segment:	In transit
External & Internal Environment:	Weather was clear with a visibility of 14 nautical miles. Wind was from the Southeast blowing with a moderate breeze. Swell was 3 m high and coming from the East.
Persons on board:	25