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.
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

- Titanium Bolt
- Clevis Fitting
- Rear Lug

Directional indicators:
- FORWARD
- UP
Lug Strength Determination

The strength of the lug was determined by:

- finite element analysis
- progressive failure analysis
- post accident lug tests
Finite Element Analysis of the Lug

Highest Stressed Region
Progressive Failure Analysis

Extensive Damage
Lug Tests
Lug Fracture Load Comparison

Test/Analysis Results

Normalized Lug Resultant Force

Limit Load

Ultimate Load

Certification Test

Lug Test 1

Lug Test 2

Lug Test 3

Flight 587

Test/Analysis Results
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.
American Airlines Flight 587
Belle Harbor, New York
November 12, 2001

NTSB Board Meeting
October 26, 2004