
APU fumes, BAe 146-200, G-JEAW

Micro-summary: APU fumes prompt the captain of this BAe-146 to terminate the flight.

Event Date: 2005-12-07 at 1805

Investigative Body: Aircraft Accident Investigation Board (AAIB), United Kingdom

Investigative Body's Web Site: <http://www.aaib.dft.gov/uk/>

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INCIDENT

Aircraft Type and Registration:	BAe 146-200, G-JEAW	
No & Type of Engines:	4 Lycoming ALF-502R-5 turbofan engines	
Year of Manufacture:	1986	
Date & Time (UTC):	7 December 2005 at 1805 hrs	
Location:	Southampton Airport, Hampshire	
Type of Flight:	Public Transport (Passenger)	
Persons on Board:	Crew - 5	Passengers - 85
Injuries:	Crew - 3 (Minor)	Passengers - 5 (Minor)
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	39 years	
Commander's Flying Experience:	6,208 hours (of which 3,069 were on type) Last 90 days - 146 hours Last 28 days - 43 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

During pushback and the taxi for departure on the fifth sector of the day, with the auxiliary power unit (APU) bleed air source selected, the cabin crew and a number of passengers detected fumes in the cabin. Two cabin crew members experienced physiological effects. Inspection of the aircraft revealed the presence of de-icing fluid in the APU air intake. The probable cause of the incident was contamination of the cabin air supply from the ingestion of de-icing fluid into the APU compressor. The aircraft had been de-iced prior to the first sector of the day.

History of the flight

Prior to the pushback and short taxi from Stand 6 to holding point B1, the APU had been started and its bleed air source selected to supply the environmental control (air conditioning) system. During pushback and the taxi, the three cabin crew and a number of passengers reported acrid smelling fumes throughout the cabin. One cabin crew member became nauseous and started vomiting, another felt light-headed and complained of a racing heartbeat. The third member was aware of the smell, but the only symptom experienced was a momentary light-headedness. At this stage the aircraft had been at the holding point for about five minutes and, when the commander was informed, he decided to abandon the flight. After obtaining ATC clearance, the aircraft was taxied back to stand, during which time the APU bleed

air was selected off and engine bleed air selected on, in an attempt to purge the fumes in the cabin. However, this proved ineffective. Fumes were not detected on the flight deck at any time. Once on stand, the engines were shut down and the passengers disembarked.

Five passengers provided details to crew of their experiences, one of whom complained of a burning sensation in the eyes. Fifteen other passengers also reported smelling fumes in the cabin but suffered no ill effects. The most affected cabin crew member had difficulty concentrating, was unable to perform her duties and continued vomiting, sporadically, for up to one hour after the event. The commander accompanied the three cabin crew members to a local hospital where they underwent medical tests.

This was aircraft's fifth sector of the day and the crew's third sector, on this aircraft, which had been de-iced prior to its first departure.

Investigation

Following this incident, the APU and engines were thoroughly examined for oil leaks that might have allowed oil to enter the bleed air system, but none were found. The hydraulic system was inspected and tested, and found to be satisfactory, and engine ground runs were performed, with bleed air selected, in an attempt to reproduce the fumes. None were noted.

On further examination, a large quantity of de-icing fluid was found within the environmental control systems

bay, which is adjacent to the APU. The area was cleaned and the aircraft returned to service. There have been no further reports of fumes in the cabin to date.

The APU inlet on Avro 146/RJ aircraft is located on the upper left side of the rear fuselage. The inlet has no door and is permanently exposed to the outside, rendering it susceptible to contamination from de-icing fluid running down the fuselage into the inlet.

Following the incident, the operator issued a Notice to Aircrew (NOTAC) which stated that the APU air supply should not be used on the sector immediately following de/anti-icing, and that the APU compressor air inlet drain must be kept free of de/anti-icing fluids. This is in accordance with advice provided by the aircraft manufacturer in its '*Plane Freezing*' winter operations document.

On 17 November 2005, the operator issued another NOTAC, No 42/05, titled '*BAE Systems Medical Advice Following a Cabin Fumes Event*', which is based on NOTAC OP43, as issued by the manufacturer. This document gives advice on actions to be followed during a Smoke and Fumes event, specifically, advice to hospitals as to which tests and procedures should be followed. The results of the medical checks on the cabin crew members following this event, which were carried out in accordance with NOTAC 42/05, did not produce any abnormal findings.