

INCIDENT

Aircraft Type and Registration:	Boeing 757-236, G-CPET	
No & Type of Engines:	2 Rolls-Royce RB211-535E4 turbofan engines	
Year of Manufacture:	1998	
Date & Time (UTC):	4 October 2006 at 1300 hrs	
Location:	En route from Madrid to London (Heathrow) Airport	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 8	Passengers - 136
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	35 years	
Commander's Flying Experience:	6,500 hours (of which 2,150 were on type) Last 90 days - 200 hours Last 28 days - 75 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

After takeoff, the flight crew detected a transient oily smell in the cockpit and, later in the flight, began to feel unwell. They donned oxygen masks and declared a 'PAN' in accordance with the published emergency procedure, after which their condition improved. The cause of the incident was determined to be an oil leak from the left engine, which allowed oil fumes to enter the bleed air/air-conditioning system and thence the cockpit air supply.

History of the flight

After takeoff on a scheduled passenger flight from Madrid to London Heathrow Airport (LHR), the flight crew noticed an oily smell in the cockpit, which seemed to be transient. Later, during the cruise, both crew

members suffered from dry mouths. The commander also developed a headache and had an oily taste in his mouth, and the co-pilot's throat felt 'raw'. During the descent, both crew members began to feel disorientated and found that they had to concentrate hard to carry out their normal duties. At this point the commander began to feel 'confused'.

The decision was taken to carry out the '*SMOKE - FUMES AIR CONDITIONING*' checklist from the Quick Reference Handbook. Both crew members donned oxygen masks and a 'PAN' was declared. A normal approach was flown and an automatic landing performed on Runway 27R at LHR. After vacating the runway, the aircraft was stopped in order to assess the situation and the crew decided that

it was safe to continue taxiing to the terminal. This was completed uneventfully.

The flight crew expressed concern that neither had detected the slow degradation in their performance as this only became fully apparent after they had donned oxygen masks and began to recover.

Aircraft information

Following this incident, the aircraft was inspected in accordance with specific procedures introduced by the airline for troubleshooting oil fume events. This did not identify any related defects and the aircraft was released for further service. Further inspections were performed on 16 October 2006, but these also proved inconclusive.

On 18 October, there were further reports of transient oil fumes in the cockpit on the initial climb on two sectors but, again, the source of the fumes again could not be identified.

On takeoff on 3 November 2006, there was another report of transient oil fumes in the cockpit with the flight crew reporting feeling nauseous by the end of the flight. On this occasion, engineering inspections identified oil staining on the left engine Low Pressure (LP) compressor outlet guide vanes, between the 5 o'clock and 6 o'clock positions. The left engine was removed from the aircraft on 6 November and sent to an overhaul agency for strip and repair.

Engine examination

At the time of removal, the left engine, serial number 31482, had completed 17,759 hours/13,551 cycles since new and 2,150 hours/1,532 cycles since its previous

service. Strip examination identified evidence of oil leakage from the LP compressor speed sensor wiring conduit.

The speed sensor is mounted at the LP compressor front roller bearing housing and its wiring is routed radially outwards through a conduit, which is filled with silicone. With time, the sealant in the conduit can deteriorate, allowing engine oil to pass through the conduit and ultimately leak into the compressor air path. A proportion of this oil can be ingested into the bleed air system, which supplies air to the air-conditioning packs, and this can lead to reports of oil fumes in the cockpit and/or cabin.

Once the repairs were completed, the engine was run satisfactorily in a test cell. Internal visual inspection after testing did not reveal any evidence of oil leakage.

Additional information

The problem of fumes in the cockpit and/or cabin on the Boeing 757, and other aircraft, is not new and has been the subject of much industry discussion. AAIB Formal Report 1/2004 presents the findings of an extensive investigation into the problem of contamination of cockpit/cabin air supply by engine oil fumes and includes the results of studies into the physiological effects of such fumes.

In December 2000, The UK CAA issued Flight Operations Department Communication (FODCOM), number 17/2000, providing valuable safety advice on the use of flight crew oxygen masks in the event of smoke or fumes entering the cockpit. Further updated safety advice was provided in FODCOMs 14/2001 and 21/2002.