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ATSB-22

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ATSB TRANSPORT SAFETY REPORT
Aviation Occurrence Investigation A0-2009-027
Preliminary

In-flight fire – 427 km south-west of Guam, 10 June 2009 Airbus Industrie A330-202, VH-EBF

Abstract

On 10 June 2009 at 1205 Universal Coordinated Time (UTC), an Airbus Industrie A330-202 aircraft, registered VH-EBF, departed Kansai International Airport, Osaka, Japan on a scheduled passenger transport service to the Gold Coast Airport, Qld., Australia with 182 passengers, 13 cabin crew and four flight crew on board.

At 1523, at approximately 427 km south-west of Guam, the flight crew noticed a burning rubber smell on the flight deck. At about that time, two caution messages were displayed to the crew identifying a fault in the right windshield heating. This was followed by a loud bang along with a flash of light, followed by smoke and fire from the bottom right corner of the right windshield. All flight crew donned oxygen masks, and a crew member used a BCF extinguisher to extinguish the fire.

The flight crew diverted the aircraft to Agana Airport, Guam, and reported that no other systems were affected by the fire. At 1614, the aircraft landed at Guam and there were no reported injuries to any of the passengers or crew.

The investigation is continuing.

FACTUAL INFORMATION

The information contained in this preliminary report is derived from initial investigation of the occurrence. Readers are cautioned that there is the possibility that new evidence may become available that alters the circumstances as depicted in the report.

History of the flight

On 10 June 2009 at 1205 Universal Coordinated Time (UTC), an Airbus Industrie A330-202 aircraft, registered VH-EBF, departed Kansai International Airport, Osaka, Japan on a scheduled passenger transport service to the Gold Coast Airport, Qld., Australia. On board the aircraft were 182 passengers, 13 cabin crew, two flight crew (consisting of captain and first officer), and two pilots observing in the crew seats behind the flight crew.

The flight crew reported that the departure and initial cruise from Osaka was normal, with the aircraft established at the assigned cruising altitude of 39,000 ft (FL390) by 1236.

At 1523, the flight crew noticed a burning rubber smell on the flight deck. The captain called the senior cabin crewmember by intercom to establish whether the smell was coming from the cabin. The report from the cabin crewmember indicated there was a burning smell evident, with no visible smoke. At about that time, when the aircraft was approximately 427 km to the south-west of Guam, two electronic centralised aircraft monitor (ECAM) messages were displayed, indicating cautions regarding the right windshield heating. Shortly

after, there was a loud bang and flash of light in the flight deck, followed by a small amount of smoke and the flight crew observed a small fire in the bottom right corner of the right, forward, windshield. The flight crew and the observer pilots put on their oxygen masks, and conducted the *windshield heat abnormal* and *avionics smoke removal* checklists.

Despite these crew actions, the fire continued. The first officer initially attempted to smother the fire by using heat resistant gloves that were located on the flight deck. This was unsuccessful so the first officer then used one of the BCF¹ extinguishers by applying several short bursts to the area of the fire. This action extinguished the fire, although the fumes remained evident for the remainder of the flight.

The flight crew elected to divert and land the aircraft at the Agana International Airport, Guam. The captain broadcast a PAN² to Guam Centre air traffic control (ATC) at 1528. The PAN was subsequently upgraded to a MAYDAY³. ATC advised the crew that the weather at Agana was a light easterly wind, unrestricted visibility, and few clouds.

The flight crew reported that no other aircraft systems were affected by the fire, and conducted an uneventful approach and landing at Agana Airport at 1614, where emergency services were in attendance.

The emergency services verified the aircraft was safe to taxi to the airport terminal where the passengers were disembarked. The operating flight crew had remained on oxygen throughout the descent and landing and there were no reported injuries to any of the passengers or crew.

Post-flight report

The aircraft's central maintenance system recorded a fault with the number-2 window heat computer (WHC) at 1523, which included the ECAM message 'A. ICE R WSHLD HEAT'.

Windshield heat system

The aircraft's cockpit had two windshields, two fixed windows, and two sliding windows (Figure 1). Each window incorporated a thin layer of electrically conductive material, which received electrical power from one of two WHCs to prevent ice accumulation and fogging.

Electrical power was transferred to each windshield's conductive layer via an electrical connector (Figure 1) and terminal block (Figure 2) positioned on the lower outboard section of each windshield.

Each WHC included internal memory for automatic storage of detected faults. The WHCs were powered by 115V AC and 28V DC from the aircraft electrical systems, and supplied 200V AC to the window heaters.

Window heat computer inspection

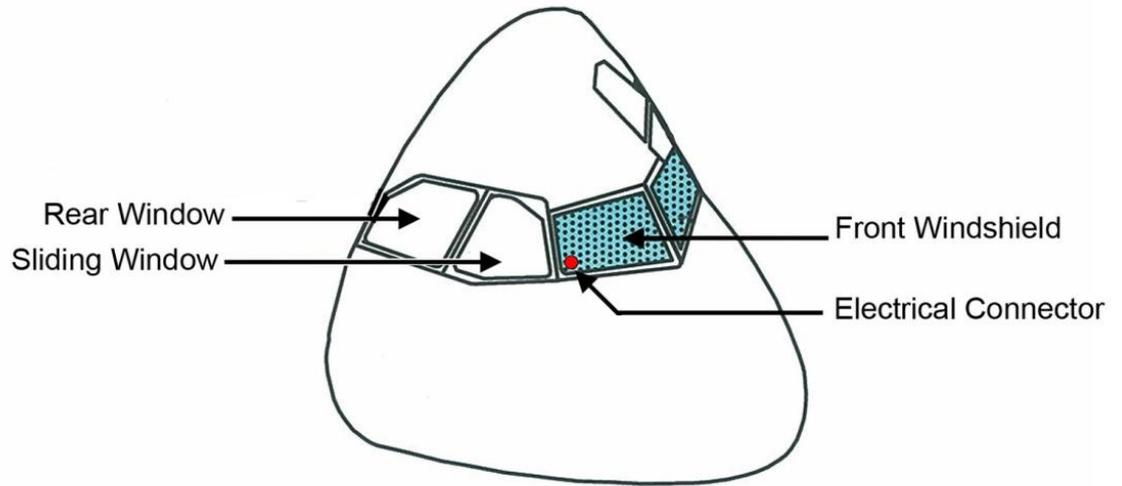
The aircraft's number-2 WHC was sent to the component manufacturer in France for inspection and testing under the supervision of an accredited representative from the Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation civile (BEA).

The WHC exhibited no external signs of damage or foreign substance ingress. The internal electrical circuits exhibited damage to discrete components and circuit boards.

As a result of the damage, the WHC could not be powered to run electrical tests or to retrieve data from the internal memory chip. The memory chip was removed for data retrieval using a test unit, but the initial attempts to recover the data were unsuccessful. Inspection and testing of the WHC is continuing.

1 Bromochlorodifluoromethane (Halon 1211) fire extinguishant
2 Radio code indicating uncertainty or alert but not yet at the level of mayday
3 International call for urgent assistance

Figure 1: Cockpit windows



Damage to the aircraft

Post-flight inspections of the aircraft in Guam showed severe burning and melting of the right side windshield terminal block (Figure 2), and minor heat damage to the glare shield and wire conduit around nearby loudspeaker wiring. The electrical plug from the WHC was firmly secured to the terminal block socket and was undamaged. There was no evidence of a loose fitting between the socket and the terminal block.

A visual inspection of the exposed wiring and conduit between the windshield and the number-2 WHC did not reveal any evidence of overheating or electrical arcing and the wiring passed serviceability tests.

All relevant circuit breakers were inspected and had remained closed.

A small amount of smoke residue was present on the inner surface of the right windshield adjacent to the terminal block. No further damage was observed on any nearby equipment or wiring.

Terminal block inspection

The windshield terminal block (P/N: SPS A340-1-4-1A, S/N: 3594) was subsequently non-destructively examined using x-ray radiography. The examination revealed severe, localised, damage to the internal wiring within the terminal block (Figure 3).

Figure 2: Windshield heat connector and terminal block (in situ)

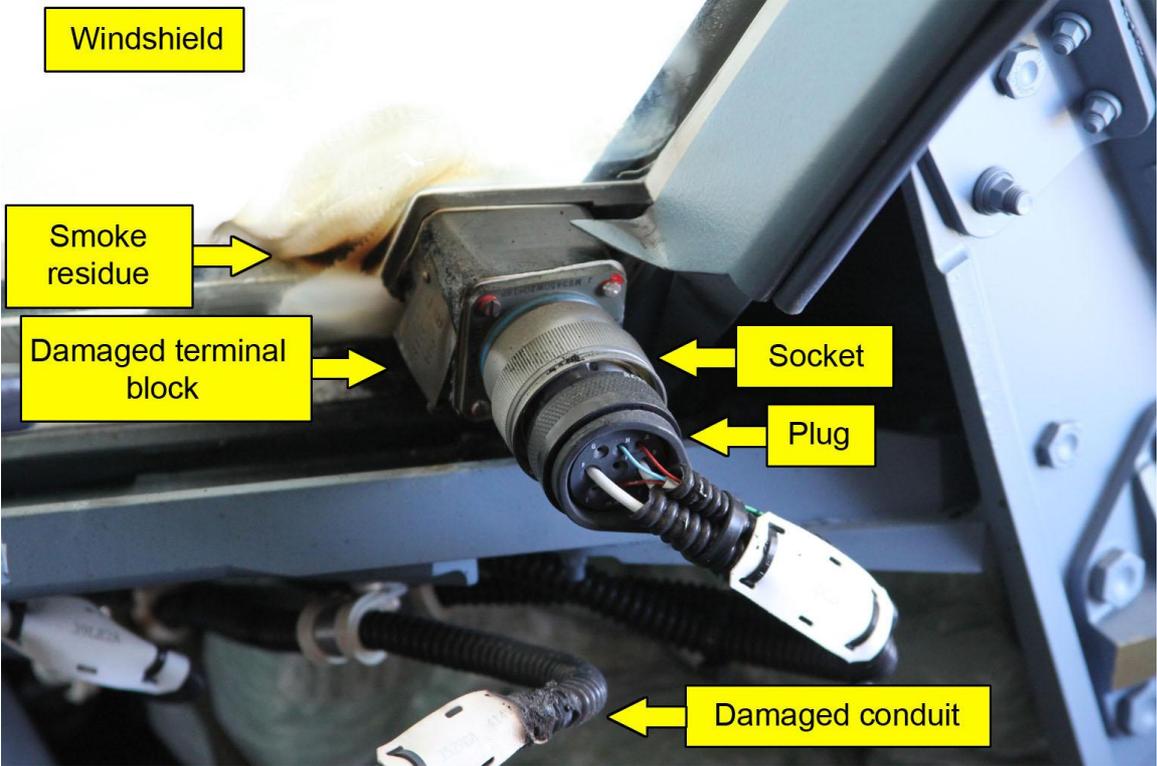
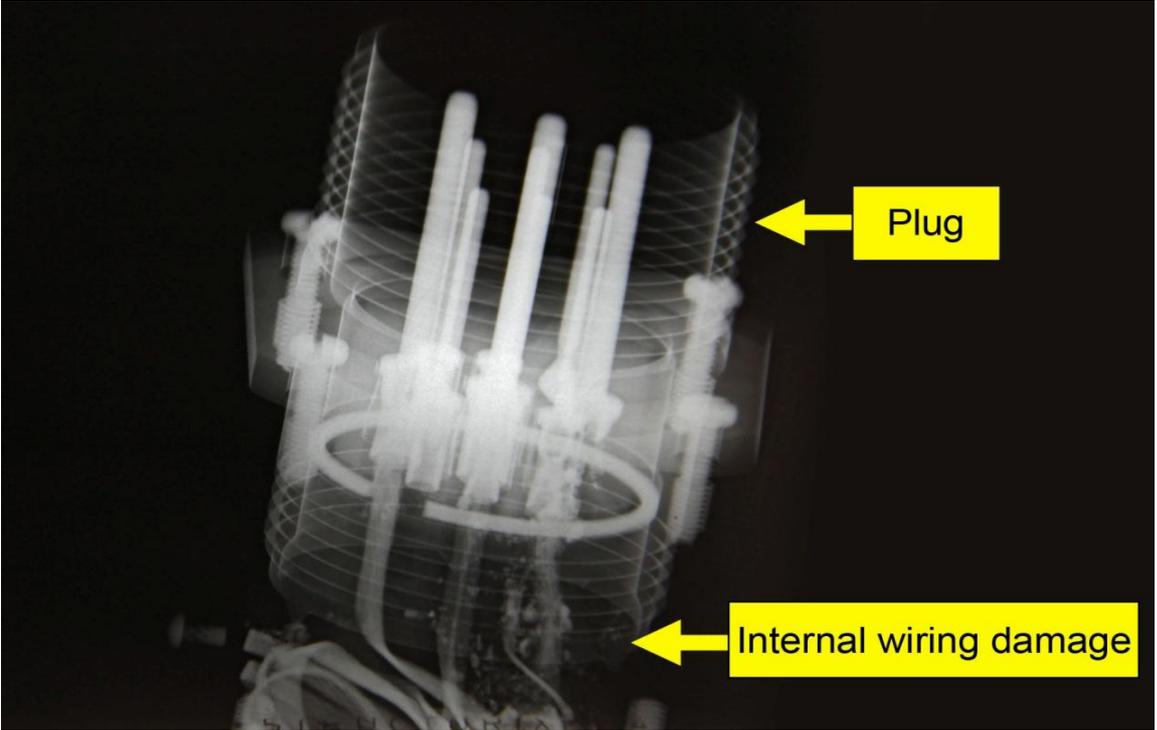


Figure 3: Windshield terminal block x-ray



Aircraft information

The aircraft was manufactured in 2007, and registered in Australia on 3 August 2007. The Certificate of Airworthiness was issued on 24 August 2007. At the time of the incident, the total airframe hours were 9,447, and the total airframe cycles were 1,422.

The aircraft completed a 'C' maintenance check on 16 December 2008 and an 'A' maintenance check 6 May 2009, at 8,993 airframe hours and 1,352 aircraft cycles.

Other windshield events

On 2 July 2009, the flight crew of a Korea Republic registered Airbus A330-300 aircraft, reported a burning smell and electrical arcing around the right windshield heating connector. The aircraft manufacturer reported that 'power to the windshield heater was cut by the WHC'. The aircraft operator reported that the post-flight report recorded a 'R WSHLD/WHC 2 fault, with the corresponding ECAM message 'A.ICE R WSHLD HEAT'.

The ATSB is seeking more information from the aircraft manufacturer about this event.

FURTHER INVESTIGATION

The investigation is continuing and will include:

- inspection and testing of the windshield, terminal block, wiring and socket
- inspection and testing of the number-2 WHC and internal components, including attempted data retrieval from the WHC memory chip
- analysis of the window heat system design and operation
- flight crew operating procedures
- flight crew simulator training, including communication with oxygen masks
- usability and location of fire extinguishers on the flight deck

SAFETY ACTION

Depending on the level of risk of the safety issue, the extent of corrective action taken by the relevant organisation, or the desirability of directing a broad safety message to the aviation industry, the ATSB may issue safety recommendations or safety advisory notices as part of the final report.

Aircraft maintenance provider

Action taken by maintenance provider

The aircraft maintenance provider immediately initiated an inspection of all windshield electrical connections within their A330 fleet.

No abnormalities were found.