

No: 3/90

Ref: EW/G89/12/07

Category: 1a

**Aircraft Type
and Registration:**

Lockheed L1011-385-1-15, G-BHBR

No & Type of Engines:

3 Rolls-Royce RB211-524B-02 turbofan engines

Year of Manufacture:

1981

Date and Time (UTC):

19 December 1989 at 1720 hrs

Location:

30 NM north-east of Jeddah, Saudi Arabia

Type of Flight:

Airline scheduled passenger

Persons on Board:

Crew - 15

Passengers - 246

Injuries:

Crew - None

Passengers - None

Nature of Damage:

Missing section of honeycomb structure from trailing edge of right elevator

Commander's Licence:

Airline Transport Pilot's Licence with Instrument Rating

Commander's Age:

46 years

**Commander's Total
Flying Experience:**

8,200 hours (of which 3,800 were on type)

Information Source:

Aircraft Accident Report Form submitted by the pilot and further AAIB enquiries

As the aircraft climbed through 10,000 ft following take-off from Jeddah, a slight vibration was felt on the flight deck, and also noticed by cabin crew at the rear of the aircraft. The vibration ceased after a few minutes and the flight continued uneventfully to Doha, all systems and performance parameters having been normal throughout. After landing it was found that the centre section of the right elevator trailing edge had become delaminated, with some of the honeycomb structure missing. The total area affected was approximately 7 ft x 4 ins. Following a ferry flight to Abu Dhabi, where a new elevator was fitted, the damaged unit was returned to the United Kingdom for investigation.

It was found that the elevator had been repaired in 1984 by an FAA approved company located in the Gulf region. This had involved removing the top skin to dry out moisture in the honeycomb and bonding on a new Kevlar skin. However it was noted during the investigation that there was little evidence of any bond over 90% of the affected area. This was the first case of delamination of this sort known to the aircraft manufacturer.

Three possibilities were suggested by the airline's engineers. These were that the bonding resin used had been past its shelf-life; or an incorrect curing cycle had been used; or there had been a delay between lay-up and curing.

The problem of water ingress into this component is not new. The honeycomb tends to fill up with water, necessitating a regular (1100 hr) x-ray inspection to ensure that the amount of water remains within set limits (for reasons of control surface balance). The last water ingress check was in November 1989, and was within limits. The last disbonding check was conducted 15-24 months previously, with satisfactory results. Thus the disbonding was either not detected, or had not occurred at that time.

Since the incident, the airline has decided to instigate a more frequent check for such disbonding.

Location:	30 NM north-east of Jeddah, Saudi Arabia
Type of flight:	Normal scheduled passenger
Personnel on board:	Crew - 15 Passengers - 246
Injuries:	Crew - None Passengers - None
Nature of Damage:	Missing section of honeycomb structure from trailing edge of right elevator
Commander's Licence:	Private Transport Pilot's Licence with Instrument Rating
Commander's Age:	46 years
Commander's Total Flight Experience:	8,200 hours (of which 1,200 were in type)
Information Source:	Aircraft Accident Report Form submitted by the pilot and further AAR enquiries

As the aircraft was seen through 10,000 ft following take-off from Jeddah, a slight vibration was felt on the right deck and also reported by cabin crew at the rear of the aircraft. The vibration ceased after a few minutes and the right engine and aircraft performance parameters were unaffected. After landing, it was found that the entire section of the right elevator had become delaminated, with some of the honeycomb structure missing. The total area affected was approximately 7 ft x 4 ft. Following a ferry flight to Abu Dhabi, where a new elevator was fitted, it was damaged and was sent to the United Kingdom for investigation.

It was found that the elevator had been repaired in 1985 by an FAA approved company located in the Gulf region. The repair involved removing the top skin to the core structure in the honeycomb and bonding a new skin on. However, it was noted during the investigation that there was little evidence of any bond over 50% of the affected area. This was the first case of delamination of this sort reported in the history of the aircraft.

These findings are suggested by the airline's engineers. There were that the bonding resin used was not of the correct type or that the bonding cycle had been used, or there had been a delay in the curing and drying.