Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201903/009 REPORT NO.: 03/2020 March 2020

MT *GIOVANNI DP*
Inadvertent release of the FFLB and subsequent injuries to a crew member in position 30° 27.7' N 040° 53.6' W 09 March 2019

SUMMARY

Giovanni DP was on an ocean passage towards Antwerp, Belgium. The crew were all mustered to carry out an abandon ship drill.

While carrying out a test of the lifeboat's release hook, the lifeboat was inadvertently released into the water with the chief officer on board.

The bridge was advised immediately and a Scharnow Turn was executed by the master to retrieve the lifeboat and the chief officer. Both were recovered successfully, although the chief officer was seriously injured.

The immediate cause of the accident was the failure of the lifeboat maintenance chain.

The MSIU has issued one recommendation to the flag State Administration, addressing safe operations of free fall lifeboats.

MT *Giovanni DP*

FACTUAL INFORMATION

Vessel

Giovanni DP was an 11,191 gt, Maltese registered oil / chemical tanker built by Cantiere Navale de Poli SPA in Italy, in 2003. The vessel had a length overall of 138.1 m, an extreme breadth of 23.0 m and a moulded depth of 12.5 m. She had a summer deadweight of 16,882 metric tonnes, corresponding to a summer draught of 9.29 m.

Giovanni DP was owned by Vanni Shipping B.V. and managed by De Poli Ship Management. At the time of occurrence, *Giovanni DP* was carrying 14,053 metric tonnes of Cumene and Furfural.

Propulsive power was provided by a single-acting, direct drive, four stroke, diesel engine, manufactured by Wärtsilä, Finland, producing a power of 6,300 kW at 500 rpm. This engine drove a single controllable pitch propeller, which enabled *Giovanni DP* to reach a speed of 17 knots. The vessel was also fitted with a bow thruster rated at 600 kW.

Crew

The vessel was manned by a crew of 21. All crew members were from the Philippines, except for the master and the second engineer, who were Latvian citizens and the chief engineer, who was from the Ukraine.

The master had been sailing with the Company in the present rank for two and a half years. He had joined the vessel in Malaga, Spain, on 26 November 2018. At the time of the occurrence, he was 61 years old and had a total sea experience of 13 years.

The chief officer joined *Giovanni DP* on 11 December 2018 from Leixoes, Portugal. He had been at sea for nine years, of which, 15 months were served in the rank of chief officer under De Poli Ship Management. He was issued with an STCW II/2 Certificate of Competence, on 29 June 2016, by the Philippines' Maritime Industry Authority. He was designated as the safety officer on board.

The second officer had obtained his STCW II/1 Certificate of Competence on 11 May 2016 from the Philippines' Maritime Industry Authority. He had joined *Giovanni DP* together with the chief officer from Leixoes. He had been working with the Company for about four years and had been at sea for 14 years.

The third officer had eight years of seagoing experience, always with the current Company. He was issued with the STCW II/1 Certificate of Competence on 22 June 2016 by the Philippines' Maritime Industry Authority. The third officer had embarked *Giovanni DP* on 08 September 2018 from the port of Bilbao, Spain.

Environment

On the day of the accident, a moderate breeze was blowing from the Southeast. The swell, which was also coming from the Southeast, was 2.0 m high, causing the vessel to slightly roll and pitch. The weather was clear with a visibility of eight nautical miles. The air and sea temperatures were reportedly 22° C.

Narrative[1]

On 09 March, *Giovanni DP* was enroute to Antwerp, Belgium, having left the Caribbean island of Sint Eustasius, five days earlier.

At 1500, all senior officers had a meeting to discuss the drills for that day. As per Company's drill schedule[2], mustering / preparation of the lifeboat, lowering of free-fall lifeboat (FFLB) (manoeuvring in the

[1] Unless otherwise stated, all times are local time (UTC – 3).

[2] Form 08007 Rev.7.

water), and launch of the FFLB (simulated launching) were due during the month of March, amongst other drills.

It was decided that a fire drill in the engine-room would be carried out, following which, familiarisation with the FFLB launching procedures and consecutive FFLB simulated launching, were to be executed. Further evidence indicated that a test of the FFLB release system had also been planned. A risk assessment for the simulated launching was not carried out, however, during discussions about the drills, additional lashing was agreed to be fitted on the FFLB.

The drills started at 1535 and by around 1548, the first drill, which was fire in the engine-room, was completed. Soon after, all crew members (except for the master, who was on the bridge) proceeded to the boat deck for an abandon ship drill.

The FFLB's maintenance chain was installed and the hook's safety bolt was checked to be in place (Figure 1). All crew members entered inside the lifeboat, confirmed their seating positions, and instructions on the different methods of launching the FFLB were given by the chief officer. Thereafter, all persons left the FFLB except for the chief officer.

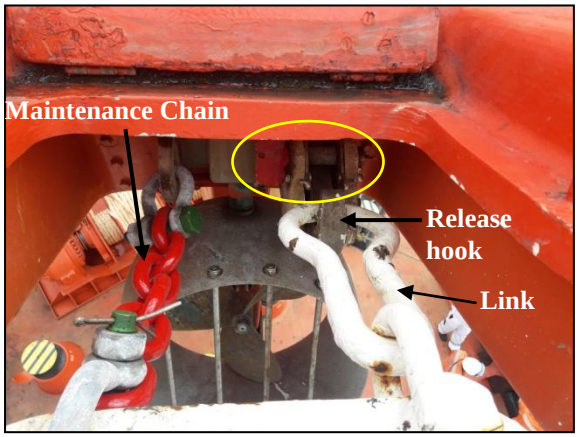

Figure 1: Maintenance chain and Free-fall release hook (safety bolt circled in yellow)

The chief officer remained in the coxswain's seat, strapped with the seat belt, while the crew members assigned with free-fall launching were instructed to attach the additional lashing, which consisted of a two-ton chain block (Figure 2). This lashing was an additional safety measure to hold the FFLB and as a means to bring back the lifeboat in position after testing.

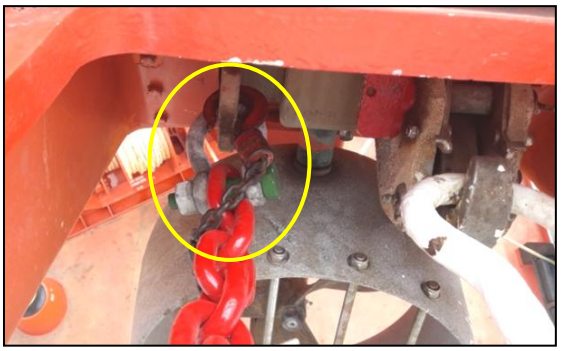

Figure 2: Chain block assembly at the lifeboat's side. The other end of the chain block was attached to the stairs leading to the lifeboat's embarkation platform

Subsequently, the chief officer ordered the safety bolt to be pulled out of its position. The third officer advised the chief officer that the safety bolt should be kept in position during simulated launchings. The chief officer, however, explained that for the release hook to be tested, the safety bolt should be taken out. The pumpman and the bosun advised the chief officer to attach the A-frame[3] to the lifeboat; however, the chief officer reportedly ignored this advice.

The chief officer started turning the hook release wheel anti-clockwise and, as soon as the hook released, a snapping noise was heard and the FFLB launched into the water. Once the FFLB was waterborne, the chief officer unstrapped himself but due to the swell which was causing the FFLB to roll heavily, the chief officer was slammed multiple times against the seats.

[3] The A-frame is a davit like structure having a fall wire connected to a winch and is normally used to hoist and to lower the FFLB.

Post accident events

The master was immediately alerted, the vessel's speed was reduced, and the Scharnow Turn to starboard was commenced. The master ordered the bow thruster, the starboard side pilot ladder, and the falls for the FFLB to be prepared.

During the execution of the Turn, communication with the chief officer was established via portable radio. He confirmed that he was capable of manoeuvring the lifeboat and as soon as lee was provided, he brought the lifeboat alongside. The chief officer was assisted to the ship's hospital and the second officer, along with the bosun, took over in handling the FFLB.

Giovanni DP's main engine was stopped, her heading maintained by the bow thruster. Due to the swell, it took several attempts to bring the FFLB in its stowed position. During this time, the FFLB sustained several damages to its outer shell.

Injuries suffered by the chief officer

The chief officer had fallen inside the lifeboat hitting his right thoracic, right shoulder and right abdominal flank, after he unstrapped himself. Due to the injuries, the master had requested radio medical advice and was strongly advised to evacuate the chief officer to the closest port.

The vessel's course was diverted to Ponta Delgada, Azores and the chief officer was landed for medical treatment on 12 March 2018. On the same day, he was deemed fit to fly back home.

Lifeboat damages

The FFLB sustained the following damages during retrieval:

- port side polyester fender;
- several cracks and scratches on the fibreglass material of the lifeboat;
- bottom slider flat-bars;
- guard rails and;
- aluminium sprinkler pipes and supports (Figure 3).

Figure 3: Damage to lifeboat's sprinkler system

Moreover, it was later confirmed that the maintenance chain, which was in position prior to the accident, had failed from the second link closest to the FFLB's stern (Figure 4).

Figure 4: Broken maintenance chain

SOLAS[4] requirements

Regulation III/19 of SOLAS, lays down the requirements for emergency training and drills. With respect to launching and manoeuvring in the water, it lays down the following requirements:

> *3.4.4 – In the case of a lifeboat arranged for free-fall launching, at least once every three months during an abandon ship drill the crew shall board the lifeboat, properly secure themselves in their seats and commence launch procedures up to but not including the actual release of the lifeboat (i.e., the release hook shall not be released). The lifeboat shall then either be free-fall launched with only the required operating crew on board, or lowered into the water by means of the secondary means of launching with or without the operating crew on board. In both cases the lifeboat shall thereafter be manoeuvred in the water by the operating crew. At intervals of not more than six months, the lifeboat shall either be launched by free-fall with only the operating crew on board, or simulated launching shall be carried out in accordance with the guidelines developed by the Organization.*

Flag State notices

The flag State Administration issues technical notices to advise and guide the maritime industry, with the aim of improving safety at sea and preventing / minimizing the risk of pollution.

Technical Notice SLS.5 Rev. 1, which was issued on 27 February 2013, deals with the frequency of fire and abandon ship drills on board Maltese flagged vessels. This notice draws the attention of all concerned parties to Annex 2 to MSC.1/Circ.1206/Rev.1[5].

Manufacturers' instructions

The FFLB Manual, which was on board *Giovanni DP*, provided important safety notices intended to prevent accidents with lifeboats. The Manual advised, *inter alia*, that operators should be fully conversant with the Manual and should be trained, preferably by the manufacturers' qualified personnel.

The Manual contained the procedure "mock-training, free-fall", which included instructions for a simulated launch and partial-testing of the hook release system. The Manual contained instructions for the maintenance chain to be attached and the safety bolt inserted before the start of the mock-training, as shown in Figure 1.

Once inside the lifeboat, the following steps had to be followed:

1. confirmation that all hatches were closed and all persons inside were seated with their safety belt tightened;
2. once ready to release, an announcement to all lifeboat occupants is made to confirm that the lifeboat was ready to launch;
3. safety pin A is removed, followed by the removal of securing bolt B (Figure 5); and
4. the hook release wheel is turned anti-clockwise for approximately 2.5 turns, until the lifeboat is released.

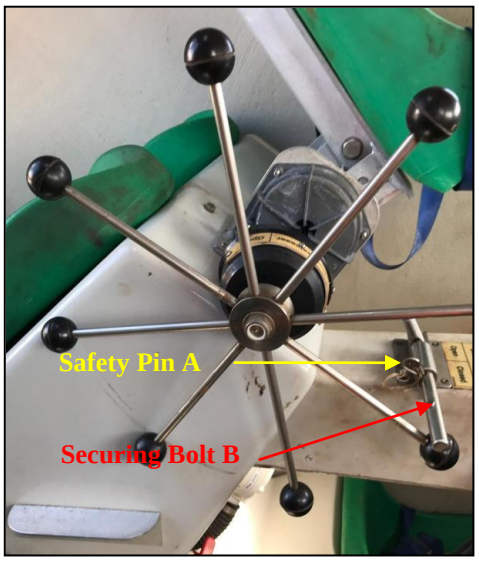

Figure 5: Hook release wheel with its securing in place

[4] International Convention for the Safety of Life at Sea (SOLAS), 1974 (as amended).

[5] Guidelines on safety during abandon ship drills using lifeboats.

The Manual specified that once the mock-training was completed, the lifeboat's davit (A-frame) should be used to remove the tension from the link and to allow time to engage the hook by turning the release wheel. It further required that the locker (Figure 6) should be verified to be in the closed position when re-setting the hook. The lifeboat was then to be prepared for launching in an emergency by removing the safety bolt, detaching the lifeboat from the A-frame and removing the maintenance chain.

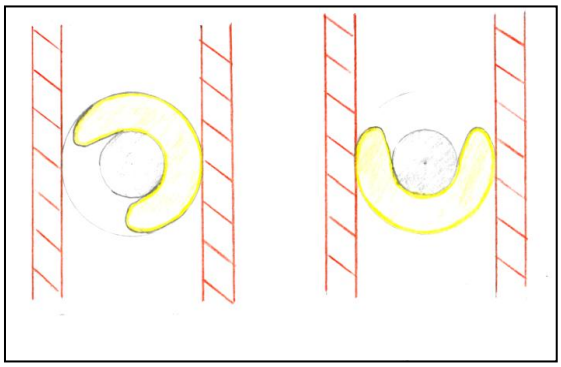

Figure 6: Sketch showing the locker (yellow) in closed and open positions

Maintenance chain

The chain consisted of two shackles with a SWL of 6.5 tonnes and seven chain links of 420 mm diameter with a SWL of 12.5 tonnes. The Certificate of Conformity was issued on 18 November 2002.

Neither maintenance procedures nor a term for replacement were given by the lifeboat manufacturers.

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.

The cause off the lifeboat release

The immediate cause of the lifeboat's release into the water was the failure of the maintenance chain. A contributory cause to its release was the removal of the safety bolt from the maintenance position.

The installation of the chain block with a safe working load of two tons did not hold the lifeboat in position. The lifeboat weighed twice as much as the SWL of the chain block and the weight of the FFLB alone would have caused the chain block to exceed its tensile breaking strength.

Moreover, the chain block did not absorb the shock load applied, once the maintenance chain had failed. Chains do not absorb such loads and are not suitable to be used as fall preventer devices.[6]

It was also revealed that the previous testing of the FFLB release system was carried out while the vessel was anchored within the breakwaters of Priolo, Italy, where the motions of the vessel were lesser than what would be experienced at sea[7]. At the time of the occurrence, the vessel was experiencing rolling and pitching motions which, most probably, would have exerted additional shock loads on the maintenance chain. This might have further contributed to the breaking of the maintenance chain.

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[6] MSC.1/Circ.1327 – Guidelines for the fitting and use of fall preventer devices (FPDs).

[7] Available information indicated that the vessel observed wave heights of 0.2 m and no swell.

Metallurgical results of the maintenance chain

A portion of the maintenance chain (one broken link and one intact) was sent to a laboratory for metallurgical tests and to determine the possible cause of the fracture (Figures 8 and 9). As a basis, the test used a standard specification for grade 80 alloys; ASTM A391:2007.

The chemical analysis confirmed that the chain had met the requirements for a grade 80 alloy steel chain and the material was, therefore, excluded from being a probable cause of the fracture.

The minimum tensile strength required from a grade 80 chain is 800 Nmm^{-2}. The tensile strength of a machined test piece taken from the broken chain link was measured to be 1345 Nmm^{-2}. The lab analysis showed that the tensile strength and hardness were very high for the grade of chain; which was probably the result of insufficient tempering after quenching[8].

On a macroscopic scale, two cracks were found to have a brittle appearance, most probably originating from the inner radius of the chain. The causes of these cracks, although not completely confirmed, were deemed to be either from stress corrosion or a hydrogen assisted crack[9].

The corrosion on the chain was deemed to be a partial cause of the failure as poor coating was noticed to have been applied on top of corroded steel. However, it was also acknowledged that the complete prevention of corrosion on such chains in a maritime environment is difficult to achieve.

Figure 8: Macrophoto of fracture side A, magnification approximately 3.3X

Figure 9: Macrophoto of fracture side B, magnification approximately 3.3X

The metallurgical test therefore concluded that the high hardness of the chain was most probably the main cause of the fracture.

Fatigue

Analysis of the hours of rest and work document showed that on the days preceding the accident, the chief officer had daily rest periods of 12 hours or more. Although there were no records of sleep quality and duration, fatigue was not considered to be a contributing factor.

Acceptance of risk

Despite being advised by the third officer to leave the safety bolt in place, the chief officer seemed to be intent on testing the functionality of the free-fall release system. As per the lifeboat manufacturers' instructions, the safety bolt should have been kept in the maintenance

[8] Tempering is the rapid cooling of the metal to put it in its hardest state, while quenching is the process of heating the metal.

[9] In high tensile steel, the distinction between these two causes cannot always be made.

position during a 'mock-training free-fall'. This would have prevented the free-fall release hook from releasing when operating the hook release wheel (Figure 5) from inside the boat.

The chief officer opted to remove the safety bolt in order to test the functionality of the free-fall release system. His aim was to make sure that all parts of the release mechanism were functioning correctly. By removing the safety bolt, he had somewhat accepted the risks it involved – although with precautions, given that he had ordered the crew to install a two-ton chain block as an extra lashing measure.

Although the bosun and the pumpman advised the chief officer to attach the A-frame to the lifeboat before testing the free-fall release system, the Manual does not list the connection of the A-frame as part of the mock-training free-fall procedure. The A-frame's purpose after the mock-training free-fall was to lift the lifeboat until the tension is removed from the link. This would have allowed the crew to reset the release hook by turning the release wheel without damaging the hook release cable.

Attaching the A-frame to the lifeboat before testing the free-fall release system would have possibly acted as an additional barrier, however, the safety investigation could not determine whether the slings would have been able to safely bear the shock load once the maintenance chain failed.

Further information collected by the MSIU revealed that during the simulated launching prior to the accident (December 2018), the same makeshift procedure was carried out. A remark which had been inserted in the Drill Scenario Form[10], identified that the release hook took too long to release at that time.

The chief officer was convinced that the extra redundancy would suffice to ensure safe testing.

Familiarisation and risk assessment

The Manual was not referred to in detail. This could have led to the chief officer not being fully aware of the correct procedure for testing the release of the hook. The actions of others further suggested that the crew members were not familiar with the instructions and procedures contained in the document.

During the senior officer's meeting at 1500, neither was a risk assessment carried out nor was the procedure for simulated launching discussed. As a result, hazards, such as the conditions of the weather on that day, would not, most probably, have been taken into consideration and therefore, the risks entailed could not have been mitigated.

IMO Guidelines

The scope of the appendix to MSC.1/Circ.1206/Rev.1, Annex 2 was to provide guidelines on simulated launching of free-fall lifeboats. Simulated launching is defined as "a means of training the crew in free-fall release procedure of free-fall lifeboats and in verifying the satisfactory function of the free-fall release system without allowing the lifeboat to fall into the sea." This procedure included the testing of the release mechanism.

On 19 June 2017, IMO published MSC.1/Circ.1578 – Guidelines on Safety During Abandon Ship Drills Using Lifeboats, which superseded Annex 2 to MSC.1/Circ.1206/Rev.1.

To reduce casualties, the definition in the revised guidelines was amended to: "a means of training the crew in free-fall release procedure of free-fall lifeboats *without the physical activation of the release mechanism*."[11]

[10] Drill Scenario Form ID 08001 Rev. 5.

[11] Emphasis added.

It is apparent that, although the chief officer was aware of the previous guidelines, and intended to comply with them, the crew members may have not been made aware of the revised guidelines. Both the Company and the chief officer seem to have been under the impression that simulated launching drill incorporated the testing of the FFLB release system.

Incorporeal barrier systems, such as the IMO guidelines, are not physically present when their use is mandated, but depend on the knowledge of the user to achieve their purpose. The indications to the safety investigation were that this safety barrier system, was not available on board *Giovanni DP*.

Technical Notice SLS.5 Rev.1

The flag State Administration's Technical Notice SLS.5 Rev.1 refers to IMO guidelines which encouraged the testing of the free-fall release mechanism during simulated launching. As mentioned elsewhere in this safety investigation report, these guidelines were superseded and the revised IMO guidelines carry different text. The MSIU also considers notices from the Administration to form part of the incorporeal safety barrier systems.

The safety investigation believes that (an outdated) technical notice, made available to Maltese registered vessels, may be misleading if referred to by the crew members or safety managers. Recipients such as ship operators are required to act on these notices and may even incorporate them into their Safety Management System (SMS). It is also worth noting that even if SLS.5 Rev.1 was on board, there was no awareness that the IMO guidelines had been changed as it would be otherwise expected that the Company would have drawn the attention of the flag State Administration on the matter.

In this case, no evidence was found, indicating that the new IMO guidelines had been incorporated into the vessel's SMS.

Latest amendments to SOLAS

SOLAS Regulation III/20.11.3, which addresses the operational testing of release gear, was recently amended. Operational testing of the FFLB release systems shall now be performed either by free-fall launch, with only the operating crew on board or, by a test, without launching the lifeboat carried out based on Resolution MSC.402(96).

Resolution MSC.402(96)[12] came into force on 01 January 2020. This Resolution specifies that operational tests of the free-fall lifeboat release function, shall be carried out by either a manufacturer's representative or, an authorized service provider.

CONCLUSIONS

1. The immediate cause of the accident was the failure of the lifeboat maintenance chain;
2. In all probability, the maintenance chain of the free-fall lifeboat failed, due to the high hardness in the steel;
3. The safety bolt was removed from the maintenance position, allowing the free-fall hook to release;
4. The chain block which was added as an additional lashing measure, was not sufficient to hold the lifeboat;
5. The crew members were not fully aware of the correct procedure for testing the release of the hook;
6. A risk assessment was not carried out on the testing of the free-fall lifeboat release system.

[12] Requirements for Maintenance, Thorough Examination, Operational testing, Overhaul and Repair of Lifeboats and Rescue Boats, Launching Appliances and Release Gear (adopted on 19 May 2016).

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION[13]

During the course of the safety investigation, the Company identified several shortcomings, which had contributed to the accident. To prevent recurrence of this event, the Company updated its planned maintenance system, now requiring the maintenance chain to be replaced at five yearly intervals.

Additional training has been planned, with special emphasizes on lifeboat simulated launching and the strict enforcement of the 'stop the work' authority. Furthermore, the risk assessment procedure was reviewed to include additional level of authorities for approval.

RECOMMENDATIONS

Transport Malta's Merchant Shipping Directorate is recommended to:

03/2020_R1 revise Technical Notice SLS.5 Rev.1, to make reference to MSC.1/Circ. 1578 of 19 June 2017.

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

SHIP PARTICULARS

Vessel Name:	*Giovanni DP*
Flag:	Malta
Classification Society:	RINA
IMO Number:	9261516
Type:	Oil / Chemical Tanker
Registered Owner:	Vanni Shipping B.V.
Managers:	De Poli Ship Management
Construction:	Steel
Length Overall:	138.11 m
Registered Length:	127.50 m
Gross Tonnage:	11,191
Minimum Safe Manning:	13
Authorised Cargo:	Oil and chemicals in bulk

VOYAGE PARTICULARS

Port of Departure:	Sint Eustatius, Caribbean, Netherlands
Port of Arrival:	Antwerp, Belgium
Type of Voyage:	International Voyage
Cargo Information:	80,053 mt of Cumene and 6,000 mt of Furfural
Manning:	21

MARINE OCCURRENCE INFORMATION

Date and Time:	09 March 2019 at 16:20 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of Occurrence:	30° 27.7’ N 040° 53.6’ W
Place on Board	Embarkation deck
Injuries / Fatalities:	One crew injured
Damage / Environmental Impact:	None reported
Ship Operation:	Passage
Voyage Segment:	In transit
External & Internal Environment:	The weather was clear with a moderate breeze from the Southeast. The swell was coming from the Southeast at a height of about 2.0 m. Both the sea and the air temperature were recorded at 22 °C.
Persons on board:	21