



# A330-300

## Trimmable Horizontal Stabilizer Damage



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*Flight Safety Manager*

### 1 | Introduction

This article describes an uneventful flight, during which, the aircraft was in an unsafe condition. As a result of what was erroneously considered as a minor damage, the limit loads of the THS were no more sustainable. This resulted from a wrong appreciation of composite structure damage.

The objective of this article is to highlight the paramount importance of building a good knowledge of composite structure damage and repair.

Composite structure training is available at Airbus training center.

The Structure Repair Manual's (SRM) procedures must be respected and, if outside SRM limits, Airbus must be contacted to always ensure aircraft structural integrity.

### 2 | Description of the event

On 21<sup>st</sup> of August 2004 upon landing, the subject airplane was found with a torn lower skin of the right hand THS Lateral Box. This damage was thought to be due to a Foreign Object Damage (FOD) and resulted in a leaking Trim Tank.

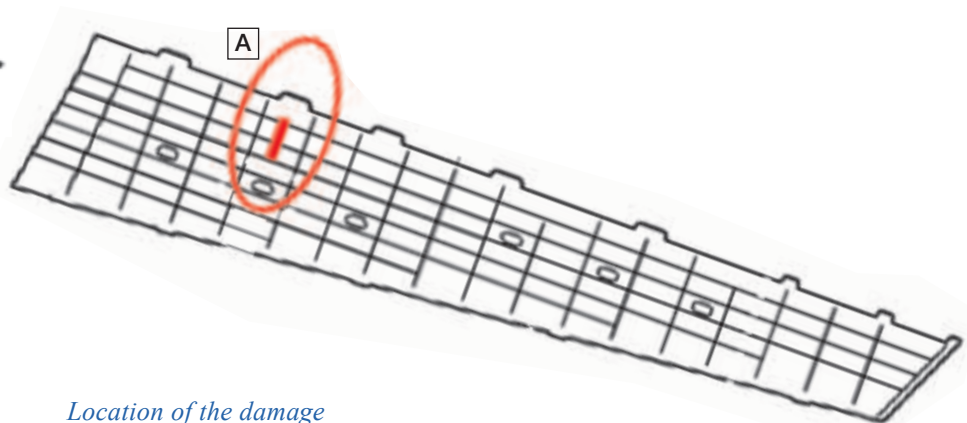
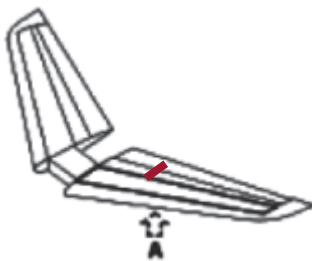
A missing water servicing door (164AR) was suspected to have caused the damage.

The damage was inspected externally only.

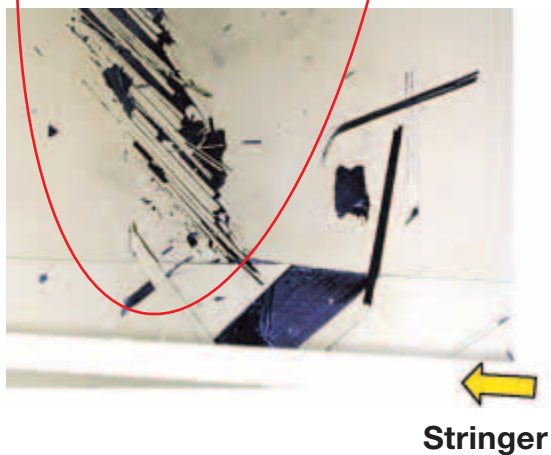
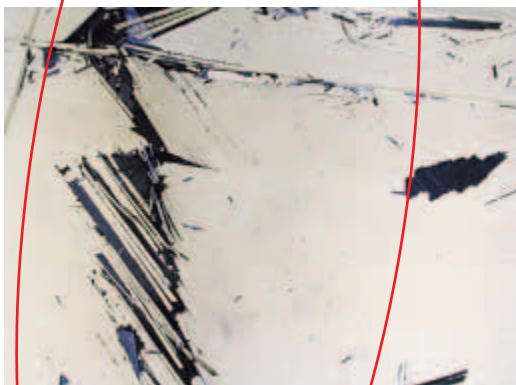
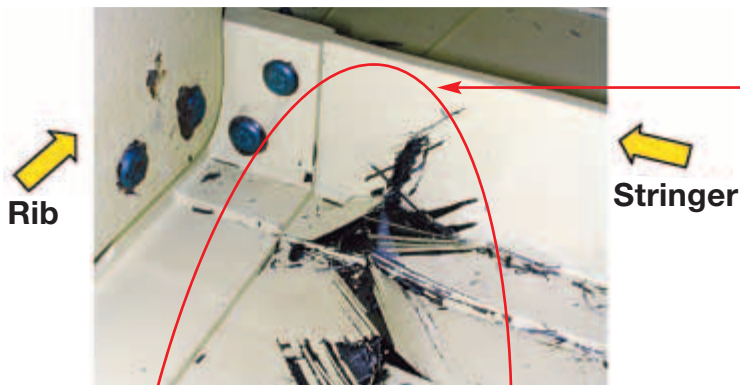
The external cut was measured to be about 330mm length by 3mm width, in line of flight, located at the THS bottom skin panel, just behind second THS inboard handhole access panel.

The visible damage is shown on the picture:

Based on external visual findings, the operator performed a temporary repair, by filling the damage

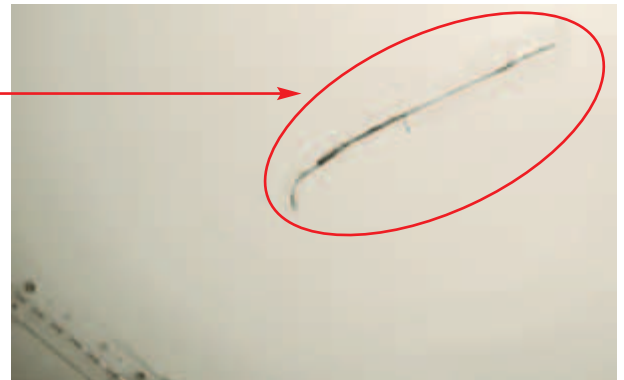


*Location of the damage*



*Resulting internal delamination*

with adhesive (EA934) and covered with two layers of Glass Fiber Reinforced Polymer (GFRP) plies. Trim tanks were emptied and a/c was flown back under MEL.



*External view of the damage*

The operator issued then an engineering note for:

- Performing a close visual inspection upon next aircraft landing, to confirm that there was no repair deterioration, crack propagation or any other adverse findings;
- Ensure that the trim tanks of the horizontal stabilizer were inop as per A330 AMM;
- Repeat close visual inspection at every transit
- Perform permanent repair at next B check (2 months later).

When informed, Airbus requested immediate damage assessment (including NDT) inside the THS trim tank before next flight (as per standard SRM requirement), in order to define a valid repair.

### 3 | Damage Description

As per the inspection, the monolithic CFRP panel was found cracked throughout the cut length, with large delaminations in the surrounding area.

Two stringers located on the THS bottom skin panel had been severely damaged.

Internal views of the THS are shown opposite.

## 4 | Actions Launched

The aircraft required immediate appropriate repair, as the temporary repair did not restore the required structural integrity of the THS.

An OIT was issued (reference SE 999.0115/04 dated 15th Oct. 2004) for A310/A300-600/A300-600ST/A318/A319/A320/A321/A330/A340. OIT recommendations are as follows:

*“In case of damage, composite structure degrades in a different way compared to metallic structure. In the particular case of impact with a foreign object the internal damage might be larger than the visible external damage. On monolithic structure, impact damage will usually result in delamination around perforation and damage to structure underneath”*

*“...All instructions for inspection and repair of composite structure given in the SRM are to be followed, to detect damage in its full extent, and to prevent [...] inappropriate repair”*

Composite structure courses are available at Airbus training department to provide specific knowledge with regard to maintenance and repair of composite structure.

See Airbus customer portal, structure training catalogue available:

- Composite structure NDT inspection (XSB2)
  - Composite repair for technicians - basic (XSA2)
  - Advanced composite repair for technicians (XSA3)
- And a new course:**
- Structure repair for engineers composite structures (XSC3)

For more information, please connect to: [https://w3.airbus.com/crs/A233\\_Train/0500\\_catalogs/Structure\\_MENU.htm](https://w3.airbus.com/crs/A233_Train/0500_catalogs/Structure_MENU.htm)

## 5 | Conclusion

- Internal damage might be larger than the visible external damage on composite structure (monolithic, sandwich, CFRP, GFRP);
- Airbus instructions related to repair of composite structure given in the SRM are to be followed, to detect damage in its full extent, and to prevent inappropriate repair;
- SRM repair procedure to be respected or, if outside SRM limits, contact Airbus to always ensure aircraft structural integrity;
- Composite structure courses are available at Airbus training department to provide specific knowledge with regard to maintenance and repair of composite structure.



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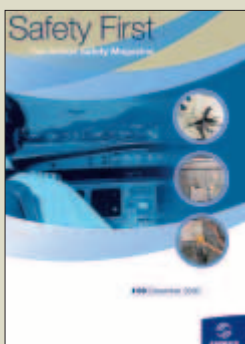
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