Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201202/026 REPORT NO.: 02/2013 January 2013

MV *PADNA*
Serious injury to crew member during a free-fall lifeboat annual inspection in the port of Marseille on 17 February 2012

SUMMARY

On 21 February 2012, the French Bureau d'enquête sur les évènements de mer (BEA mer) relayed an accident notification from the Maritime Administration in Marseille to the Marine Safety Investigation Unit (MSIU). The accident had happened on 17 February 2012, on board the Maltese registered vessel *Padna* (Figure 1).

Preliminary information indicated that preparations were being made to test the free-fall lifeboat davit's boom when the lifeboat was accidentally released with one of the crew members on board.

The crew member was consequently injured as a result of the fall and was hospitalised.

BEA mer cooperated closely with MSIU and a safety investigator was deployed on board, together with a safety investigator from BEA mer. The safety investigation identified a number of factors, including a partially reset hydraulic release piston and issues with the safety management system.

Two recommendations were issued to Transport Malta's Merchant Shipping Directorate.

Figure 1

FACTUAL INFORMATION

Vessel's description

Padna was a Maltese registered 4793 GT general cargo vessel, built by Sanym S.A., Buenos Aires, Argentina in 1991[1]. She was owned by Lubin Corporation, St. Vincent, West Indies. The vessel was classed with the Russian Maritime Register of Shipping (RMRS). *Padna* has an overall length of 99.9 m and a beam of 18.20 m. The vessel operated on international trade.

***Padna'*s crew complement**

The vessel's Minimum Safe Manning Certificate specified a complement of 13 crew members. At the time of the accident, the vessel had 15 crew members on board, comprising Croatian, Ukrainian, Georgian, Serbian and Romanian officers and ratings. The working language was English.

Vessel's recent past

Padna's safety management had been specifically monitored by the Merchant Shipping Directorate (MSD) for almost five months prior to the accident. This was due to the outcome of two shipboard inspections, which had revealed a considerable number of deficiencies.

The vessel had been detained on 01 August 2011 by port State Control (PSC) at La Spezia, Italy with 14 deficiencies. This was the vessel's second detention in 10 months, following an earlier detention by the flag State's Inspectorate on 21 January 2011 in Malta. (Moreover, during this monitoring by MSD, the vessel was again inspected by PSC in Marseille on 25 November 2011 and five deficiencies were identified).

The MSD addressed the situation in an extraordinary manner, which had also necessitated a meeting in Malta with the vessel's owners. In its correspondence with the owners, the MSD imposed four conditions *i.e.* a firm commitment in favour of safety, a flag State inspection in Marseille, a change of management, and a second flag State inspection of the vessel within two months from the management change.

On 23 January 2012, the managers presented a binding statement to the Registrar of Ships, submitting themselves to an undertaking to "upgrade the ship to the highest standards possible and to maintain the said ship, as a minimum, in compliance with the applicable international and EU requirements at all times." Ship management was transferred to Euroship d. o. o. on 07 February 2012.

Narrative

On 09 February 2012, the flag State inspection was carried out in Marseille. 14 deficiencies were identified, one of which related to the lifeboat engine. In addition, an abandon ship drill was carried out on board on 15 February 2012. The free-fall lifeboat was tested and lowered in the water and later recovered and stowed in its position. The master did not report any operational / technical problems.

On 17 February 2012, an authorised and certified technician from the local yard 'Macor e.u.r.l.' boarded the vessel to carry out the annual inspection and maintenance of the free-fall lifeboat. After an initial inspection and an attempt to start the engine (which would have required the crew to remove the aft lashing and enter the lifeboat), the bosun claimed that the technician informed him to prepare the lifeboat so that it is lowered in the water.

The second engineer, bosun, and one of the ABs prepared the lifeboat for the lowering operation. This necessitated the removal of the forward lashings, connecting the port and starboard slings to the davits hooks (Figure 2) and taking the slack on the falls before the boom is slowly swung out.

[1] *Padna* was deleted from the Register of Maltese Ships on 30 April 2012 after the vessel was reported trading with expired Statutory certificates.

Figure 2: Hoisting slings

The AB had already removed the lower lashings, disconnected the port side hook from the boom's lashing eye, and was about to connect the port side sling to the port side fall (Figure 3). However, the 'Macor e.u.r.l.' technician clarified to the bosun that there was no need for the slings to be connected as he only intended to swing the davit's boom outwards[2].

Figure 3: Port and starboard falls and hooks

Whilst the AB took the port side sling free in his hand, the starboard hook was disconnected and both hooks were hoisted very slowly by hydraulic means. The second engineer recalled that he had only just touched the hydraulic controls when the free-fall lifeboat suddenly released.

The AB lost his balance and fell into the sea in close proximity of the lifeboat. He resurfaced a few seconds later and although a lifebuoy was thrown in his direction, it became immediately evident that he was unconscious. Eventually, he was pulled out of the water by the second mate.

The vessel's agent was informed of the accident and an ambulance was called on site. The injured AB was transferred to the hospital for treatment. Although he regained consciousness two days later, he was not interviewed by the MSIU safety investigator[3].

Lifeboat related deficiencies[4]

On 20 February, the 'Macor' Technician issued a report following the recovery of the lifeboat on board. According to the report, several items required rectification *i.e.*:

1. No cooling water in the engine;
2. Leaking exhaust gas pipe;
3. Hoisting slings required renewal;
4. Faulty hydraulic release system;
5. Missing pyrotechnics; and
6. Damaged keel hook.

Short term Statutory certificates

Following the accident, the MSD authorised RMRS to issue short term Safety Equipment and Safety Radio certificates, valid until 14 March 2012[5]. The short term Statutory certificates were issued pending renewal of the

[2] In this way, the lifeboat would remain in its stowed position whilst the davit's boom would swing freely outboard to its maximum outreach.

[3] MSIU is informed that one week after regaining consciousness, the AB 'disappeared' from the hospital. About two weeks later, the ship's agent learnt that the AB had travelled back home alone, reportedly safe.

[4] These deficiencies were not listed on the flag State inspector's report following his inspection on 09 February 2012, although it was reported that the lifeboat engine could not start.

[5] The MSD intended to impose another limitation for a single voyage from Marseille, France to Koper, Slovenia. This matter is explained further in this safety investigation report.

lifeboat's hydraulic release mechanism, completion of the s-VDR annual performance testing and repair/replacement of the communication system on board.

On 14 March 2012, the MSD received a request from the new safety managers for a further extension of the Safety Equipment and Safety Radio certificates' validity. The managers were putting forward their request in light of a delay in the delivery of the parts for the lifeboat's hydraulic release mechanism and the testing of the s-VDR unit.

On 23 March 2012, the MSD became aware that the vessel had been in Algeria for a number of days. It was noticed that erroneously, the Safety Equipment and Safety Radio certificates did not specify the flag State Administration's requirement for the single voyage to Koper. However, the flag State Administration's requirements had reached RMRS; the Occasional Survey Report dated 01 March 2012 made reference to the single voyage to Koper[6].

Not only the MSD's instructions were ignored by the ship's managers, but a day later, the Directorate were informed that the vessel had left Algeria to Koper with expired Safety Equipment and Safety Radio (short term) certificates, and without seeking prior flag State authorisation[7].

On 30 March 2012, whilst the vessel was at sea, the Registrar of Ships issued a one month notice of intention of closure of Malta Registry. RMRS was also requested to immediately withdraw the vessel's SMC and ISCC on behalf of the flag State Administration and upon vessel's arrival at Koper. Both certificates were eventually withdrawn on 05 April 2012.

The vessel was deleted from the Register of Maltese Ships on 30 April 2012. The decision was irrevocable.

Weather conditions

At the time of the accident, the wind was west-south-west turning to west-north-west, force 3. The sea state was calm with a north-westerly swell of less than half a metre.

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, to prevent further marine casualties or incidents from occurring in the future.

Lifeboat drill and muster list duties

The injured crew member had joined the vessel on 16 September 2011. The familiarisation checklist indicated that he had gone through the familiarisation process over two days *i.e.* 16 and 23 September 2011. The familiarisation document had three items related to life saving appliances, *i.e.:*

1. Location and use of the lifesaving equipment;
2. Lifeboat muster station; and
3. General muster, alarms, and related duties.

Although the checklist was very generic and did not specify know-how of the launching operation, there was no indication that the crew member was not familiar with the launching procedures. Rather, of more concern was the absence of the chief mate during the lowering preparations.

[6] The Occasional Survey Report was also copied to the ship's safety managers, who were therefore aware of the flag State Administration's requirement for a single voyage to Koper. Moreover, they were also verbally notified by the MSD that there was a single voyage restriction to Koper. The managers never clarified this matter with the MSD when the short term Safety Equipment and Safety Radio certificates were issued without the single voyage restriction to Koper.

[7] Managers later clarified that the vessel was forced to leave the port in order to vacate the berth.

According to the muster list, the chief mate was responsible to monitor the lowering of the lifeboat. In his absence, there was no coordination in the lowering procedure, including the completion of a thorough pre-launch safety check.

Release mechanism

The free-fall lifeboat was tested and lowered in the water on 15 February 2012 during an abandon ship drill. After the drill, the lifeboat was hoisted up and stowed in its position. No problems were reported.

Once the forward and aft lashings were removed, the free-fall lifeboat was only kept on the davit by a hook on the release bracket to the boat (Figure 4). The hook, which held the lifeboat in place, was firmly secured to the davit.

Figure 4: The hook, which keeps the lifeboat in position

To release the lifeboat, a hydraulic piston had to be pumped out of its cylinder either by the main or the emergency hydraulic pumps. The piston (Figure 5) lifts the aft end of the boat and when the transverse bolt on the release bracket clears the davit's hook, the lifeboat becomes free to slide down.

A post-accident examination of the hydraulic piston revealed that it was almost completely out of the cylinder. This suggested that the hydraulic line from the hydraulic pump to the cylinder was still under pressure and so the hook at the aft end was just holding the lifeboat in the stowed position.

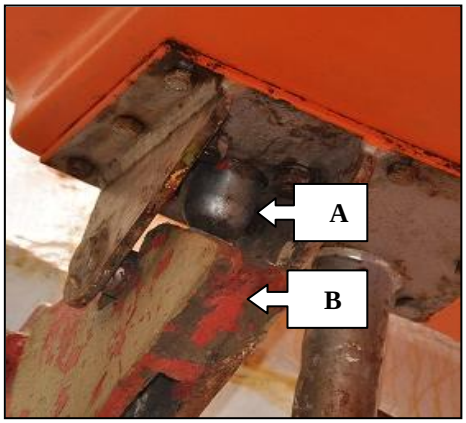

Figure 5: The hydraulic piston (A), which lifts the lifeboat's aft end from the hook (B)

The physical condition of the hydraulic piston was therefore considered to be the cause of the inadvertent release of the lifeboat.

The verification of the piston's position was a missed procedural step and it was critical. The hydraulic system was designed as such that before the boat is retrieved, a pressure relief valve (Figure 6) had to be opened in order to relieve the hydraulic pressure from the line and reset the hydraulic piston back into its prelaunch position.

This procedural step had either been missed two days before the accident or else, the relief valve operated but no verification made to confirm that the pressure in the hydraulic system had indeed been relieved and the hydraulic piston travelled inside the cylinder.

Irrespective of which of these two options applied, the end result was that the position of the hydraulic piston had not been verified prior to removing the lower and upper lashings.

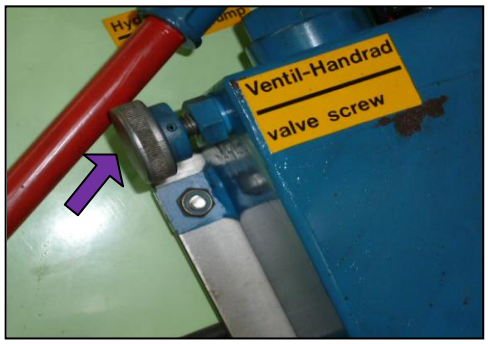

Figure 6: The valve, which had to be operated in order to reset the release piston.

In fact, the relief valve was found faulty and unable to relieve the hydraulic pressure in the line. Under such conditions of hydraulic lock, there was no way for the piston to fully reset.

The operation of the control levers on the boom's hydraulic system were not considered to have contributed to the inadvertent lifeboat's release.

Lifeboat manual and lowering procedures

A copy of the free-fall launching procedures, emergency release, and boat retrieval was included in the vessel's Training Manual. However, the copy was not posted inside the free-fall lifeboat. The procedures were also available in the Operation Manual, which was kept in the wheelhouse and on the main deck in close proximity of the lifeboat's hydraulic control station.

No evidence was available to determine the identity of the last crew member inside the lifeboat two days before the accident. Therefore, the safety investigation remained unaware as to who had retrieved the lifeboat and secured it in place[8]. However, irrespective of who retrieved the lifeboat, the procedures were not consulted – otherwise, the release mechanism would have been checked and the fault detected.

Risk assessment

The importance of risk assessment is in its potential to help ensure the safe operation of the ship and activities carried on board. Therefore, the benefit of a risk assessment exercise is the potential of identifying high consequence activities, false/error triggering mechanisms and conditions likely to influence these errors/failures.

It would have been possible that through a risk assessment exercise, the hazards related to the release mechanism would have been identified and the matter rectified in good time. This is even so when one takes into consideration that the checking of the release mechanism was one of the last steps, which therefore makes it prone to omission errors.

The lifeboat accident and the condition of the hydraulic piston on the hydraulic release system were indicative that the process of risk assessment was not institutionalised in the working practices of the ship.

Safety management system and the flag State's enforcement

The deficiencies identified by the shore technician suggested more than inadequate maintenance practices on board. The events prior to the change in management were evidence of three missing dimensions of a sound safety climate *i.e.:*

1. management's concern about the crew members' overall safety;
2. management's commitment to deal with the matter; and
3. crew members' exposure to physical risk.

This led to implications on the wider global concept of safety culture and the safety management system[9]. The UK Health and Safety Executive identified an important link between safety culture and safety management systems, albeit in a different safety critical domain. The identified organisational functions were:

1. development and implementation of a [safety] policy;
2. organisation – the development of the organisation to sustain effective communications, the promotion of competence at all levels and leadership to maintain a common culture supportive of health and safety;

[8] This would have directed the safety investigation in determining whether the crew member was familiar with the necessary procedures to retrieve the lifeboat.

[9] The safety investigation draws on the definition of safety management as the set of management activities that ensures that hazards are effectively identified, understood, and minimised to a level that is reasonably achievable.

3. planning to minimise risks and setting performance standards;
4. measuring performance; and
5. auditing and reviewing performance and all the aspects of the organisational safety system.

These functions are clearly related rather than exclusive. The absence of strategic safety values (which need to be manifested in the company's safety policy), and lack of risk assessments were therefore considered to be the result of a safety management system, which was not identifying, treating and checking hazardous conditions in a continuous and systematic manner.

The problems manifested in the implementation of the processes / functions mentioned above were considered to have had an impact on safety and compliance with the safety regulatory obligations. This seemed to be an impetus for the MSD to request a change in the vessel's management, seeing that planning and organisation of safety on board was not a main focal aspect of the ship management.

On the other hand, the issue with the expired Statutory certificates did not convince the MSD that the 'new' management was considering safety management as a company core value. The managers' decision to request the vessel to sail, without even notifying the flag State Administration suggested serious issues with the location of safety responsibility.

The MSD was convinced that commercial activities and concerns on financial implications had hindered the necessary continuous reflection on the safety practices on board.

The MSD had presented the 'new' managers with key performance indicators (KPIs), which seemed to equate to some indices of, for instance, an acceptable number of deficiencies identified in the initial and follow-up flag State inspections. There is enough academic data, however, which indicates that KPIs are not necessarily an accurate overall measure of a healthy safety management system.

It is acknowledged that KPIs *may* indicate that something is going wrong somewhere[10]. However, these are neither a diagnosis of what was malfunctioning on board nor a basis for treatment.

Considering the vessel's history and poor safety track record, albeit under different management (but same ownership), the MSD's four conditions did not necessarily address the heart of the problem.

Rightly so, the MSD was seeking a cultural and organisational evolution of the management of the vessel. However, that would have necessitated a shift from a focus of meeting targets and enforcing rules to measuring beliefs and values of the managing company.

Other safety issues - access into the lifeboat

Access into the lifeboat was not possible unless the aft lashings were removed (Figure 7).

Figure 7: One of the crew member removing the aft lashings in order to gain access into the lifeboat

The scope of lifeboat lashing is to secure the lifeboat for sea and for maintenance purposes. Their removal for inspection purposes defied

[10]There is no guarantee that an inspection would capture the complexity of socio-organisational systems.

their intended scope; a defence mechanism, which had to be deactivated in order to gain access into the lifeboat.

However, given that the intention of the technician was only to swing the boom, access into the lifeboat was no longer required. The lashings were not secured again once it was established that the lifeboat was not to be lowered into the water.

CONCLUSIONS

- The physical condition of the hydraulic piston on the release mechanism is considered to be the cause of the inadvertent release of the lifeboat.
- The lifeboat may have not been properly stowed after the abandon ship drill two days before the accident.
- The partially re-set hydraulic piston was not detected after the abandon ship drill. This was either due to a memory lapse to implement all the procedural steps, or the pressure relief valve was operated but no verification made as to whether or not the hydraulic pressure was actually relieved within the system.
- There was no evidence which indicated that a thorough risk assessment was made prior to the lifeboat inspection was initiated.
- The safety management system did not identify, treat, and check hazardous conditions in a continuous and systematic way.
- The pending maintenance issues and decision by the 'new' managers to sail with expired Statutory certificates suggested serious issues with the location of safety responsibility at the strategic level of the managers' organisation.

RECOMMENDATIONS

Transport Malta's Merchant Shipping Directorate is recommended to:

02/2013_R1 Bring to the attention of ship owners and masters the technical details of IMO's Maritime Safety Committee Circular, MSC.1/Circ.1206/Revision 1 - Measures to Prevent Accidents with Lifeboats (11 June 2009)

02/2013_R2 Ensure that in circumstances where it is deemed that there is either a significant concern on the safety value within a managing company or there is a history of safety issues, it conducts a through analysis of the multi-organisational aspect of the safety management system *vis-à-vis:*

- obtaining an accurate indication of the managers' resources and constraints at management and organisational levels; and
- how these resources and constraints would impinge on the managers' capability to conduct thorough risk analysis, identification of safety barriers and management of the life cycle of these safety barriers.

SHIP PARTICULARS

Vessel Name:	*PADNA*
Flag:	Malta
Classification Society:	Russian Maritime Register of Shipping
IMO Number:	9014298
Type:	General Cargo
Registered Owner:	Lubin Corporation, St. Vincent
Managers:	Euroshipping d. o. o.
Construction:	Welded Steel
Length Overall:	99.9 m
Registered Length:	95.85 m
Gross Tonnage:	4793
Minimum Safe Manning:	13
Authorised Cargo:	General cargo

VOYAGE PARTICULARS

Port of Departure:	Oran
Port of Arrival:	Marseille
Type of Voyage:	International
Cargo Information:	In ballast
Manning:	15

MARINE OCCURRENCE INFORMATION

Date and Time:	17 February 2012
Classification of Occurrence:	Serious Marine Casualty
Location of occurrence:	Marseille, France
Place on board	Lifeboat deck
Injuries / fatalities:	One serious injury
Damage/environmental impact:	None
Ship Operation:	Berthed
Voyage Segment:	Arrival
External & Internal Environment:	The wind was west-south-west turning to west-north-west, force 3. The sea state was calm with a north-westerly swell of less than half a metre.
Persons on board:	15