fieldhouse yacht surveys

MARY BELL

Damage Inspection

Insurance Reference Number: 1234

Completed for

[Name & address removed]

On Thursday 5th May 2020

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Law and Jurisdiction

This document is to be construed under English Law and English Law shall be used in interpreting the document and for resolving all claims or disputes arising out of or connected with the document.

1. INTRODUCTION

1.1. This is to certify that Nic Fieldhouse, Principal Surveyor of Fieldhouse Yacht Surveys and Consulting Ltd, carried out a Damage Inspection on MARY BELL in accordance with instructions received from from *[Name & address of Claims Handler removed]*.

1.2. I was informed by *[Name of marina manager removed]* at *[Address removed]* Marina, that at 22:00 on Tuesday 3rd May 2020, he made an inspection of all of the vessels in the marina. During this inspection, he noted nothing abnormal with the position of MARY BELL in the water. At 23:00, one of his colleagues made a similar inspection and reported that MARY BELL had sunk and was resting on the bottom of the marina.

1.3. I was informed by *[Name removed]*, the Manager at *[Address removed]* Marina, that prior to the Incident, *[Name removed]* (the Insured) had not been to visit his boat for approximately nine to ten months.

1.4. The primary aim of this document is to report on the cause of the sinking of MARY BELL.

1.5. MARY BELL was inspected by Nic Fieldhouse whilst she was submerged and also when afloat at her pontoon mooring at *[Location & address removed]* on Thursday 5th May 2020.

1.6. The inspection of MARY BELL was conducted by Nic Fieldhouse, Principal Surveyor of Fieldhouse Yacht Surveys and Consulting Ltd.

1.7. The inspection was carried out in accordance with Fieldhouse Yacht Surveys Standard Terms and Conditions and with relevant codes of practice published by the International Institute of Marine Surveying.

1.8. Those present during the inspection were:

[Name removed] (the Insured), Owner of MARY BELL, for part of the inspection

[Name removed], Marina Manager, for part of the inspection

[Name & name of salvage company removed]

[Name & name of salvage company removed]

[Name & name of salvage company removed]

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2. Scope & Limitations

2.1. The vessel was inspected whilst she was submerged and also when afloat at her pontoon mooring. There was no exterior access to the submerged parts of the hull plating. Interior access to the bottom plating was restricted by the presence of concrete ballast and the fixed panels of the interior floor lining.

2.2. Internal inspection was limited to the areas that are normally accessible directly or through lockers, inspection hatches, removable panels, etc. No part of the vessel was dismantled; no bolts were removed for inspection and no linings removed, except in order to gain access to the parts of the gas cylinder storage locker that were inside the living quarters. Consequently, any part of the vessel, her equipment or fittings, which were unexposed or inaccessible, cannot be confirmed to be free from defect.

2.3. We have not inspected steel plating or other parts of the structure which are covered, unexposed or inaccessible and we are, therefore, unable to report that any such part of the structure is free from damage or deterioration.

2.4. At the time of survey the ambient temperature was approximately 7°C, with a light wind and continuous light rain.

2.5. During the recovery operation, the salvage team of *[Name of salvage company removed]* had to work in the cockpit area whilst the vessel was still submerged. Due to the buoyancy of the plywood cockpit sole boards, these had become dislodged and floated to the surface, exposing all fixed equipment within the engine compartment. The activities of the salvage team may have dislodged the outlet hose (by inadvertently standing on it) of the vessel's only automatic bilge pump (paragraph 4.3.5), therefore the integrity of this hose prior to the Incident cannot be determined.

3. Vessel Particulars

Name of vessel	MARY BELL
Craft Identification Number	None seen
Built by	Springer narrow boat
Hull construction material	Welded steel plate
Build date	31 to 40 years old

Table 1: Vessel Details

4. Description of Findings

4.1. Through-Hull Penetrations

4.1.1. Table 2 and Figure 1 summarise the through-hull penetrations found on MARY BELL.

#	Function	Type	Distance above or below waterline (approximate)	Notes
1	Foredeck drain, port	Hole in side plate	50 mm above	These drains at same level as foredeck. The sill of the door onto the foredeck was 75 mm above foredeck level, therefore sill **only 125 mm** above waterline
2	Foredeck drain, starboard	Hole in side plate	50 mm above	
3	2 off, engine compartment air vents	Large louver type vents	200 mm above	These vent directly into engine compartment
4	Engine exhaust outlet	welded steel pipe	> 200 mm above	Steel pipe in good working order. **No swan neck** (anti-siphon loop)
5	Bilge pump outlet (un-used)	welded steel pipe	110 mm above	Attached to non-reinforced hose with one steel clip. **No swan neck** (anti-siphon loop) No bilge pump attached to this hose
6	2 off, engine compartment air vents	Large diameter holes in side plate	190 mm above	These vent directly into engine compartment
7	Gas cylinder locker vent, upper	Hole in side plate	10 mm below	Originally blocked-off with old rubber glove
8	Gas cylinder locker vent, lower	Hole in side plate	**30 mm below**	This hole was not blocked off, allowing continuous flooding of gas cylinder storage locker.
9	Heads waste water pump out	welded steel pipe, hose pushed through hole	140 mm above	Hose not secured to skin fitting, just pushed through hole. **No swan neck** (anti-siphon loop)

Table 2: Function and condition of through-hull penetrations, hoses and clips

4.1.2. Through-hull Fittings less than 250 mm above waterline

4.1.2.1. The through-hull fittings of the engine exhaust outlet, the un-used bilge pump hose and the heads waste water pump-out (items 4, 5 & 9 in Table 2 and Figure 1) were all located below the minimum recommended clearance height of 250 mm above the vessel's static waterline and were not fitted with isolation valves. Boat Safety Scheme guidelines state that where it is necessary to have the through-hull fitting below the 250 mm height, the through-hull should be permanently and securely connected to ducts or hoses that are watertight up to the 250 mm level. In practise, this means that the attached hoses should be secured to the skin fitting with two stainless steel hose clips, if possible. Additionally, the attached hose should be looped upwards to form a swan neck, where the top of the loop is at least 250 mm above the waterline. This swan neck should be securely held in place to prevent it from falling below 250 mm.

4.1.2.2. Table 2 above shows that the through hull openings of the un-used bilge pump outlet and the heads waste water pump outlet (items 5 & 9 in Table 2 and Figure 1) were very close to the waterline. Note that the attached hose of the un-used bilge pump was not connected to any pump and the gradient of the hose sloped downwards.

4.1.3. Gas Cylinder Storage Locker

4.1.3.1. The gas cylinder storage locker was fabricated from steel plate, with continuously welded seams. The port side of the locker was formed by the topside plating and was fitted with two vent holes to allow any leaking gas to escape out of the vessel. The upper vent hole (item 7 in Table 2 and Figure 1) was located approximately 10 mm below the waterline. At the time of the survey, this hole was blocked off with an old rubber glove. A second vent hole was located immediately below the first (item 8 in Table 2 and Figure 1) and was positioned approximately 30 mm below the waterline. During the survey, both vent holes were blocked by the Surveyor with softwood bungs, to minimise the risk of further flooding via these vents. The outside position of these vent holes are shown in Figure 2.

4.1.3.2. The lower vent hole of this locker would have allowed river water to enter this locker. In normal operation, the welded base and sides of the locker would have prevented water ingress into the engine compartment & vessel interior. Visual inspection of the locker base and sides found that all steel plating was in fair condition, except for the aft steel panel of this locker. Rust holes through this panel were noted. One of these holes was approximately 50 mm diameter. When lightly kicked with a rubber wellington boot (no steel toe-cap), further holes were created to port & starboard of the original holes. An image of these holes can be seen in Figure 3, shown from inside the gas cylinder storage locker. Note that the water height inside this locker was the same as the water level outside of the vessel. In the photograph, the minimum height between the edges of these holes and the waterline was 15 to 20 mm. Note that this height was measured whilst the Surveyor was on board, standing on the port side of the engine compartment. With the vessel free of people, these holes would have been approximately 30 to 40 mm above the waterline.

4.2. Other Potential Sources of Water Ingress

4.2.1. Propeller Shaft Seal

4.2.1.1. The propeller shaft seal was inspected and found to be free of any evidence of leakage.

4.2.2. Weed Hatch

4.2.2.1. The steel plating and the welded edges of the weed hatch were visually inspected and hammer tested and found to be in serviceable condition, with no evidence of significant thinning of the plating.

4.2.2.2. The clamped lid & seal of the weed hatch were inspected without removing the lid. These were found to be in serviceable condition. There was no evidence of leaking around the seal of the lid. The seal of the lid could not be tested (by hose pipe test), therefore the watertight integrity of the weed hatch could not be fully assessed.

4.2.3. Cabin Roof & Sides

4.2.3.1. The integrity of the cabin roof and sides were inspected. There was no evidence to indicate that rain water had leaked into the vessel through any gaps or openings. The vent holes of the solid fuel stove and water heater were either fitted with a cowl or were sealed off with tape.

4.2.4. Hull Integrity

4.2.4.1. There was no exterior access to the submerged parts of the hull plating. Interior access to the bottom plating was restricted by the presence of concrete ballast and the fixed panels of the interior floor lining. Where accessible for inspection, the hull plating was found to be reasonably sound, with no evidence of water ingress through any holes in the plating.

4.3. ELECTRICAL SYSTEM (240 VOLTS A.C.)

4.3.1. A shore power (240 volts a.c.) system was installed on MARY BELL. This included a Sterling Power Products battery charger, mounted just forward of the four 12 volts d.c. batteries and directly beneath the plywood sole boards of the cockpit. I was informed by the Marina Manager that at the time of the sinking, the vessel was not connected to shore power, therefore the only intended method of charging the vessel's four 12 volts d.c. batteries was via the solar panel.

4.4. ELECTRICAL SYSTEM (12 VOLTS D.C.)

4.4.1. Solar Panel

4.4.1.1. A large, rigid solar panel was mounted on the cabin roof. This was connected to the vessel's 12 volts d.c. electrical system via a Solar Technology International charge controller unit, mounted inside the cabin, secured to the starboard side of the aft bulkhead.

4.4.1.2. Figure 4 shows the condition of the charge controller unit. At the time of survey, the corroded and broken in-line fuse of this unit was lying on the galley worktop, positioned directly below the unit. It was determined that due to the heavy corrosion of the terminals and the broken condition of the fuse, the solar panel had been out of operation for a non-determinable length of time.

4.4.2. Batteries

4.4.2.1. Four deep-cycling, 12 volts d.c. leisure batteries were installed inside the engine compartment, positioned immediately to starboard of the engine. These were resting on a rubber mat, supported by the uxter plating of the hull.

4.4.2.2. The negative posts of all batteries were in good condition and free of significant corrosion. Figure 5 shows the poor condition of one of the positive posts. All four positive posts were in a similar condition. The heavy corrosion on these posts would have significantly affected the efficiency of the batteries and their ability to provide power to the single electric bilge pump.

4.4.3. Bilge Pump

4.4.3.1. One automatic bilge pump, with integrated float switch was installed on MARY BELL. This unit was installed inside the engine compartment, located directly beneath the propeller shaft seal. The pump body was not secured to the bottom plating of the hull. When functioning, this unit would pump water out of the bilge compartment beneath the propeller shaft seal, but due to the high sides of the compartment, it would only pump water out of adjacent compartments (including the living quarters) once water had flowed over the sides of this bilge space.

4.4.4. At the time of inspection, the outlet hose of this pump was lying inside the engine compartment, not connected to any skin fitting. Prior to the salvage operation, the outlet of this hose may have been projecting through one of the louver vents (item 3 in Figure 1 and Table 2). The possibility that this hose was dislodged by the salvage team during the recovery operation cannot be ruled out, but there was no evidence to indicate that this was the case.

4.4.5. *[Name & name of salvage company removed]* informed me that during the recovery operation, they had to remove the switch panel of the 12 volts d.c. electrical system, which was in the way of their access to the interior. Peter informed me that prior to this, the two wires of the electric bilge pump were still connected to the switch panel.

4.4.6. In order to test the functioning of this bilge pump, the two wires of the pump were connected to a 12 volts d.c. power supply (provided as a temporary measure by the salvage company). The pump was found to function normally.

4.5. Cockpit Canopy and Integrity of Cockpit Sole

4.5.1. A black plasticised canvas cockpit canopy was fitted over the cockpit, supported by a tubular steel frame. This canopy can be seen in the image on the front cover of this report. I was informed by the Marina Manager that this canopy was not fitted with side panels. In addition to the black canvas, a thin blue plastic tarpaulin was fitted over the canopy, which protected the sides of the cockpit “to a degree” from rain water ingress. This blue tarpaulin was also “blown about by the wind”. The aft plastic window of the canopy was found to be old and torn.

4.5.2. During times of rainfall, the poor condition of the canopy and blue tarpaulin would have allowed small but significant quantities of rain water to enter the cockpit.

4.5.3. The cockpit sole boards were made up of approximately eight plywood panels. Each was supported by the raised edges of the cockpit coaming or by U-section steel channels, welded at their ends to the cockpit coaming or forward cockpit bulkhead. All rain water entering the cockpit would drain over the edges of the plywood boards and into the bilges of the engine compartment.

4.6. Other Considerations

4.6.1. No evidence of vandalism or attempted break-in was noted.

4.6.2. During discussions with the Marina Manager, I asked him if water levels in the Marina varied. He stated that water levels in the Marina do vary by a small amount. When I pointed out that if the mooring lines were tight, and the water level rose, then the vessel could be pulled down by an amount. The Manager stated that if this were to happen, then they would notice this and slacken the mooring lines.

4.6.3. I was informed by *[Name of Claims Handler removed]* that the hull below the waterline of MARY BELL had been repaired in the past using an over-plating technique. The favoured method used to return the strength and water-tightness to a corroded hull is the full removal of the thin plating, followed by the welding of new hull plate. Compared to this method of re-plating, over-plating is not considered to be an adequate structural repair. When over-plating is carried out over a large area, it significantly affects the buoyancy and stability of the vessel and can significantly reduce its freeboard height. In the case of MARY BELL, it is very likely that the addition of over-plating has reduced its freeboard height.

5. CONCLUSIONS

5.1. In consideration of all of the evidence gathered during the inspection and after the conversations with the Marina Manager, the following list describes the most likely cause of sinking:

1. Solar panel control unit not functioning, therefore no charging of batteries (section 4.4.1).
2. Batteries run flat through lack of charging and regular running of bilge pump. This would have taken place during a period of several months of significantly high rainfall.
3. No bilge pump operation.
4. Poor condition of cockpit canopy (paragraph 4.5.1) allowed rain water to enter cockpit. Cockpit not self-draining (paragraph 4.5.3), allowing rain water to accumulate in bilges of engine compartment.
5. During the period of high rainfall, which the UK had experienced immediately prior to the Incident, there would have been a gradual drop in the vessel's freeboard height at the stern of the vessel, with the majority of the water accumulating in the bilge spaces of the engine compartment.
6. After the stern of vessel had dropped by 30 to 40 mm (the height of the rust holes in the side of the LPG cylinder locker above the vessel's original waterline, discussed in paragraph 4.1.3.2), the vessel would have taken on water more rapidly. Soon after, the hose of the un-used bilge pump (item 5 in Table 2 and Figure 1) would have reached the waterline and then taken on water through the hose.
7. Finally, when the waterline reached the four air vents of the engine compartment (items 3 & 6 in Table 2 and Figure 1), these large openings would have allowed water into the vessel at a very high rate, sinking the boat within minutes.

6. RECOMMENDATIONS

6.1. As soon as the ‘red board’ ban on the local river is lifted, the vessel should be towed to the nearby lifting facility and lifted ashore. Prior to this, careful attention should be given to ensure that the vessel does not sink again.

6.2. When ashore, the hull should be inspected for evidence of any severe corrosion that might have lead to water ingress via corrosion holes in the hull.

6.3. If the boat is to be refurbished, the following work should be undertaken:

1. Replace gas cylinder storage locker.
2. Test weed hatch and replace seal.
3. Raise all skin fittings to >250 mm above waterline and / or fit with anti-siphon loops in attached hose.
4. Raise sill of foredeck door.
5. Improve the weather protection of the cockpit.

Date of publication: Friday 6th May 2020

7. PLAN VIEW AND PHOTOGRAPHS OF MARY BELL

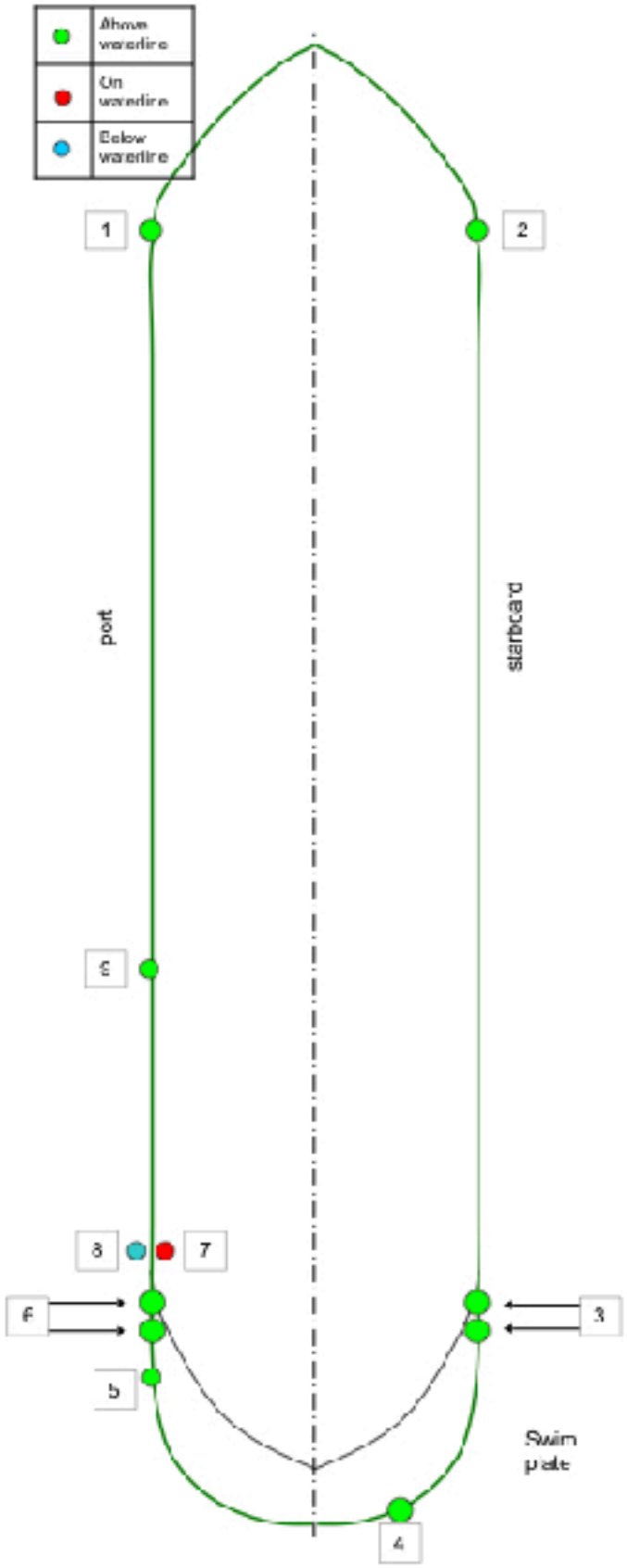

Figure 1: Plan view of MARY BELL showing locations of through-hull penetrations

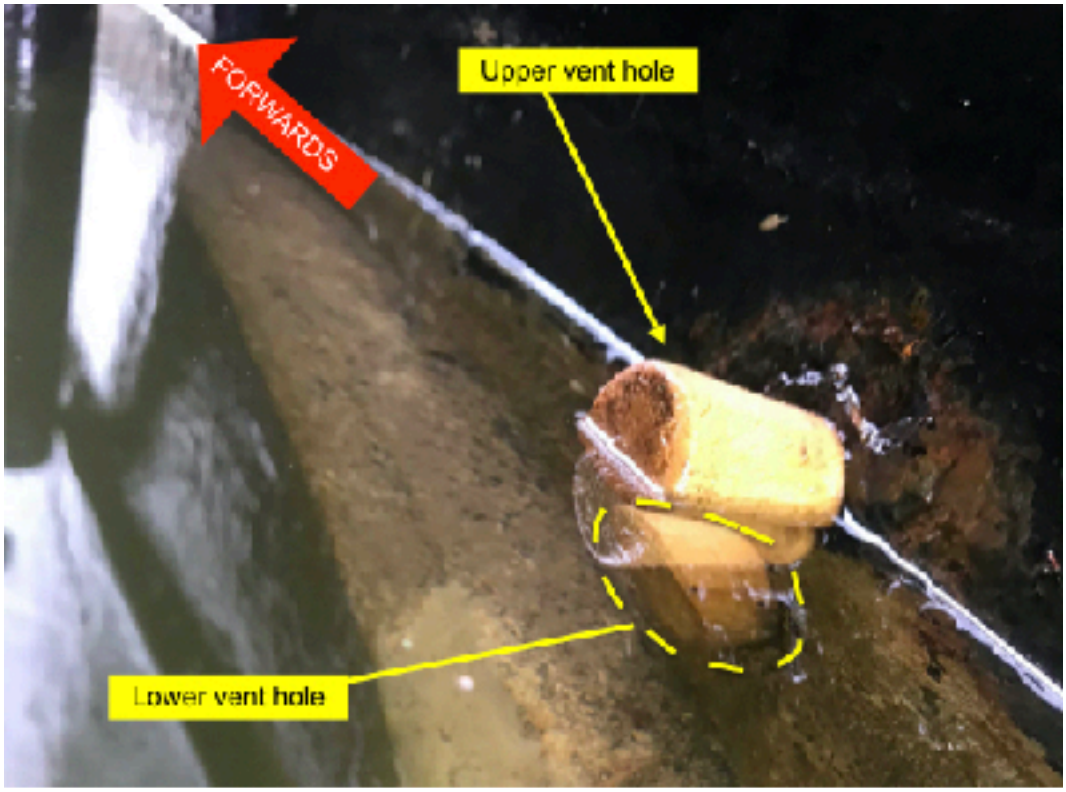

Figure 2: Exterior view of LPG cylinder locker vent holes (wooden plugs fitted by Surveyor)

Figure 3: Corroded plating on inside panel of LPG cylinder storage locker

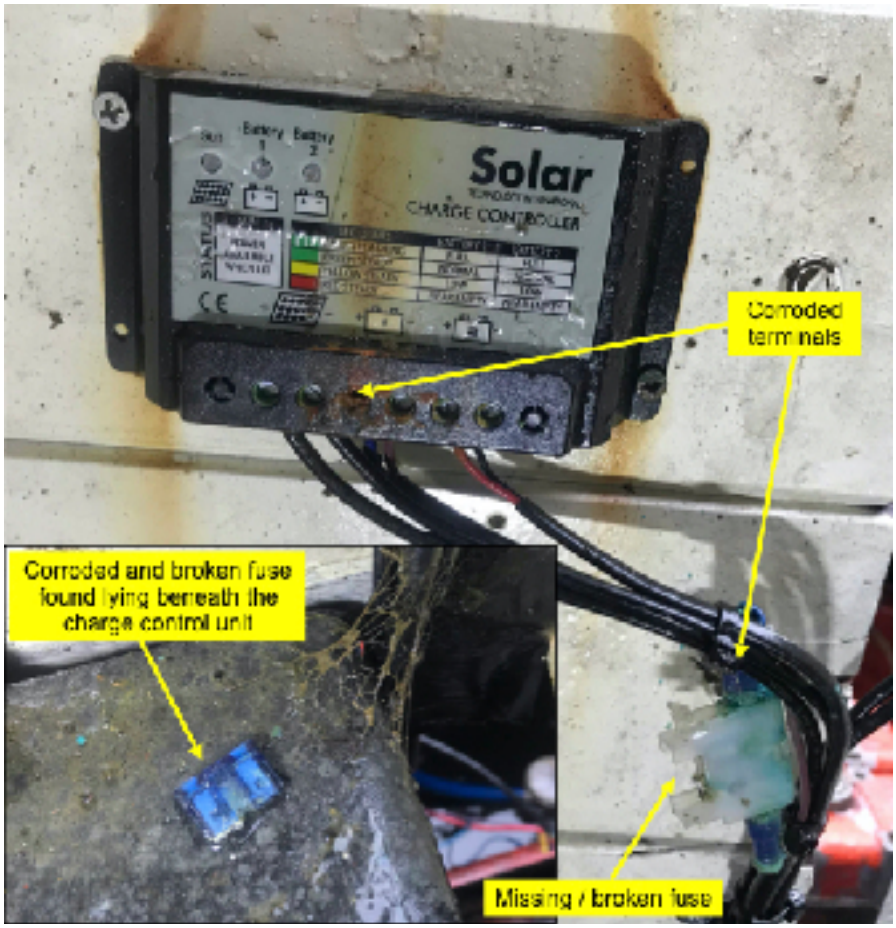

Figure 4: Condition of solar panel charge control unit

Figure 5: Typical condition of battery terminal posts