



DEBRIS EXAMINATION REPORT

SAFETY INVESTIGATION FOR MH370

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

Identification of Debris (Items 9 and 15 in the “Summary of Possible MH370 Debris Recovered”) recovered at Macenta Peninsular, Mozambique on 22 May 2016 and Riake Beach, Nosy Boraha Island, Madagascar on 06 June 2016, respectively

Updated on 30th April 2017

Issued on 28th February 2017

Ref: DB/04/17



The Malaysian ICAO Annex 13
Safety Investigation Team for MH370

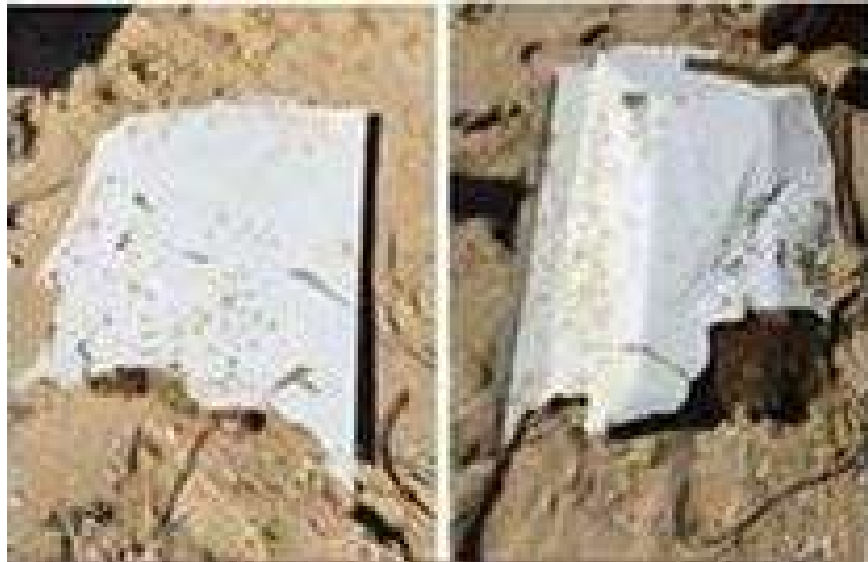
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Malaysia Airlines Boeing B777-200ER (9M-MRO), 08 March 2014

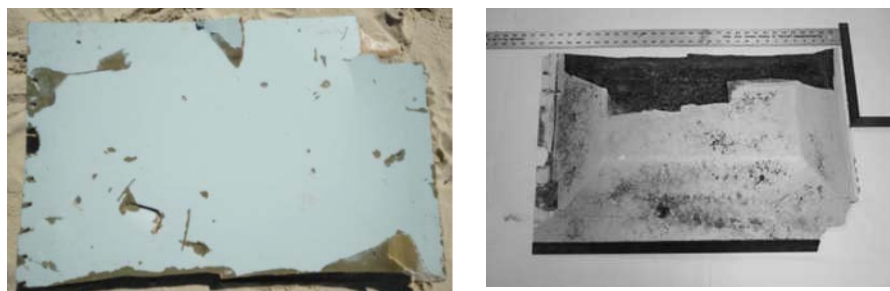
Identification of Debris (Items 9 and 15 in the “Summary of Possible MH370 Debris Recovered”) recovered at Macenta Peninsular, Mozambique on 22 May 2016 and Riake Beach, Nosy Boraha Island, Madagascar on 06 June 2016, respectively

1.0 Introduction

Item 9 was recovered at Macenta Peninsular, Mozambique on 22 May 2016 while Item 15 was recovered at Riake beach, Nosy Boraha Island, Madagascar on 06 June 2016. These parts were identified as Item No. 9 and 15 of the items found; refer to the “*Summary of Possible MH370 Debris Recovered*”.



Item 9



Item 15

The items were brought back to Malaysia for identification and further examination by the “Malaysian ICAO Annex 13 Safety Investigation Team for MH370”.

2.0 Parts’ Characteristics

Both debris (Items 9 and 15) were of composite structure with non-metallic honeycomb core and of Graphite Fibre Reinforced Plastic (GFRP) construction. The upper surfaces of the parts were painted with grey paint. The core ramps were visible at two places for Item 9 and three places for Item 15. Rub strips were still intact on one edge of the parts. Item 9 was weighed and found to be 2.18 Kg. while Item 15 was 3.34 Kg.

3.0 Identification

The parts were taken to a B777-200ER, formerly operated by Malaysia Airlines (MAS), undergoing a maintenance check at Subang, Malaysia, for identification purposes.

Item 9 matched the left part (outboard section) of the Upper Fixed Panel forward of the flaperon on the **left** wing.

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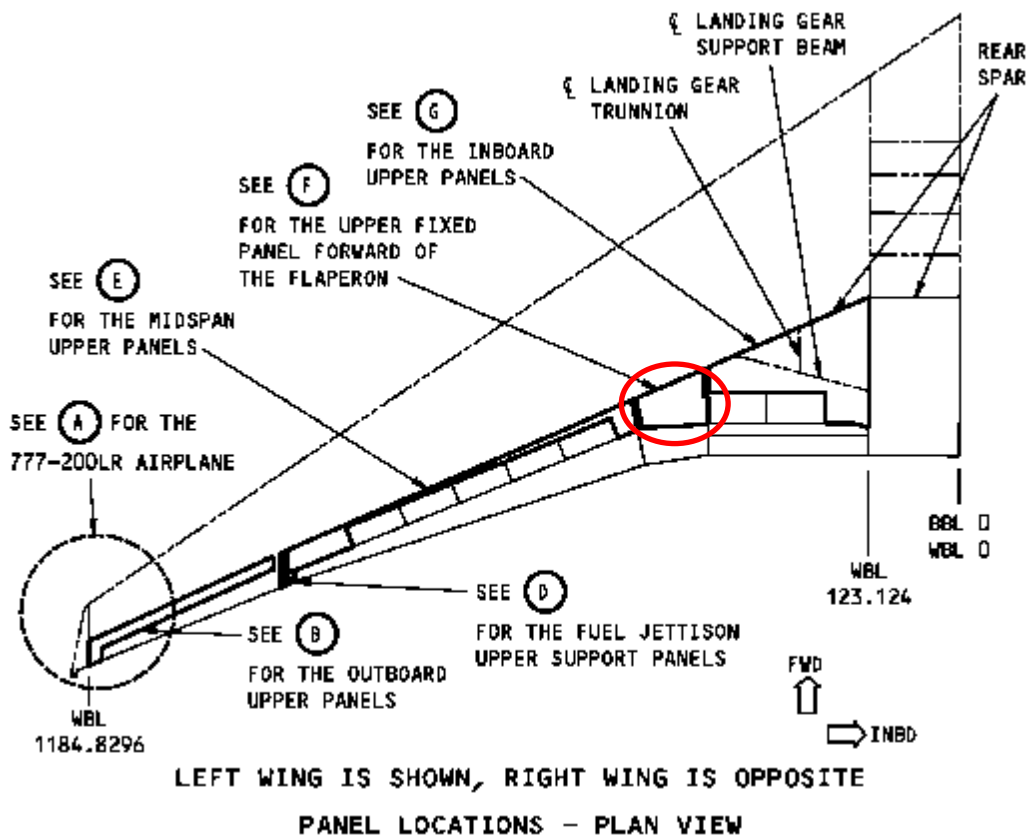
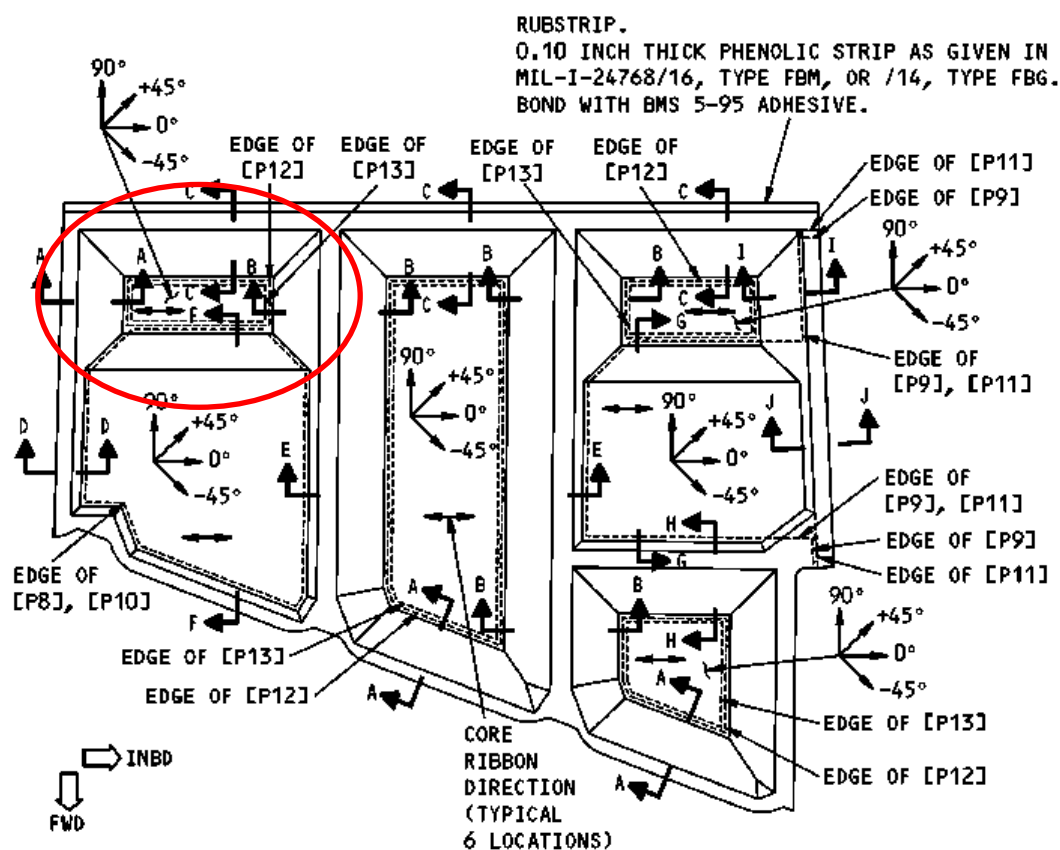


Diagram illustrating the upper fixed panel forward of the flaperon. The diagram shows a cross-section of the panel with the following labels and dimensions:

- IRSS 608**: Located at the top left corner of the panel.
- IRSS 514**: Located at the top right corner of the panel.
- [19] 115W3230**: A dimension line indicating the width of the panel.
- FWD**: An arrow pointing upwards, indicating the forward direction.
- INBD**: An arrow pointing to the right, indicating the inboard direction.

Diagram (F)

777-200
STRUCTURAL REPAIR MANUAL

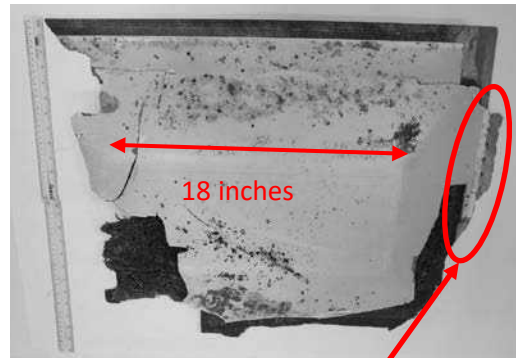
PLY LAYUP AND CORE RIBBON DIRECTION
777-200/200ER AIRPLANES

Further verification was carried out with reference to the B777 Aircraft Structure Repair Manual (SRM) which indicated that the panel was indeed the Upper Fixed Panel forward of the left flaperon.

The above figure shows Item 9 as a section of the “Upper Fixed Panel Forward of the Flaperon” on the left wing. It was observed that the outboard side was fractured and on the inboard side the fastener holes were still visible with a pitch of 1 inch. This fastener pitch matched that on the inboard side of the panel of the aircraft. The fasteners’ pitch on the outboard side was 2 inches. The raised portion of the core of the section of the panel (see figure below) of length 18 inches also matched with that on the aircraft panel.

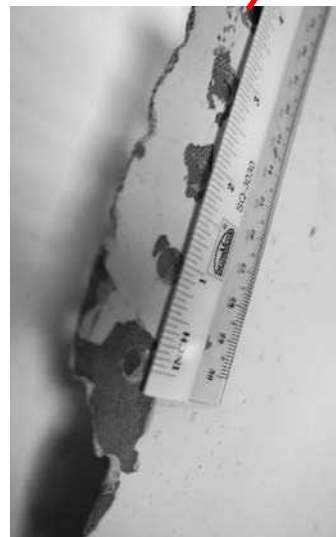


Panel on Aircraft



Debris

Item 9



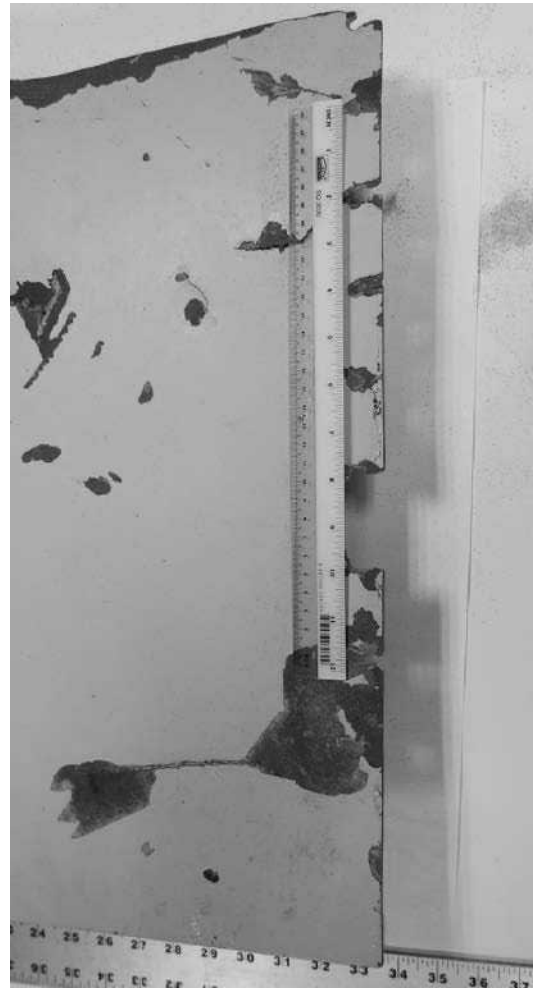
Fastener Pitch – 1 inch

Similar matching process was carried out on Item 15; it was identified to be the outboard section of the “Upper Fixed Panel forward of the flaperon” on the **right** wing (refer to figure below). The pitch of the fasteners’ holes on the right side (outboard) of the panel was measured to be 2 in. and that matched that on the debris.

The Boeing 777 Illustrated Parts Catalog (IPC) indicates that the part numbers of the Upper Fixed Panels forward of the left flaperon to be 115W3210-1 and that forward of the right flaperon to be 115W3210-2, respectively.



Item 15 against Upper Fixed Panel
forward of Right Flaperon



Fastener pitch – 2 inches

The locations of where the parts were found, considering that MH370 (aircraft registered as 9M-MRO) ended its flight in the South Indian Ocean, are consistent with the drift path modeling produced by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). This suggests that the parts are highly likely from MH370 given that the likelihood of them originating from another source is quite remote. The reports from the Australian Transport Safety Bureau (ATSB) on the drift modeling can be found at http://www.atsb.gov.au/media/5772107/ae2014054_final-first-principles-report.pdf and http://www.atsb.gov.au/media/5771939/ae-2014-054_mh370-search-and-debris-update_2nov-2016_v2.pdf.

4.0 Structure Examination

Item 9 was fractured at three places and one edge was still intact. The intact edge was that with the rub strip and indicated that it was the rear section of the panel. The fracture lines showed that the fibres were pulled but there were no signs they were kinked. The core was intact and had not crushed; it had fractured along the skin.

Item 15 had fractured at two places; the rear section was intact with the rub strip. The outboard section had the fasteners torn out with some of the fastener holes still recognizable. The inboard section was observed to have signs of 'net tension' failure as it had fractured along the fastener holes.

5.0 Conclusion

Item 9 is confirmed to be the outboard section of the "Upper Fixed Panel forward of the flaperon" on the **left** wing whilst item 15 is confirmed to be the outboard section of the "Upper Fixed Panel forward of the flaperon" on the **right** wing. From the locations where they were found, and being consistent with the drift path modeling for debris from an aircraft ending its flight in the South Indian Ocean, it is highly likely that they are from MH370 (aircraft registered as 9M-MRO).