

# Boeing 747-283B, G-VOYG, 6 August 1996

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<b>Aircraft Type and Registration:</b>	Boeing 747-283B, G-VOYG
<b>No &amp; Type of Engines:</b>	4 Pratt & Whitney JT9D-7J turbofan engines
<b>Year of Manufacture:</b>	1971
<b>Date &amp; Time (UTC):</b>	6 August 1996 at approximately 1146 hrs
<b>Location:</b>	On departure from London Gatwick Airport
<b>Type of Flight:</b>	Public Transport
<b>Persons on Board:</b>	442
<b>Injuries:</b>	Nil
<b>Nature of Damage:</b>	Damage to No 3 engine and cowling
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence
<b>Commander's Age:</b>	36 years
<b>Commander's Flying Experience:</b>	6,500 hours (of which 1,800 were on type) Last 90 days - 130 hours Last 28 days - 50 hours
<b>Information Source:</b>	AAIB Field Investigation

The aircraft departed London Gatwick from Runway 26L on a Lambourne3M Standard Instrument Departure (SID) bound for Orlando, Florida. The weather at the time, broadcast on the 1145 hrs ATIS, was: surface wind 220°/14 kt (maximum 26 kt; minimum 5 kt); visibility 30 km with nil weather; cloud broken at 2,300 feet; temperature 19°C; dew point 11°C and QNH 1007 mbs.

Shortly after take off the crew heard a muffled thud which was followed by the failure of No 3 engine EGT gauge. There were no indications on the flight deck of any other malfunctions. Discovering, after consultation with their operations, that there were no replacement gauges at Orlando and that an EGT gauge is an MEL (minimum equipment list) item, the crew were advised to return to Gatwick for replacement of the faulty instrument. The aircraft landed without incident at 1304 hrs.

After shutdown it was discovered that a significant section of the No 3 engine cowling was missing. Several large sections of cowling were found on farmland within a mile of the western end of Runway 26L.

The JT9D engine hinged side cowlings provide access to the engine compressor case, combustion chamber and turbine areas, various engine accessories and power plant equipment. The 15th stage bleed ports are incorporated on the right side cowling panel for discharging bleed air overboard.

The cowlings are located and supported on their top edge by six hinge hooks containing recesses which engage a series of rollers carried by the support structure on the top of the engine nacelle. The lower edges of the left and right hinged cowlings are joined together by six adjustable latches which engage in 'U' bolts on the bottom of the right hand cowling.

Examination of the cowlings revealed that the left cowling had detached first, and had then caused the rear of the right hand cowling to detach. All of the left hand cowling was recovered in one piece except for one hook hinge which was not found. Of the other five hook hinges, three had recesses in which the original paint had not been marked by the rollers. This indicated that the rollers had not engaged the recesses, either on G-VOYG, or on any other aircraft to which the cowling had been fitted with those hinge hooks.

The front of the right hand cowling, containing four hook latches and four 'U' bolts had remained attached to the engine, whilst the rear section had fragmented and detached. Although none of the 'U' bolts or latches had been significantly damaged, there was severe distortion around one of the latches and its associated locating spigot on the rear section of the right hand cowling.

The possibility was considered that the cowling had been distorted because of the lack of proper roller engagement. If this had been the case an engine surge may have caused an overpressure within the cowling, leading to its release. Although the FDR did not show evidence of a surge it was decided to carry out a test bed run to determine the susceptibility of the engine to a surge. The engine had sustained some external damage during the incident and therefore minor repairs were necessary to permit a diagnostic test bed run in the 'as received' condition. The engine was handled in such a way as to provoke a surge on the test bed but did not show any tendency to surge.

On 26th September 1996 Boeing issued a telex to all 747 customers which reviewed the causes of side cowling losses. In summary, excluding this incident, 39 side panel losses had been reported since 1969, of these:

14 were attributed to improperly latched, or unlatched, forward latches,

18 (+ 1 suspected) losses were attributed to specific engine incidents, not applicable in this incident,

6 had no cause attributed.

The operator's procedures require that the opening and closing of the side cowlings should be documented, there were no such entries relating to the previous flight. As a result of this incident the operator initiated a programme to check all the hinge hooks on his aircraft for engagement.

The failure of the No 3 EGT gauge was caused by secondary damage to the No 3 engine as a result of the cowling separation.

