



Diving Service



- Marine Contractors

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To Martin Dawson
Department of Crown Lands

From Alan McLennan
Project Manager

29th April, 2021

LTMMMP Inspection of ex-HMAS Adelaide wreck April 2021

Thank you for asking MDS to inspect the ex-HMAS Adelaide in order to carry out the requirements of the Long-Term Monitoring and Management Plan (LTMMMP) for structural condition monitoring. This report also includes inspection of the barred off areas in the upper superstructure and Ultrasonic Thickness (UT) testing of the six Monitoring Locations. Our last LTMMMP inspection was on March 13th, 2020. MDS Divers carried out the survey of the wreck on April 14th, 15th and 16th 2021.

The Dive Team was supervised by David Allchin and Alan McLennan with the five divers Daniel Fell, Zoe Pocklington, Nathan Hay and Tony Whitem. All the divers hold ADAS Part 2 or 3 qualifications and are experienced naval ship inspectors. The diving equipment used was SCUBA and the breathing gas was Nitrox 32%. The team operated from the 2C surveyed boat "Sea Hunt" (AMSA registration 425 435). The diving method was a combination of SCUBA buddy pairs and SCUBA using AGA Divator masks with hard wired voice communications.

The depth of the diving was limited to 30 metres in order to maximize our dive time and comply with AS2299.1.2007 Section 7. This depth allowed the divers to descend to just below the main deck level and observe the hull down to the seabed. The sea state was a low swell and light northerly winds. The inspection followed shortly after a record rainfall event on the east coast of NSW. As a result, the water was very dirty, and a strong northerly current was running over the wreck site from the flooded Hawkesbury River.

Results of the survey

Vessel List and Trim - The vessel remains at the same list as in previous years at approximately 4 degrees to port. This was determined by use of digital depth gauges on the gunwales amidships and a spirit level placed on the hangar deck

The trim of the vessel was also unchanged. The sand level was similar to previous years with the sand being very close to the vessel's seagoing waterline. The duckbill on the transom was just under the sand and the bow was buried to the tip of the keel.

Barred Off areas – The 35 barred off areas on Page 25 of of Annexe A of the LTMMP were examined and all bars were found to be in place except for the destroyed Hangar Catwalks and Captain’s Bathroom.

Hull Integrity - The vessel can be divided horizontally into two halves. The top half is the aluminium superstructure and the lower half below the main deck is the steel hull.

The Steel Hull - The lower half of the vessel below the main deck has suffered little deterioration since the sinking. This continues to be the case. No corrosion, cracking or displacement of fittings was observed on the outside or inside of the steel hull. All entrance ways inspected were clear. All long-term monitoring points were inspected, and no deterioration was found since our last inspection. These locations were:

- the Missile launcher opening,
- the Forward screen,
- the Hangar frames.
- the Transom

The Aluminium Superstructure - The upper half of the vessel has continued its steady rate of deterioration. There is increased corrosion and cracking in most areas, but this is at the expected rate.

We did not locate any new areas of cracking or panel breakouts since our last interim inspection in December 2020.

The Divers swam through the centre of the superstructure and found that all the openings were clear. They found that several fittings that had been attached to a wall were loose and were near an entrance amidships, so they jettisoned these to the seabed.

LTMMP Monitoring Locations –Thickness Testing

In addition to visual monitoring, the locations were also thickness tested at three separate points close to the monitoring point. The method used was as follows at each area to be measured:

- An area was selected for testing and its position was recorded.
- An area 100mm in diameter was scraped clean.
- An Olympus 26MG ultrasonic thickness gauge with a 60-metre-long probe cable was used to measure the metal thickness. The probe was placed on the cleaned area and the diver notified the surface team by two-way voice communications.
- When a stable reading was achieved the Diving Supervisor recorded the thickness and told the diver to move to the next location.
- The thickness test results were recorded in the table below

Location – Main Deck except for Location 6	Frame Number	Nominal Thickness (mm)	Recorded thickness (mm)2020	Recorded thickness (mm)2021	Difference to Nominal (mm)
1 – Hangar Deck – 300mm aft of the centre pillar –	335	6.35	6.79	6.8	+0.45
2 – 300mm off the change in shape at waist on the port side -	180	7.95	7.73	7.68	-0.27
3) 300mm off the change in shape at waist on the starboard side -	180	7.95	8.01	8.08	+0.13
4) 300mm off the base of the weather shield – port side	100	6.35	7.53	6.88	+0.53
4) 300mm off the base of the weather shield – port side	100	6.35	6.51	6.5	+0.15
5) 300mm off the missile launcher opening	85	9.52	10.9	9.57	+0.05
6) Base of main mast 02 deck	Too corroded to measure				

Notes on the thickness tests

- In some areas the paint coatings were not ground off. The paint thickness is included in readings above. This may explain some of the thicknesses being greater than the nominal steel size.

LTMMP Monitoring Locations – Visual Monitoring

The Divers made note of the monitoring items listed in the LTMMP Locations 1 to 6.

- Location 1 – The hull plating on the forecastle just aft of where the GMLA launcher. There has been no deterioration in this area.
- Location 2 – Amidships at the base of the forward weather screen (where the superstructure and hull are bonded together) – There is no visible deterioration in this area. There is no sign of any separation between the forward screen and the hull.
- Location 3 - At the vertical midpoint of the main masts – The mast appears to be in a similar condition as 2021. The entire main mast was examined however the mast is heavily encrusted with marine life restricting a detailed examination. There appears to be no sign of cracking or deformation. All parts of the mast remain straight and true. The base of the mast was also closely examined, and no sign of cracking or deformation were observed.
- Location 4 – The connections of the masts to the 02 deck. There is no sign of any deterioration in the legs. No cracking or deformation was observed. However, the aluminium plating that the legs pass through has severely corroded.
- Location 5 – The hull plating on the transom – The transom area has changed very little since the sinking.
- Location 6 – Where the helicopter hangars are attached to the hull. In May 2015 the starboard hangar wall suddenly broke way and fell to the seabed and in 2019 the port side wall also broke away. The main framework of the hanger is steel, and this is still securely attached to the main deck. The frame is showing no sign of failing.
- Internal Debris – The internal areas were free of fresh debris apart from a set of shelves which partially blocked a passageway.

Moorings

Only one special Markers was intact and in position. The other Special Marker is on a mooring in the Haven. Only two mooring buoys were present. One mooring was connected to the top of the mast. The second mooring was fastened to the starboard side near the top of the hangar. All parts of these mooring connection were in good condition.

Marine Life

The marine life is still in abundance on and around the ship. The mast still holds dense plant life. The top of the wreck still attracts many bait fish such as the Yellowtails, and predator fish such as Kingfish. There were several large Wobbegong sharks laying on the ship.

Corrosion

There were no signs of corrosion observed in the steel hull. The hull appears to be in the same condition as the last survey in 2020. In places the thick marine life was scraped off for thickness testing, the original grey paint coating was still intact.

The aluminium superstructure however displays widespread signs of severe corrosion. As seen in the last survey, the welded joints of the panels to the sub frame have corroded away in many areas leaving the panels likely to be dislodged.

On the 02 deck there is widespread delamination of the aluminium panels. There are many deposits of the white corrosion products. There are many corrosion holes through the frame members. The weld seams of most of the exterior panels of the aluminium superstructure are highly corroded.

Despite the continuing corrosion of the superstructure, there has been no new cracks or loss panels since our last inspection.

Conclusion –

- All passageways are open and unobstructed. We found no swinging panels or obstructions that could restrict egress from the wreck.
- All “barred off” area barriers remain intact.
- The vessel position remains unchanged
- We found no new dangers that would increase the hazard for recreational diving since our last report.

Thank you for asking us to undertake this inspection, regards,

Alan McLennan
Phone 0433 111 5 28

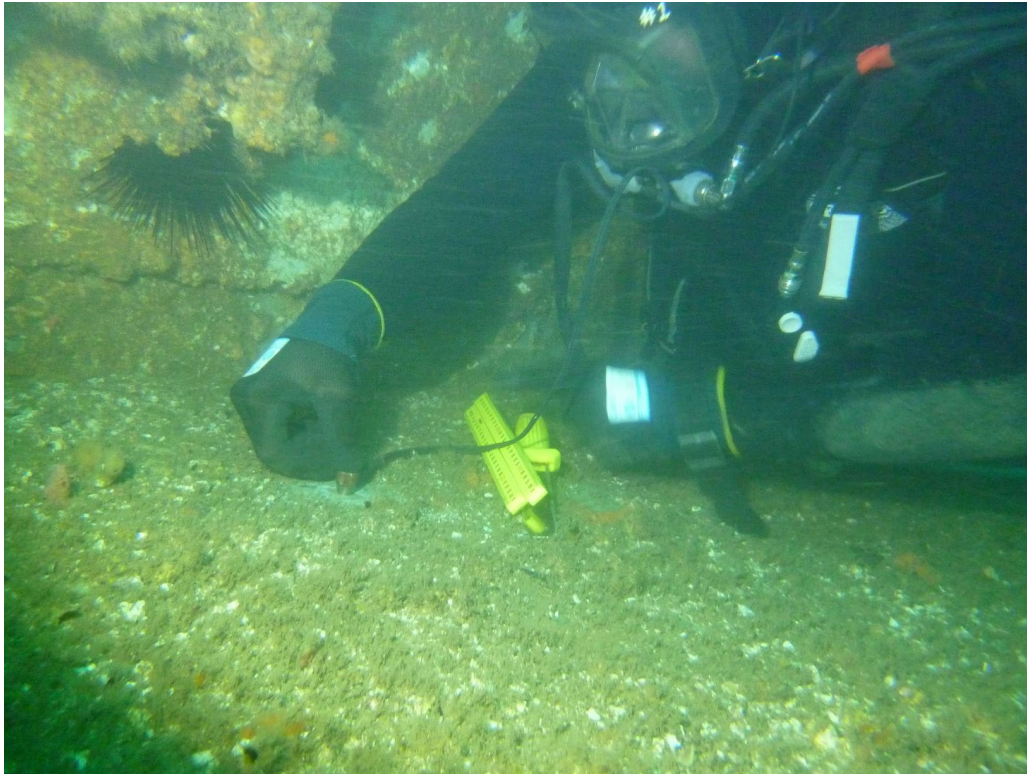


Figure 1 Diver collecting thickness measurement at the port side amidships

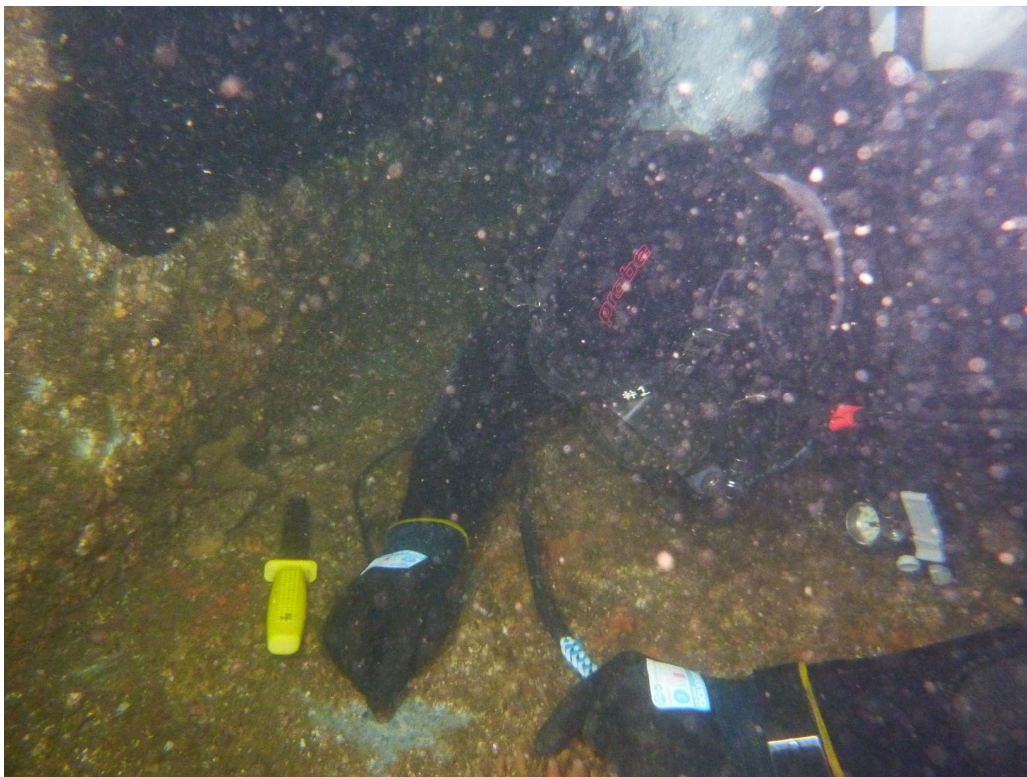


Figure 2 Diver collecting thickness measurement at the starboard weather shield.



Figure 3: Close up of thickness testing location on Starboard side amidships. Note the grey hull paint still intact

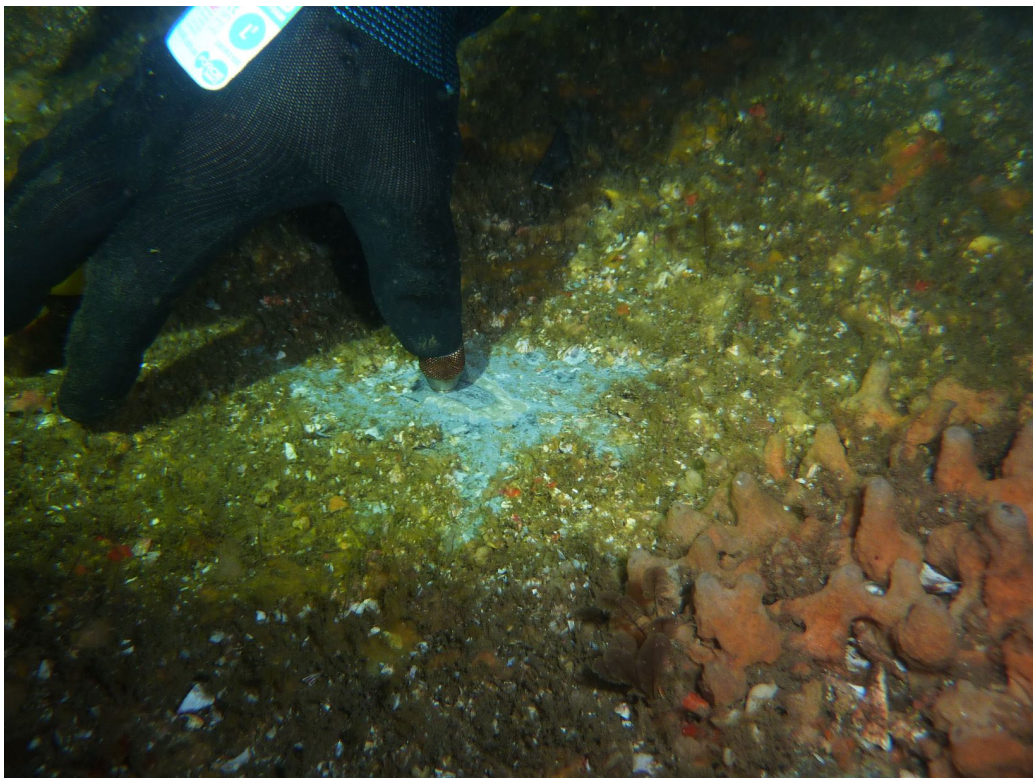


Figure 4 Close up of thickness testing location on the hanger deck. Note the grey hull paint still intact



Figure 5: The list was checked by using a level and ruler on the hanger deck. No change was found in the usual list of 4 degrees to port



The list was also checked by placing a depth gauge on opposite gunwales amidships.

The difference of 900mm was the same as previous tests indicating that the list was unchanged.



Figure 6 Escape Hatch 1 Frame 251 Port Side - Bars in place



Figure 7: Escape Hatch 1 Deck Frame 210 -Bars in place



Figure 8: 400Hz Freq Changer Room Frame 262 - Bars in place



Figure 9: Escape Hatch 02 Frame 144 - Bar intact



Figure 10: Passageway 1-212-0-L Frame 247 - All bars intact

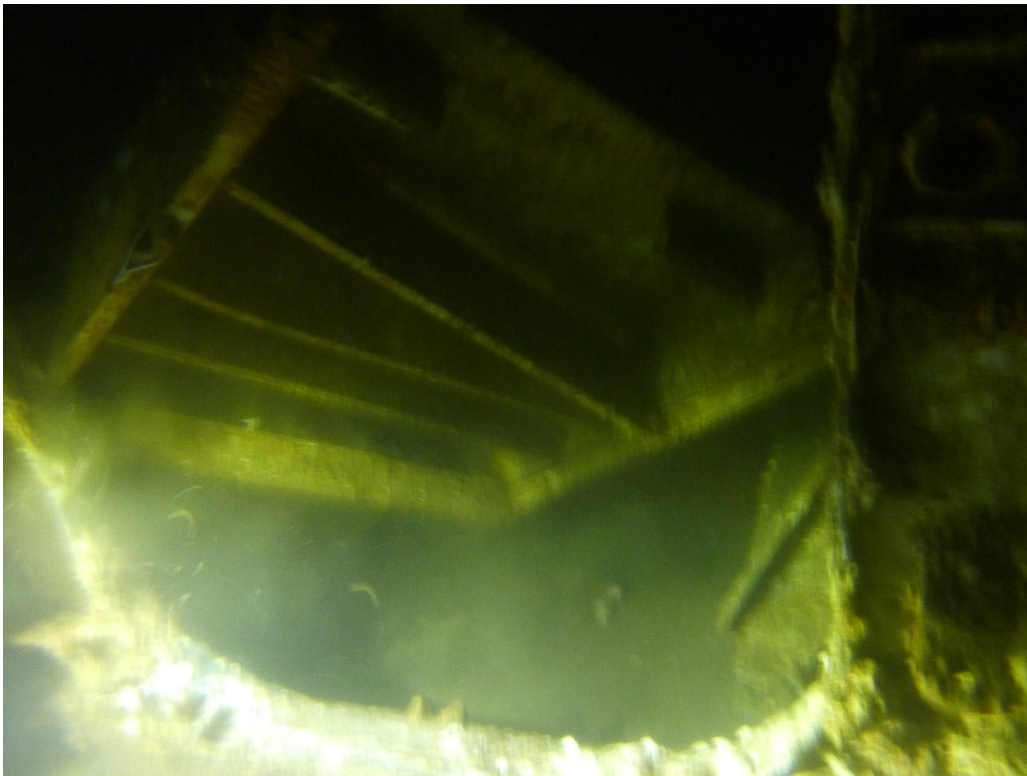


Figure 11: Fallen shelves blocking a passageway. These were jettisoned overboard.



Figure 12 Another view of the jettisoned shelves



Figure 13: The Main mast is fully intact and shows no sign of wear.



Figure 14: A close-up of the strut of the main mast. It is fully encrusted with marine growth and no sign of corrosion or cracking.



Figure 15: A view of one of the main mast legs showing a sound connection to the superstructure.



Figure 16: A similar view of another leg of the main mast