

Boeing 747-136, G-AWNO, 8 February 1996

AAIB Bulletin No: 6/96 Ref: EW/A96/02/02 Category: 1.1

Aircraft Type and Registration: Boeing 747-136, G-AWNO

No & Type of Engines: 4 Pratt & Whitney JT9D-7A turbofan engines

Year of Manufacture: 1973

Date & Time (UTC): 8 February 1996

Location: O'Hare Airport, Chicago

Type of Flight: Public Transport

Persons on Board: Crew - 18 Passengers - Not known

Injuries: Crew - Nil Passengers - N/A

Nature of Damage: Damage confined to Flight Attendant's control panel at door 4R

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 54 years

Commander's Flying Experience: 15,000 hours (of which 8,000 were on type)

Last 90 days - 194 hours

Last 28 days - 37 hours

Information Source: Aircraft Accident Report Form submitted by the pilot and additional investigations by AAIB

On arrival at Chicago, the cabin crew reported that, during the landing, sparks and audible arcing had been coming from the cabin attendant's control panel at door 4R and that a localised fire had been extinguished. The control panel was removed and the connector and electrical wiring to the panel were temporarily insulated for the return flight to London. The damage had been confined to this panel, on which the wiring and Passenger Services System/Passenger Entertainment System (PSS/PES) switches were burned and melted.

Investigation of the damaged panel, by the operator, showed that the PSS ON/OFF switch, which carries the 115 Vac and 28V DC supplies on the panel, had experienced severe electrical and heat damage. This had been attributed initially to moisture ingress allowing the 115 Vac supply to arc across the contacts, however, the panel had been repaired and the switch disposed of before the AAIB became involved, so it was not possible to examine any of these damaged parts further. The

operator was aware of several similar previous occurrences, and the UK CAA's database identified eight occurrences which were possibly related.

During the course of this investigation, a similar panel, from another of the operator's 747 fleet, was returned for overhaul with a similar defect. This had not been the subject of an air safety report and had not created any significant problems in the cabin. The AAIB's examination of this second damaged panel showed that a similar switch, with the same type of internal mechanism and performing the same function, had burned, causing considerable sooting of adjacent switches, the wiring loom and the panel itself. The stainless steel switch casing had been burned through and the internal plastic parts were destroyed. Resistance checks showed that several of the switch pin terminals had low resistance paths to earth. Further investigation of the door 4R area on several aircraft suggested that this panel was reasonably well protected from moisture ingress and that this was unlikely to have contributed to the cause of the switch failure.

The Boeing Commercial Airplane Group advised AAIB that several similar switch failures had been investigated by the manufacturer and moisture was not considered to be a factor. The problem had been identified as a mechanical failure of the switch internal mechanism creating a short circuit between 115 Vac and ground. Boeing advised that there was sufficient energy in such a short circuit to cause a limited fire and burn through the switch. Boeing also advised that, as a result of their investigations, an Alert Service Bulletin (ASB) 747-33-2252 was being prepared which would provide modification instructions to operators. This Service Bulletin will recommend that a new type of switch be installed, with an improved mechanism to prevent a short circuit from power to ground in the event of a mechanical failure. Following an evaluation of the first switches, in July, it was anticipated that the ASB and parts will be available to operators in October.