

Boeing 747-243B, G-VGIN

AAIB Bulletin No: 10/97 Ref: EW/C97/4/3 Category: 1.1

Aircraft Type and Registration:	Boeing 747-243B, G-VGIN
No & Type of Engines:	4 Pratt & Whitney JT9D-7J turbofan engines
Year of Manufacture:	1971
Date & Time (UTC):	28 April 1997 at 0018 hrs
Location:	En-route Washington DC - London Heathrow
Type of Flight:	Public Transport
Persons on Board:	Crew - 20 - Passengers - 140
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Overheating damage to wiring loom and furnishing behind overhead panels in forward cabin
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	57 years
Commander's Flying Experience:	16,800 hours (of which 11,800 were on type) Last 90 days - 155 Last 28 days - 51
Information Source:	AAIB Field Investigation

The aircraft had taken off from Washington Dulles Airport en-route for Heathrow. As it approached Halifax, Nova Scotia, the cabin crew in the first class section saw smoke and sparks coming from an overhead panel above the beautician's table, which was fitted as part of this operator's interior layout. No passengers were in the area at the time, which was curtained-off, and they remained unaware of the occurrence. The Flight Crew were informed and the appropriate drills were executed.

The Flight Engineer investigated by dropping the two Passenger Service Unit panels nearest to where the cabin crew had seen the smoke and sparks. Initially he could not see any problem, however, upon removing a lamp fitting and shining a torch into the aperture, he could see evidence of blackened wires and paint discoloration. There were by now no further signs of smoke or fire but he left the opening available for the introduction of extinguishant if required. He also examined the circuit-breaker panels and found that two had tripped - P14 'Ceiling control' and P15 'Light windowright'. The flight was continued and completed without further problems.

After landing, the aircraft was removed from service and inspected by the operator and the AAIB. Severe overheating damage was found to wiring loom W1144 which was located in the central ceiling panel in Zone B (Station 655) and contained wires for the ceiling and sidewall lights in this zone, both 115V ac and 28V dc. The loom comprised about 50 wires, the majority of which had melted at the same location, associated with a 'P' clip which had also partially melted. Secondary damage to a gasper air pipe and sooting/heat damage to adjacent structure and trim panels was also noted. It was evident that the fire had self-extinguished but the loom in the area of the overheating was too badly burned to identify which individual wire had initiated the sequence.

The airline uses third-party maintenance for major checks and modification and G-VGIN had just undergone such a check at the maintenance facility of another UK operator. Whilst undergoing this work a modification had been embodied to the lighting in the affected section which involved introducing new wires into loom W1144, which consequently ran through the 'P' clip mentioned above. Examination of some of the new wires in an area away from the overheating showed damage to the insulation typical of it having been pulled through a clip, possibly in the presence of sharp metallic debris such as swarf, causing tearing of the insulation. A considerable amount of 'fresh' debris such as swarf, a solid fastener, a stiff nut and a drill bit was found in the area which had been subject to modification. The operator's Quality Assurance is of the opinion that the overheating was due to the new wires being pulled through the 'P' clip with a piece of swarf trapped within the clip, causing damage to the insulation. Unfortunately, the overheating damage in the immediate area had destroyed any direct evidence of this.

The airline has drawn the attention of their maintenance contractor to these findings who had stated that they will in future ensure that such a situation should not arise again, both with respect to 'pulling' wires through clips and the amount of debris not cleaned-up after modification work. The operator also inspected another aircraft which had undergone the same modification work by the same contractor and, as a precaution, changed all four circuit breakers associated with the wiring loom. It is understood that, although some quantity of debris was recovered from the other aircraft, there was no evidence of a potential short-circuit in the loom as had been postulated for the incident to G-VGIN.