Boeing 757-236, G-BIKG

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Aircraft Type and Registration:	Boeing 757-236, G-BIKG
No & Type of Engines:	2 Rolls-Royce RB211-535C turbofan engines
Year of Manufacture:	1983
Date & Time (UTC):	10 June 1999 at 0645 hrs
Location:	Approximately 55 nm southwest of Newcastle
Type of Flight:	Public Transport
Persons on Board:	Crew - Not known - Passengers - Not known
Injuries:	Crew - None - Passengers - None
Nature of Damage:	Nil
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	49 years
Commander's Flying Experience:	11,590 hours (of which 2,137 were on type)
	Last 90 days - 151 hours
	Last 28 days - 60 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and discussions with operator

The aircraft was operating from London Heathrow to Edinburgh and in the cruise at FL 350, approximately 55 nm to the south-west of Newcastle. The commander was the handling pilot for the sector, but had handed over control to the P2 whilst he made a cabin address. The commander had checked in again with the P2, prepared the navigation aids for their arrival at Edinburgh, and had started the briefing for the arrival, when the audio warning siren sounded. The 'Cabin Altitude' warning was observed on the Engine Indication and Crew Alerting System (EICAS) and the red 'Cabin Altitude' lights on the overhead and centre panels illuminated.

The commander immediately called for the flight deck crew oxygen masks to be donned; this was done promptly and he re-established communications with the P2. The cabin altitude on the overhead panel was seen to be greater than 15,000 feet, and the outflow valve position indicator showed fully closed, so the passenger oxygen was switched 'ON'. The P2 simultaneously selected manual on the mode select switch on the Cabin Altitude Control Panel and operated the manual control to confirm that the outflow valve was fully closed. The commander instructed the P2 to

start an emergency descent, which he did smoothly and promptly, whilst he broadcast a 'MAYDAY' call on the ATC frequency in use. The aircraft was cleared to descend to FL 100. During the descent the Quick Reference Handbook (QRH) was used to confirm that the memory drills had been completed correctly.

When level at FL100 the senior cabin crew member was called to the flight deck. She confirmed that there were no casualties in the passenger cabin and that there was no obvious damage to the aircraft. The cabin altitude stabilised at 4 to 5,000 feet, so the flight crew removed their oxygen masks, downgraded the 'MAYDAY' to a 'PAN', and continued the flight to Edinburgh.

A review of the aircraft's recent history revealed that the Cabin Altitude Control System had had difficulty maintaining the desired cabin altitude at FL370 with both air conditioning packs operating normally and with the outflow valve fully closed. Leaks were identified at the main entry doors 1L, 2L and 4L, which were rectified.

Prior to the incident flight, the No 2 air conditioning pack had been 'locked out' in accordance with the Despatch Deviation Manual (DDM) because of a heat exchanger air leak. High Flow Mode was verified to be operating normally on the remaining, No 1 pack.

Following the incident the No 2 pack heat exchangers were changed to enable cabin pressure leak checks to be performed. It was discovered that the equipment cooling overboard exhaust valve was remaining open, in the 'smoke' position. Following rectification of that defect several other airframe pressure leaks were identified resulting in a cabin pressure loss exceeding 2,000feet/min at 4 psi differential pressure.

The incident was caused by an aircraft suffering excessive cabin air leakage being despatched with one air conditioning pack inoperative. The Boeing 757 is designed and certified to maintain cabin altitude up to FL 350 with one pack operating in the high flow mode. However, as the aircraft already had several airframe pressure leaks, the remaining pack, even in high flow mode, was unable to maintain cabin altitude at the desired level.

A further cabin pressurisation system failure had occurred on another of the operator's Boeing 757's, G-BIKL, on 22 May 1999. The aircraft was operating with the No 2 air conditioning pack inoperative in accordance with the DDM. An emergency descent was carried out from FL 310 following a No 1 engine bleed off light illuminating in the cruise and the cabin altitude starting to climb at about 2,000 feet/min. A review of the Technical Log history revealed a "long thin trail of reports of left bleed off in the cruise with subsequent checks showing no fault found".

The operator had in place two systems to detect repeat defects; copies of the last 10 technical logs were available on the aircraft for the flight and maintenance crews, and the computerised maintenance data system checked for three repeat defect codes on any one aircraft in the last 100 sectors. Neither system would have detected "the long thin trail of defects on G-BIKL".

As a result of the investigation of these incidents, the operator has reviewed its maintenance programmes to ensure that there are adequate checks to detect and correct excessive cabin air pressure leaks. Changes have also been drafted to the company's Despatch Deviation Manual (DDM) reminding captains and ground engineers of the need to review any defect history when applying DDM requirements.