



DEBRIS EXAMINATION REPORT

SAFETY INVESTIGATION FOR MH370

**Malaysia Airlines MH370 Boeing B777-200ER (9M-MRO)
08 March 2014**

Identification of Debris (Items 28 to 32 in the “Summary of Possible MH370 Debris Recovered”) recovered from Madagascar in 2016, 2017 and 2018

Issued on 30th December 2018

Ref: DB/01/18



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Safety Investigation Team for MH370

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Introduction

Five pieces of debris were handed over to the Minister of Transport, Malaysia on 30th November 2018. These were then handed over to the Malaysian ICAO Annex 13 Safety Investigation Team for MH370 for identification and examination. For indexing purposes these pieces are identified as Items 28, 29, 30, 31 and 32 and added on to the “**Summary of Possible MH370 Debris Recovered**”. These pieces were all found in Madagascar at different times between late 2016 and late 2017, except for item 30 which was found in August 2018. The debris were examined to determine whether they could be from MH370.

Item 28

This item was found in the Antongil Bay, Madagascar. The Antongil Bay is situated at the northern end of the east coast of the island. The debris was of triangular shape with a width of approximately 10 in. and height of 12 in. It had a partial grey skin on one side. The debris had an edge band with 4 fasteners’ holes still visible with one of the holes torn. The spacing between the fastener holes was 2 in. apart.



The construction was a hybrid laminate with plies of Carbon Fibre Reinforced Plastic (CFRP) and Glass Fibre Reinforced Plastic (GFRP) composite sandwich panel with non-metallic honeycomb core. It was a standard construction of aircraft sandwich part. The thickest part of the core was approximately 1.5 in.



There were no identification numbers on the part. Based on the plies of carbon tape layers the piece of debris was similar to part of the vertical stabilizer trailing edge panels forward of the rudder of a B777 aircraft. However, the fastener spacing on these panels is 1.2 in. as opposed to 2 in. on the debris. The small size of the debris made it difficult to determine whether it could be from a B777 aircraft.

Item 29

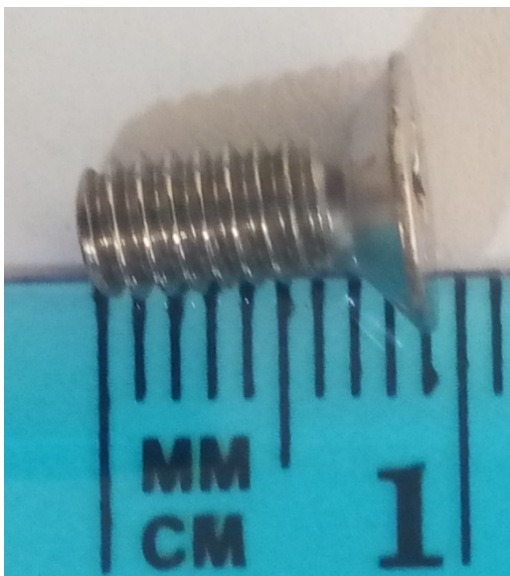
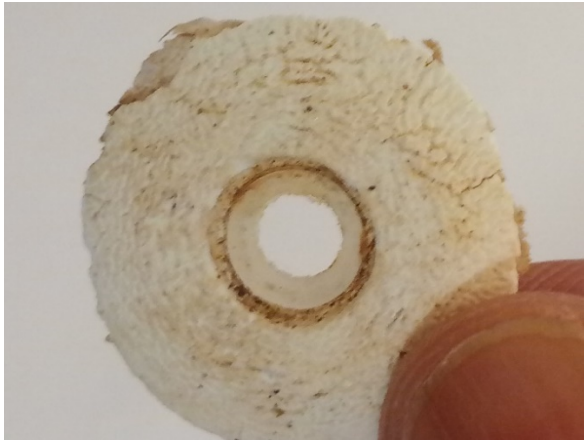
This piece of debris was found in Antongil Bay, Madagascar. The size was approximately 13 in. by 11 in. and approximately 0.6 in. thick. The paint scheme was slight white, which had been discoloured. It was badly fractured and could be from a larger part since there were no end of parts visible on this piece.



It was constructed from laminate plies of Glass Fibre Reinforced Plastic (GFRP) composite with non-metallic honeycomb core. There were no black colour plies, which means there were no carbon plies in the laminate. The non-metallic honeycomb core had also been discoloured possibly due to exposure to the weather. A countersunk fastener remained attached to the panel. The fastener was screwed into a potted insert.



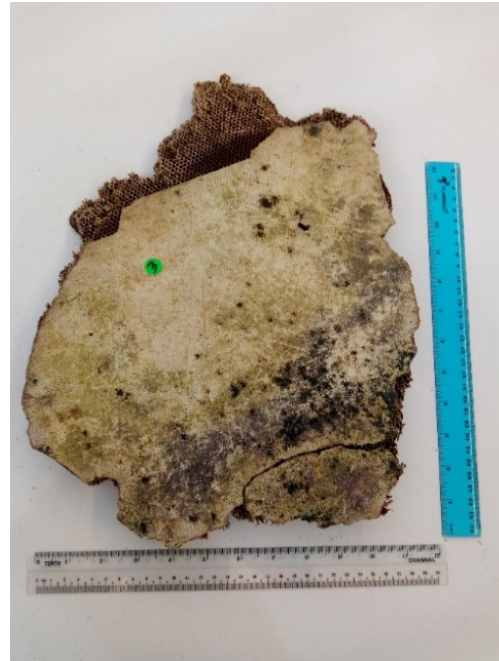
It was obvious that the fastener was not designed to carry high load and was used to hold a plastic panel piece; the rest of the piece had been ripped off with only a small piece remaining secured by the fastener. The fastener was approximately 9 mm in length and had a Phillips countersunk head.



The potted insert indicated that the part was not a primary carrying structure and was most likely an interior part possibly from a cargo floor panel or main deck interior or ceiling panel. However, it was difficult to determine whether it could be from a B777 aircraft.

Item 30

This piece of debris was found on the Riake Beach, which is situated north-east of Sainte-Marie in Madagascar. It was brownish on both sides. The part was fractured on all sides and without end of part. There were no fastener holes, or any form of identification numbers found on the part.

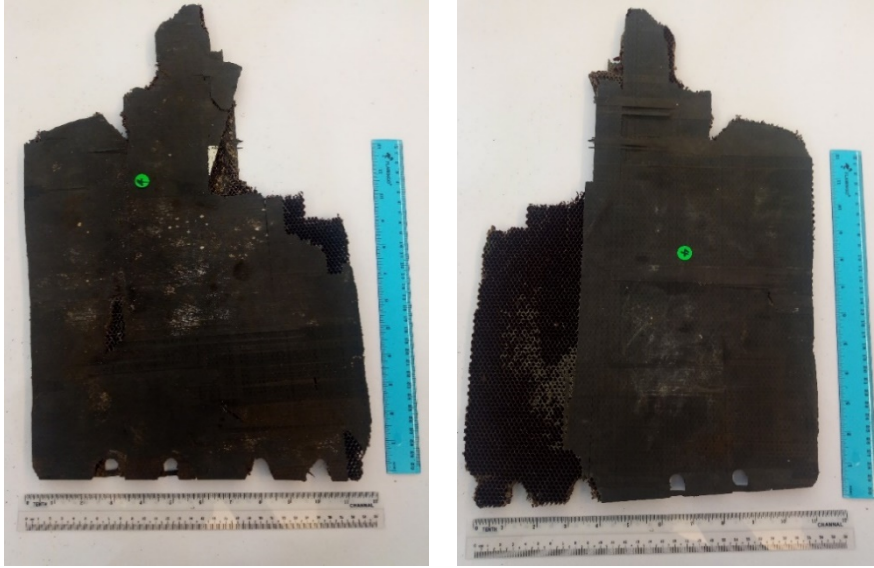


The part was approximately 14 in. by 11 in. It was constructed of laminate plies of Glass Fibre Reinforced Plastic (GFRP) composite with non-metallic honeycomb core, approximately 1 in. thick.

The part is possibly part of a cabin interior wall, galley, closet, or partition. Many lavatory and galley walls have similar construction and are about 1" thick. However, the partitions on MAS B777 are mostly 1.3" thick. Therefore, there is no conclusive evidence that this part could be from a MAS B777.

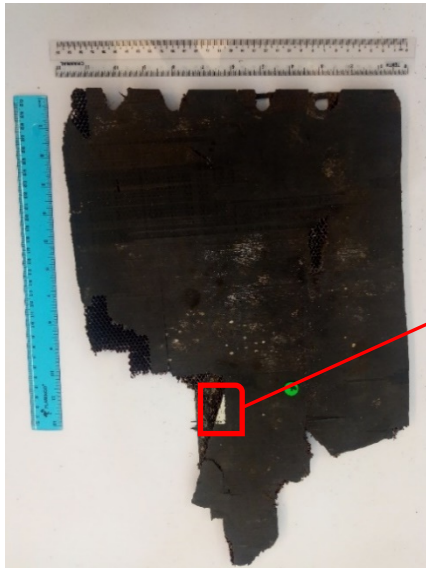
Item 31

This piece of debris was found in Sandraviny, South Madagascar. The part was black in colour and it was obvious that it was made of carbon. The part was approximately 17.5 in. by 11.5 in. The unidirectional carbon fibres were clearly visible. On the edge of the panel there were signs of potted inserts that were ripped off.



The piece of debris was constructed of laminate plies of Carbon Fibre Reinforced Plastic (CFRP) with approximately 0.4 in. thick non-metallic honeycomb core.





Part of a white placard was visible on one side of the debris with the characters "VPPS61". On further research it was determined that these characters were the trailing numbers of the part number of the placard (marker) 'BAC27WPPS61' which is used for the cabin floor panels on the B777 aircraft. This part number is placed at the bottom right hand corner of the placard, as shown below, which is an extract from a Boeing drawing for such a placard. Part of the character 'W' was missing on the debris giving the impression that it was a character 'V'.

**REPLACEMENT OF
THIS PANEL WITH OTHER THAN
BMS4-20 WILL REQUIRE MINIMUM
1 MIL FOIL COVERING ON
NON-FAYING LOWER SURFACE**

BAC27WPPS61

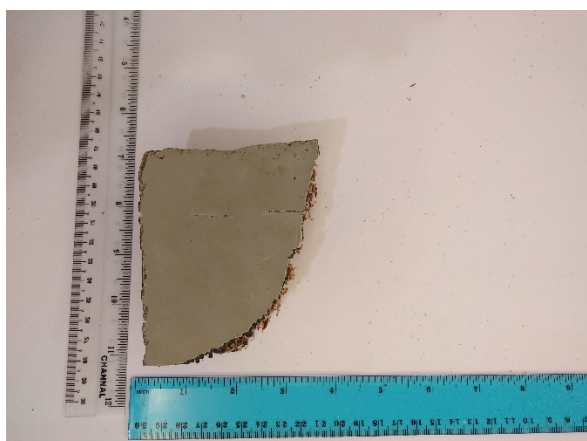
The BMS4-20 mentioned on the placard refers to the Boeing Material Specification (BMS) that establishes requirements for unidirectional and woven graphite and glass cloth faced aramid honeycomb core floor panel stock.

The thickness of the debris and the material it was made of were consistent with that stated on the floor panel manufacturer's (The Gill Corporation - one of the manufacturers) Product Data Sheet which meets the BMS4-20 specification and therefore it is almost certain that the debris is part of a cabin floor panel of a B777 aircraft.

The location of where the piece of debris was found, considering that MH370 (aircraft registered as 9M-MRO) ended its flight in the South Indian Ocean, is consistent with the drift path modeling produced by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). This suggests that the part is likely from MH370 given that the likelihood of it originating from another source is quite remote.

Item 32

This piece of debris was found in Sainte-Luce, South Madagascar. The part was approximately 4 in. by 3 in. and light grey on one side and white on the other. This was the smallest piece of the debris collected.





It was constructed of laminate plies of Carbon Fibre Reinforced Plastic (CFRP) with a non-metallic honeycomb core of 1 in. thick.

The material the part was made of indicated that it could be from the cabin interior possibly from a galley, lavatory, closet or compartment panel. However, it was difficult to determine whether it could be from a B777 aircraft.

Conclusion

There were no conclusive evidences that the five pieces of the debris could be from MH370 although they appeared to be parts from an aircraft. However, Item 31 is likely to be from MH370 (aircraft registered as 9M-MRO) based on the material it was constructed of and the visible part of the placard which confirms that the debris is a floor panel of a Boeing aircraft.