

NTSB Board Meeting AA Flight 587



Structures Investigation

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Certification Requirements (Vertical Stabilizer Loads)

Several conditions dictate the development of the aerodynamic loads used to design the vertical stabilizer:

- engine failure
- lateral gust
- yawing maneuver

The first officer of flight 587 performed a maneuver for which the airplane was not certificated.



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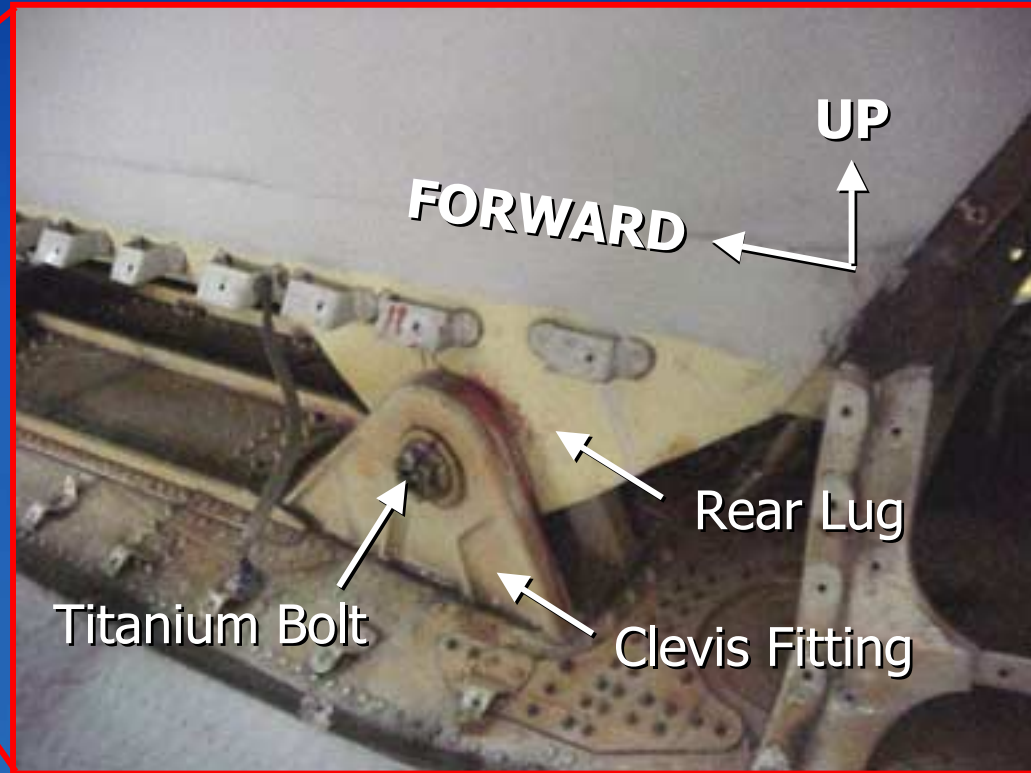
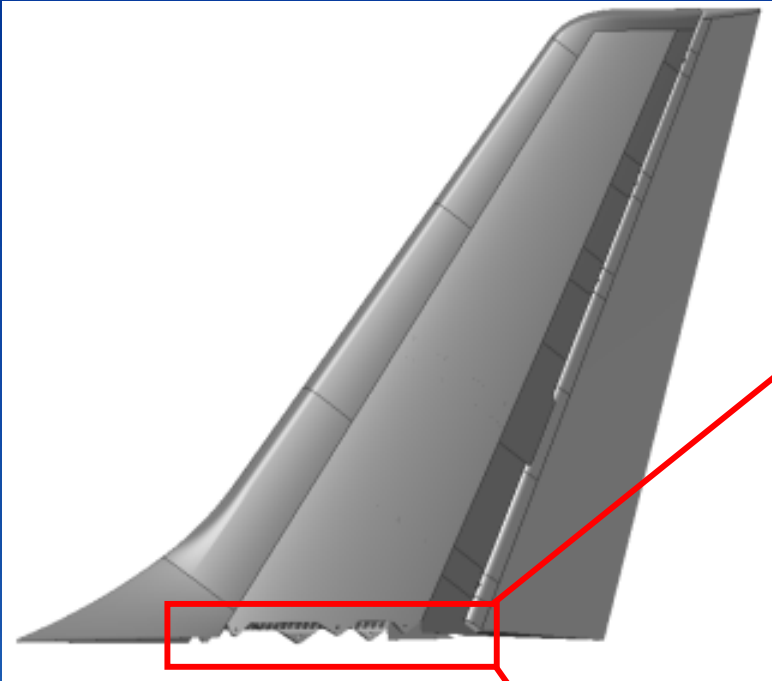


Certification

- The vertical stabilizer was designed and manufactured in accordance with the applicable certification requirements.
- During the full-scale test, a rear lug fractured in tension at nearly twice the design limit load, as expected.
- The analysis and testing done during the certification program were valid and complete.



Main Attachment Fittings



Lug Strength Determination

The strength of the lug was determined by:

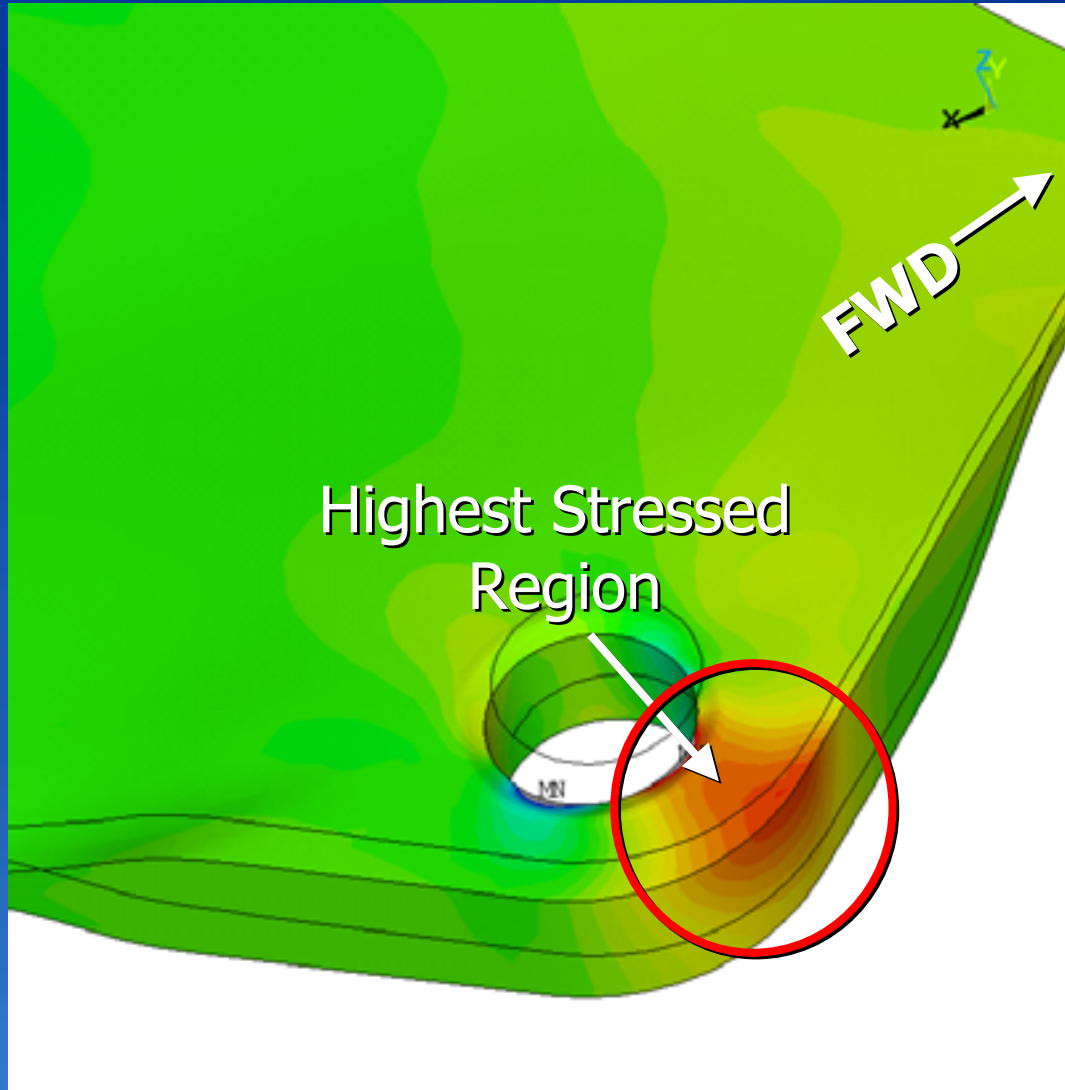
- finite element analysis
- progressive failure analysis
- post accident lug tests



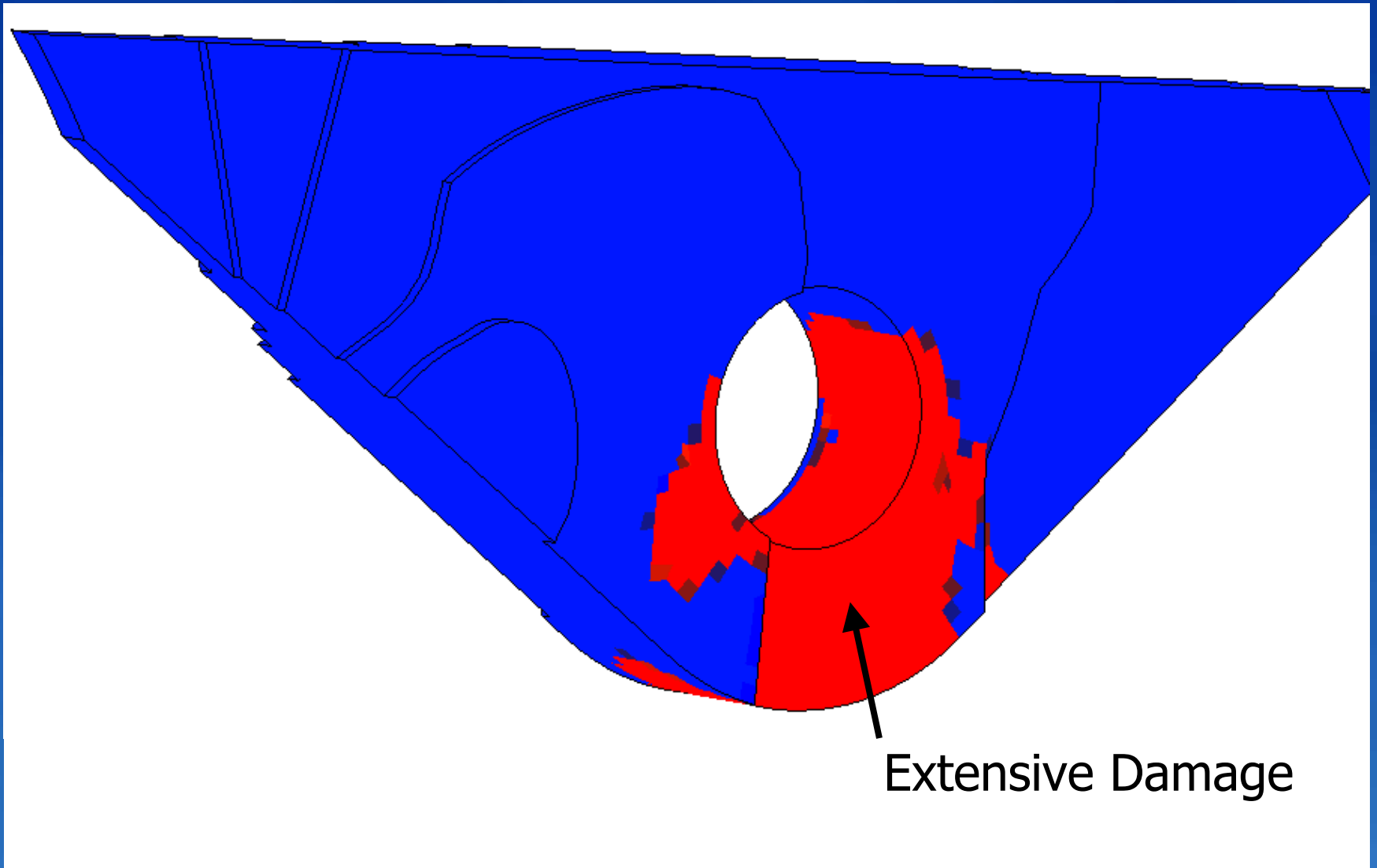
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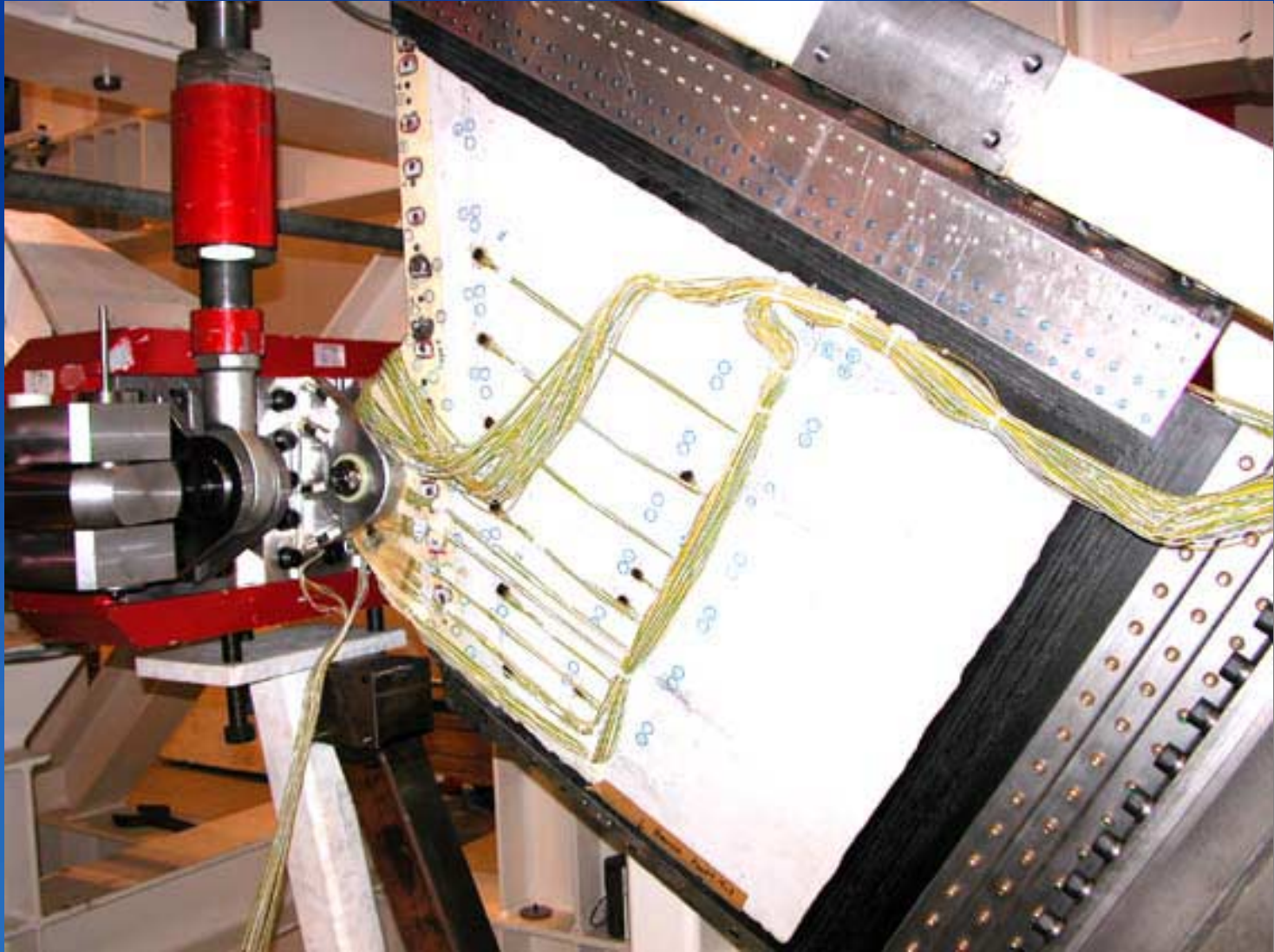
Finite Element Analysis of the Lug



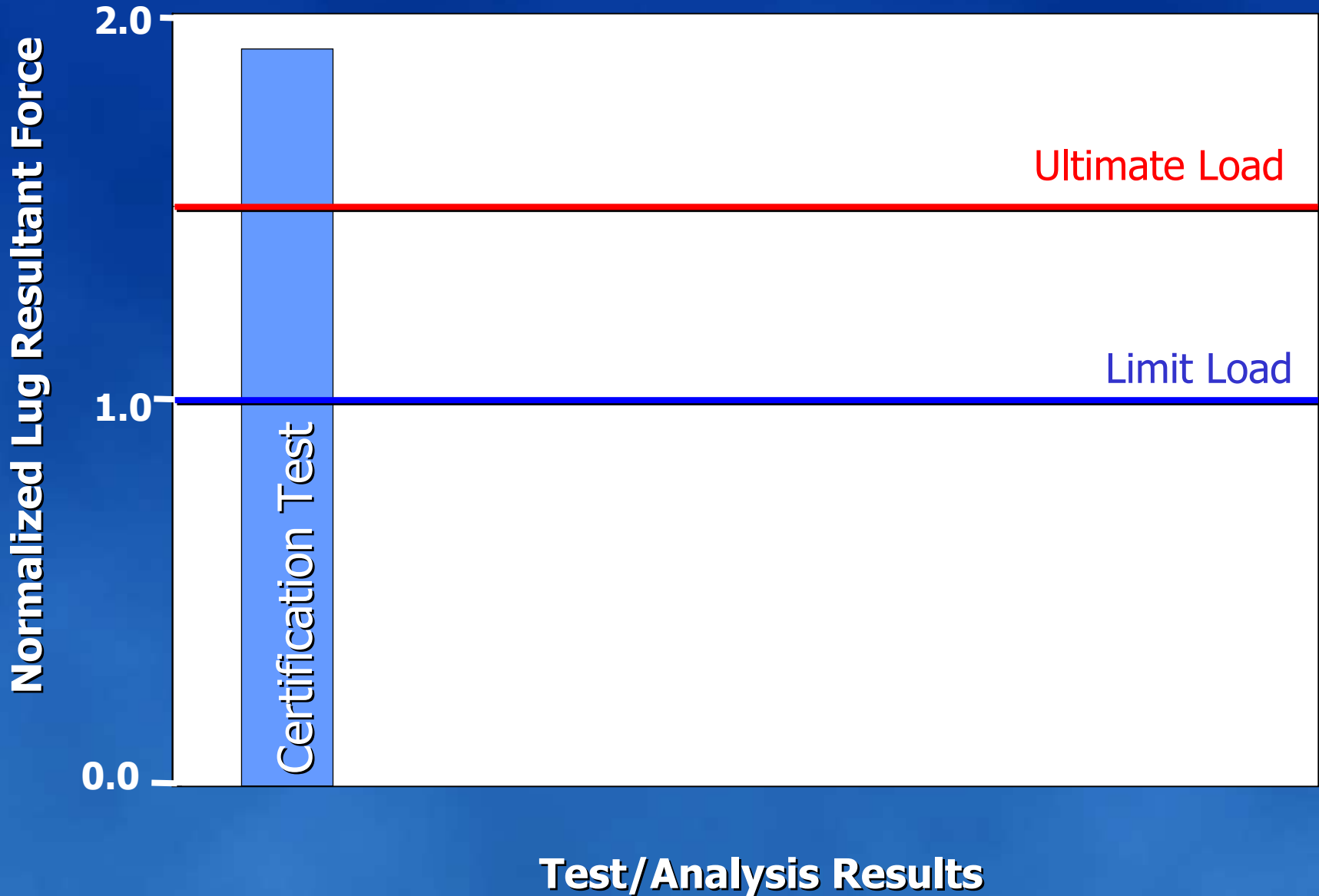
Progressive Failure Analysis



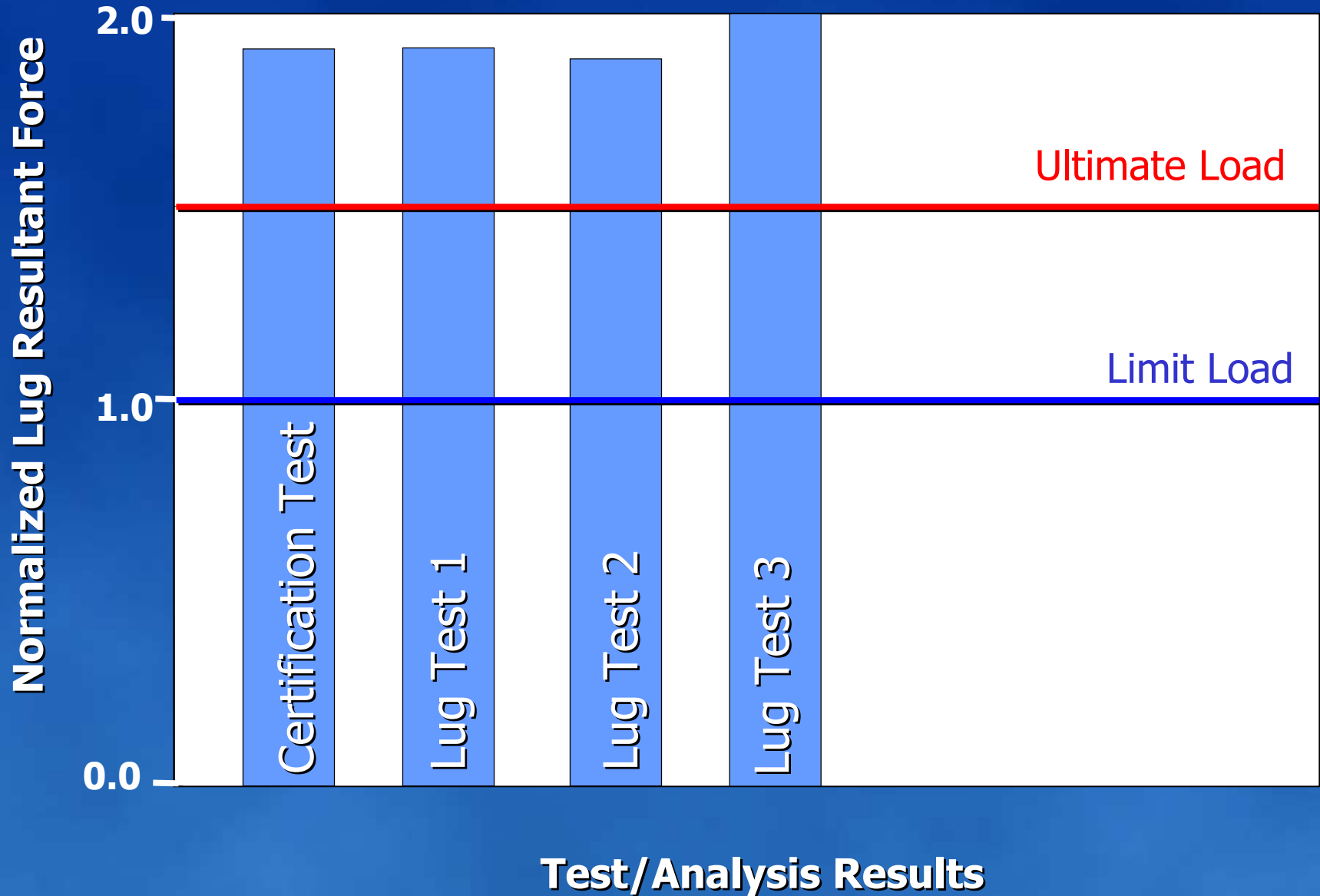
Lug Tests



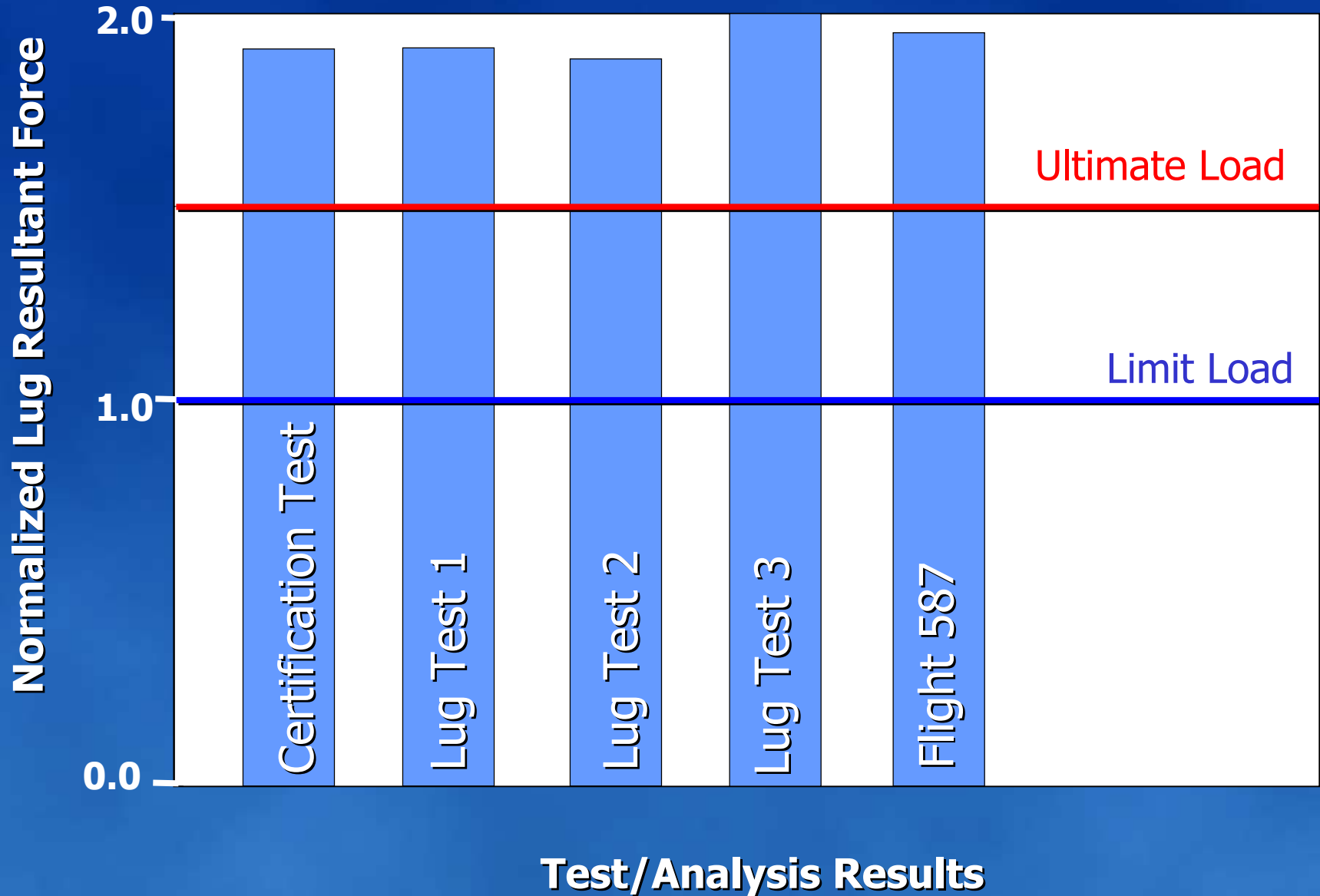
Lug Fracture Load Comparison



Lug Fracture Load Comparison



Lug Fracture Load Comparison



Structural Analysis Findings

The vertical stabilizer was designed in accordance with the applicable certification requirements.

The right rear lug fractured at a load above ultimate load, in accordance with its design strength.



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National Transportation Safety Board



American Airlines Flight 587
Belle Harbor, New York
November 12, 2001

NTSB Board Meeting
October 26, 2004

