



SAFETY INVESTIGATION REPORT

201107/019

REPORT NO.: 01/2012

March 2012

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.

© Copyright TM, 2012

This document/publication (excluding the logos) may be re-used free of charge in any format or medium for education purposes. It may be only re-used accurately and not in a misleading context. The material must be acknowledged as TM copyright.

The document/publication shall be cited and properly referenced. Where the MSIU would have identified any third party copyright, permission must be obtained from the copyright holders concerned.

MY LADY LUCK
Flooding of lazarette
In position Lat. 44° 10.9'N Long. 009° 27'E
17 July 2011

SUMMARY

On 19 July 2011, the Harbour Master of La Spezia, Italy, notified the Maltese authorities that on 17 July 2011, a report was received that the motor yacht *Lady Luck* had reported flooding in her aft compartment. It was stated that following an assessment of the situation, the master decided to return to the port without any shore assistance. The yacht was not in danger of sinking, however, as a result of the flooding, she sustained electrical and mechanical damages to several of the fitted components on board.

The investigation found that the result of the flooding was an elbow fitting on the air conditioning sea water inlet, which failed as a result of its corroded condition.

As a result of this investigation, one safety recommendation was issued to the owners.

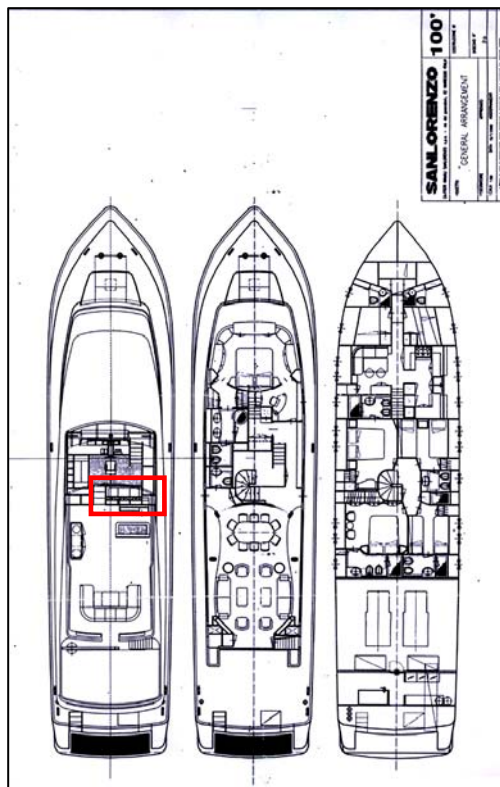
Image courtesy of Wadebridge Ltd



FACTUAL INFORMATION

Vessel description

Lady Luck was a luxury San Lorenzo yacht, built in 2001. The yacht's framework was made of GRP. Her interior was refitted in 2007. The yacht accommodated up to 10 guests in five cabins. The Minimum Safe Manning Certificate required three crew members. However, at the time of the accident, *Lady Luck* had five crew members on board, i.e., a master, deck engineer, chef, chief stewardess, and a stewardess.



Lady Luck had two generators providing 66 kW of combined power. The yacht was fitted with two, 16 cylinder MTU main engines, which develop 2,686 kW of combined power. The engines drove two propellers, giving the yacht a service speed of about 25 knots¹.

In view of her length, the requirements of EU Directives 94/25/EC did not apply and *Lady Luck* was built in accordance with RINA requirements.

¹ One knot, or one nautical mile per hour equals to 1.852 kilometres per hour.

NARRATIVE

On 17 July 2011, at around 1100, the crew members commenced with the necessary preparations to depart from La Spezia, Italy. The engine-room was checked and seeing no abnormalities, the main engines and other auxiliary equipment were started in preparation for the departure, scheduled at 1115.



Lady Luck departed Portovenere, La Spezia at 1130, with a heading of 300°. After clearing the port area, the speed was gradually increased to about 18 knots.

About 45 minutes later, several alarms, including bilge, general and main engines alarms were activated on the yacht's fly bridge. Although *Lady Luck* lost her 220V electrical power, almost immediately the 24V emergency power source came on line.

The master reduced speed and instructed his engineer to inspect the engine-room through the main deck cockpit hatch. The engineer was unable to open the access hatch since there was no electrical power to operate the hydraulic piston fitted to the hatch. He therefore decided to access the engine-room through the watertight door on the port side alleyway.

The engine-room appeared normal and therefore the engineer decided to inspect the lazarette. A watertight door separating the engine-room and the lazarette was opened and

immediately water came flooding in the engine-room. The engineer was able to close the watertight door again and proceeded to the main deck to inform the master of the

flooding. By this time, *Lady Luck* had already navigated about 18 nautical miles and was in position 44° 10.9'N 009° 27.23'E.



As soon as the flooding in the lazarette was reported, the engineer was instructed to shut down the generators. Moreover, concerned of potential MARPOL contraventions, the master also required that the fuse on the automatic bilge pump be removed. However, the valves on the engine-room manual bilge pump line were opened and the bilge pump kept on stand-by. The condition below the deck was continuously monitored through the deck hatch, which was now forced open for this purpose.

Eventually, smoke was noticed coming from the deck scupper. The breathing apparatus and fire extinguisher were prepared as a precautionary measure. Furthermore, in order to mitigate electrical hazards, the emergency generator was switched off. At this stage, the master and the engineer were able to observe the flooding from the lazarette through the deck hatch².

² The position of the deck hatch was located directly above the lazarette and in fact, it was the crew's normal point of access to this area on a daily basis. This access gave a bird's eye view of the general lazarette area and for the monitoring of the water ingress.

Neither the master nor the engineer made any attempts to identify the source of the water ingress since their main concern at the time was to proceed directly to the shipyard. Moreover, it was considered to be dangerous to enter a space, which by then had floating floor plates³ and open floor spaces.

The agents were therefore called on the phone and informed that it was necessary for *Lady Luck* to return to the port and proceed immediately to the shipyard since she was taking water. The Port authorities were not informed of the situation as this was not perceived to be a top priority matter.

It was also decided that none of the guests was to be made aware of the flooding problems until the yacht was very close to La Spezia. Instead, they were told that the main generators had developed a fault and *Lady Luck* had to return to Portovenere.

Lady Luck arrived safely at about 1330 and she was immediately taken on the slings.

³ The floor plates were manufactured from marine ply covered in aluminium.

Passengers were then disembarked, water pumped from the flooded compartments and the vessel was eventually lifted on the hard. At this stage, La Spezia Port Authority was informed of the occurrence. An official notification was submitted to the Maltese authorities on 18 July 2011.

Damage sustained

The lazarette was separated from the engine-room by a watertight bulkhead although access between both spaces was possible through a watertight door. The lazarette was divided into three main compartments/rooms, *i.e.*, a steering gear room at the aft end; and two other compartments forward of the steering gear room – a pump-room on port side, and an electric switchboard room on starboard side.

The water damage was confined to the lazarette. However, equipment fitted inside all three compartments was submerged and damaged as follows:

- | | |
|---------------------------|---|
| Steering gear room | <ul style="list-style-type: none">• service batteries;• fire pump;• air condition pumps;• steering pump;• divers' ladder hydraulic pump;• one electrical junction box. |
| Pump-room | <ul style="list-style-type: none">• toilet and black water pump. |
| Electric switchboard room | <ul style="list-style-type: none">• main switchboard;• inverter;• battery charger. |

Although the water had been drained at the time of inspection, however, clear water stains could be observed up to a height of about 0.40 m above the floor plates.

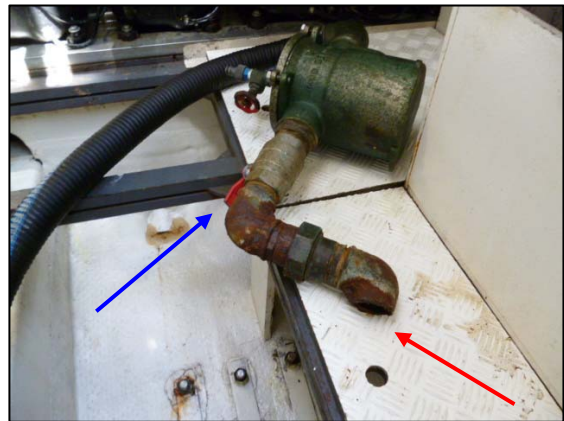
There were several other loose items, which were also affected as a result of the flooding water. The extent of sustained damage was not yet known at the time of the inspection.

ANALYSIS

Material failure

The flooding in the lazarette was the result of a failed elbow fitting, which was part of the cooling water system of the air conditioning unit, as indicated below. The failure was the result of galvanic corrosion, accelerated by the use of dissimilar materials.

In actual fact, the elbow fitting (which is normally made of cast iron with a thin layer of zinc coating) acted as a sacrificial metal. Erosion also played a contributing part as a result of the change in water flow direction.



System limitations

The failure (red arrow) occurred just after the sea suction valve and before the quarter turn valve (blue arrow) as shown in the picture. Therefore, closing the sea suction valve would have limited the extent of flooding inside the lazarette⁴. Both valves could only be operated manually and locally. An inspection of the two valves *i.e.* the sea suction valve and the quarter turn showed that the crew would have found it extremely difficult to close the valves (if not impossible) as they were seized in the open position.

In addition, the location of the wheel on the sea suction valve was difficult to reach

⁴ This option was dismissed by the crew members because their main concern and focus was to return safely to the port. This was indicative that their perception on the rate of flooding was not considered to be dangerous enough that the yacht would not make it safely back.

although not impossible – a fitting, which would have still made it very difficult for the crew members to operate with water progressively rising inside the space.

System awareness

The extent of corrosion on the elbow fitting and other areas of the pipe was not a short term issue. It indicated that the corrosion problem, whilst expected, was missed over a number of months. So were the two seized valves.

The captain had been on board for approximately three months and recalled that on 10 July 2011, the air condition unit was serviced, and the sea suction strainer cleaned. He submitted that the quarter turn valve was operational at the time. Notwithstanding, the valve was found seized in the open position after the accident. It was highly improbable that the valve seized during the period between 10 and 17 July 2011.

Whether or not any of the valves was seized, plays no direct effect on the dynamics of the flooding as there was no attempt to try and close either of them, given that they were unaware of the cause of the water ingress and the hazard created by the displaced floor plates (due to the water).

What remained crucial was that the crew members were unaware of the actual physical condition of the pipe and a critical fitting was not monitored. As such, the system was not fitted with numerous redundancies, which made it even more critical. Thus, with the valves seized open, and the crew unaware of the extent of corrosion, the hazards on board were increased dramatically.

In addition, the present crew members were unaware of any previous problems with the pipe and therefore they had no specific reason as to why they should have focussed on that area. Moreover, although the height of the bilge in the area was very limited, there was

ample height for the pipe to be fitted (and concealed) underneath the floor plates.

Maintenance procedures

Although there were no written maintenance procedures on board, the visit of the technician to maintain the air condition unit indicated that a maintenance structure did exist. However, a piece of critical fitting, which had failed under operating conditions and the seized valves, were all indicative that the maintenance structure as applied on board is not extended to cover such areas.

The purpose of a maintenance programme is to extend the useful life of defective part or fitting and maintain it in a safe operable condition. Since the fitting was not part of the planned maintenance, the item fell within a corrective maintenance system, where replacement and/or repair are normally affected only when the part fails.

As this particular occurrence has indicated, this meant that corrective action could have led to severe consequences.

Other safety factors

The investigation revealed other safety concerns, which although had no direct influence on the accident's dynamics, they were worth noting.

Whilst the navigational charts on board were not updated with the latest corrections, the passage plan was incomplete.

During the flooding, it was decided that the passengers on board are not notified of the flooding. Instead, they were informed that the yacht had a generator problem and had to return to port. It was understood that at the time, the crew members wanted to avoid a situation with panicking passengers.

However, such an approach was not risk free – although it is acknowledge that the crew members were able to have an

approximate reference of the water ingress rate because one of the crew members entered the lazarette to pull the fuse on the bilge pump. However, they were unable to make an accurate assessment of the rate of (progressive) flooding.

Their physical position on the deck did not give them an accurate indication of what had failed and therefore they could not establish whether or not the failure would have suddenly progressed and the flooding rate increased dramatically. Had that been the case, then the passengers would have been unprepared and without their life-saving equipment donned⁵.

It also transpired that La Spezia Port Authority was not informed of the occurrence since the main concern was to navigate the yacht back to the port. This indicated that the crew did conduct a preliminary risk assessment, albeit not in the formal/traditional sense. However, whilst ensuring the yacht's safety was a prime concern, notifying the Port Authority would not have undermined the safety of the yacht in any way⁶.

As already mentioned, the crew members were unable to make an objective analysis of the situation and therefore had no guarantee that the rate of flooding would have remained constant or stopped as soon as the internal level of water reached the waterline.

CONCLUSIONS

1. The flooding was the result of a sheared elbow fitting, which failed through galvanic corrosion and water erosion.
2. The failed fitting was located beneath the floor plates and its condition was not readily visible to the crew members.
3. The maintenance programme applied on board did not include this critical fitting and therefore its condition deteriorated and failed before it could be safely replaced.
4. The decision of not immediately notifying the passengers and port Authority was influenced by the prevailing situation on board.

RECOMMENDATIONS⁷

Wadebridge Ltd is recommended to:

01/2012_R1 Ensure that a maintenance management plan identifies and addresses all the critical components, their condition, and hence the system's function.

⁵ The passengers could have run the risk of taking considerable time to don their life saving equipment under unfamiliar and an emergency situation. Notwithstanding, this approach would not have necessitated them to go to their cabins for the lifejackets. The passengers were on the fly bridge and a number of lifejackets were located in four storage cabinets in the wheelhouse.

⁶ In fact, the authorities could have prepared their resources and ensured that they are deployed in good time if the need arises.

⁷ **Recommendations should not create a presumption of blame and/or liability.**

SHIP PARTICULARS

Vessel Name:	<i>LADY LUCK</i>
Flag:	Malta
Classification Society:	RINA
IMO Number:	<i>Not Assigned</i>
Type:	Commercial yacht
Registered Owner:	Wadebridge Ltd
Managers:	Wadebridge Ltd
Construction:	GRP
Length Overall:	28.90m
Registered Length:	26.66m
Gross Tonnage:	149
Minimum Safe Manning:	3
Authorised Cargo:	NA

VOYAGE PARTICULARS

Port of Departure:	Portovenere (La Spezia), Italy
Port of Arrival:	Santa Margherita, Italy
Type of Voyage:	Coastal voyage
Cargo Information:	NA
Manning:	5

MARINE OCCURRENCE INFORMATION

Date and Time:	17 July 2010 at 1215
Classification of Occurrence:	Serious Marine Casualty
Location of occurrence:	44 ⁰ 10.9'N 009 ⁰ 27'E
Place on board	Lazarette (Ship/other)
Injuries / fatalities:	None
Damage/environmental impact:	None
Ship Operation:	On passage
Voyage Segment:	Mid-water
External & Internal Environment:	Moderate sea, daylight, and Force 3 SW wind. Visibility was good with clear weather. The auxiliary engine was flooded with water.
Persons on board:	11