Pilot incapacitation, BAe 146-300, G-JEBA, February 2, 2006

Micro-summary: **This BAe 146-300's first officer was incapacitated by noxious fumes on climbout.**

Event Date: **2006-02-02 at 1810 UTC**

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 146-300, G-JEBA
No & Type of Engines:	4 Lycoming ALF502R-5 turbofan engines
Year of Manufacture:	1990
Date & Time (UTC):	2 February 2006 at 1810 hrs
Location:	During climb from Belfast City Airport
Type of Flight:	Public Transport (Passenger)
Persons on Board:	Crew - 5 Passengers - 77
Injuries:	Crew - 1 (Minor) Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	44 years
Commander's Flying Experience:	9,300 hours (of which 3,500 were on type) Last 90 days - 100 hours Last 28 days - 10 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

During the climb from Belfast, the co-pilot detected an odour in the flight deck air, shortly after which he complained of a dry throat, burning eyes, a tingling sensation in the fingers and of being hot. After donning his oxygen mask he slid his seat back and took no further part in the flight. No other personnel on the flight were affected, including the commander who carried out an uneventful return and landing at Belfast. Subsequent examination of the aircraft revealed deposits in the air conditioning ducting and an unrelated oil leak in the APU bay.

History of the flight

The aircraft had been prepared for a scheduled passenger flight from Belfast to Gatwick. During this sector the co-pilot was the handling pilot. After a normal departure, and during the climb, the co-pilot noticed a smell described as being similar to that of a central heating boiler. The commander, when asked by the co-pilot, did not discern this odour.

Subsequently, the co-pilot complained of a dry throat and burning eyes. Control was handed over to the commander, shortly after which the co-pilot experienced a tingling sensation in his fingers as well as complaining of being hot and sweating. The co-pilot was placed on oxygen and the commander elected to return to Belfast.The co-pilot slid his seat back and took no further part in the flight. The oxygen did not appear to be helping in the relief of the co-pilot's symptoms, although he remained conscious.

After an uneventful descent, approach and landing at Belfast, the co-pilot was given first aid and began to recover. He was taken to a local hospital for further checks, including the taking of blood samples for later tests.

Throughout the flight the commander, cabin crew and passengers did not suffer any ill effects and did not notice any smoke, fumes or odour.

Aircraft examination

An examination of the aircraft's engines, APU, air conditioning and ducting was carried out using existing service documentation issued by the manufacturer. The only anomalies that were found were an oil leak in the APU bay and some light deposits in the air conditioning ducts that run from the air conditioning packs to the cabin and flight deck. The oil leak was traced to the APU air-cooled oil cooler for the APU generator oil which is located on the left fire wall, away from the APU. The air used to cool the APU generator oil is separate to that of the main air supply to the APU and the aircraft bleed air system, and it consists of its own air intake, fan, ducting and exhaust. It is therefore unlikely that the leaking oil from the oil cooler, although pooled in the APU bay, would have found its way into the APU engine air supply.

Blood tests

Tests on blood taken from the co-pilot immediately after his arrival at hospital proved inconclusive.

Other occurrence

Following this first occurrence the co-pilot returned to flying duty. On 16 February 2006 he was conducting a flight from Belfast on a BAe 146 (G-JEBG) and during the taxi from the stand he again complained of stinging eyes and sweating. The aircraft was taxied back to stand and the co-pilot was taken to hospital. No other persons on the flight were affected, although some cabin crew and passengers had detected fumes and an odour in the cabin air. The subsequent aircraft examination did not reveal any definitive cause, although there was evidence of possible contamination of the APU bay with exhaust air from the APU.

Discussion

The co-pilot had become incapacitated during the flight, however he was the only individual affected. It is possible, although not confirmed, that fumes generated by the APU or engine could have been the initiating factor, considering that deposits were found in the air conditioning ducting, and also that the co-pilot had detected an odour in the air of the flight deck. Although an oil leak was found in the APU bay, it is unlikely that this oil had found its way into the air supply system.

Following an investigation into a similar incapacitation on a BAe 146 in November 2000 (Aircraft Accident Report 1/2004 G-JEAK), it was concluded that:

> *'2. Subsequent research and tests suggests that the crew of G-JEAK, and the crew of other aircraft which have suffered similar incidents, may have been exposed to turbine engine oil derived fumes in the cabin/cockpit air supply, originating from either an engine or APU, which had an irritant, rather than a toxic, effect.'*

Several recommendations were made during this investigation and as a result the CAA issued guidance that if contaminated air is suspected then the flight crew should don their oxygen masks and use 100% oxygen.