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Broken Tail Fin Under Scrutiny

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Only once in the past 30 years has a commercial airliner lost its tail section in flight, but that case involved a vastly different scenario than American Airlines Flight 587.

A Japan Air Lines flight crashed into a mountain outside Tokyo in 1985 after the tail of the Boeing 747 fell off, killing 520 people. But that accident occurred because the rear pressure bulkhead in the back of the plane collapsed, a scenario impossible in the case of Flight 587, which was at too low an altitude to cause any strain on the pressure bulkhead.

"I'm unaware of the tail coming off an airplane like this," said Bernard Loeb, the former aviation safety chief for the National Transportation Safety Board.

Investigators probing the crash of Flight 587 will be looking at how much stress it would take to knock the tail off, as well as searching for fatigue cracks that may have been missed in maintenance inspections. "The first order of business will be to determine what it takes to take that tail off — what kind of loads would cause that," Loeb said.

The NTSB yesterday shot down a scenario that many experts had considered possible — that an engine came off and hit the tail, knocking it off.

The tail section — the vertical stabilizer and the rudder — was found in Jamaica Bay about a half-mile from the crash site. The plane's two engines also came off before the plane hit the ground.

The tail of the Airbus A300 is made of a carbon composite material on an aluminum frame. The FAA requires the manufacturer to demonstrate that the tail and rudder are able to sustain loads of up to 1.5 times the maximum loads that it might experience in flight.

Robert Loewy, a professor of aerospace engineering at Georgia Tech, said the composite material has been around for decades. The composites are "harder to inspect than metals because they're made up of laminates bonded together. If these layers become unbonded, it's not obvious from the surface," Loewy said. "It's not as apparent to the eye if there's a failure . . . some failures aren't obvious and they have to be inspected in different ways."

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