

**SERIOUS INCIDENT**

<b>Aircraft Type and Registration:</b>	Boeing 737-73V, G-EZKG	
<b>No &amp; Type of Engines:</b>	2 CFM56-7B20 turbofan engines	
<b>Year of Manufacture:</b>	2004	
<b>Date &amp; Time (UTC):</b>	11 August 2010 at 1640 hrs	
<b>Location:</b>	West of Nantes, France	
<b>Type of Flight:</b>	Commercial Air Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 5	Passengers - 144
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	None	
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence	
<b>Commander's Age:</b>	60 years	
<b>Commander's Flying Experience:</b>	17,950 hours (of which 13,430 were on type) Last 90 days - 236 hours Last 28 days - 82 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

**Synopsis**

During the climb the left BLEED TRIP OFF caution message illuminated. Shortly after completing the associated checklist procedure the right BLEED TRIP OFF caution message illuminated, followed by the cabin altitude rising at a high rate. The CABIN ALTITUDE warning horn sounded during the subsequent descent and an emergency descent was then initiated. The aircraft returned to London Luton Airport at FL080 without further incident.

Later the co-pilot stated that he had incorrectly selected the bleed switch to OFF instead of the pack switch to OFF when he completed the left BLEED TRIP OFF checklist. The right engine bleed was unable to meet

the demand from two air conditioning packs and tripped off, resulting in the loss of cabin pressure.

**History of the flight**

The aircraft was performing a scheduled passenger flight from London Luton Airport to Lisbon International Airport, Portugal. The commander was the pilot flying. Before departure the commander discussed with the co-pilot and the cabin crew the aircraft's previous reported faults, which included several bleed air trips on the previous sector. As a result the Bleed Air Regulator was replaced and satisfactory engine ground runs were carried out prior to the aircraft being dispatched.

The takeoff and initial climb were uneventful, except that on passing FL100 the pilots observed that the left and right duct pressures indicated 15 psi and 40 psi respectively. As the aircraft was climbing through FL280 the left BLEED TRIP OFF caution message illuminated on the BLEED panel on the forward overhead panel and AIR COND illuminated on the System Annunciator; the commander requested the co-pilot to carry out the associated checklist. During this procedure the commander was distracted from monitoring the co-pilot's actions by ATC transmissions and a call from the cabin crew on the interphone, to which she responded "Standby".

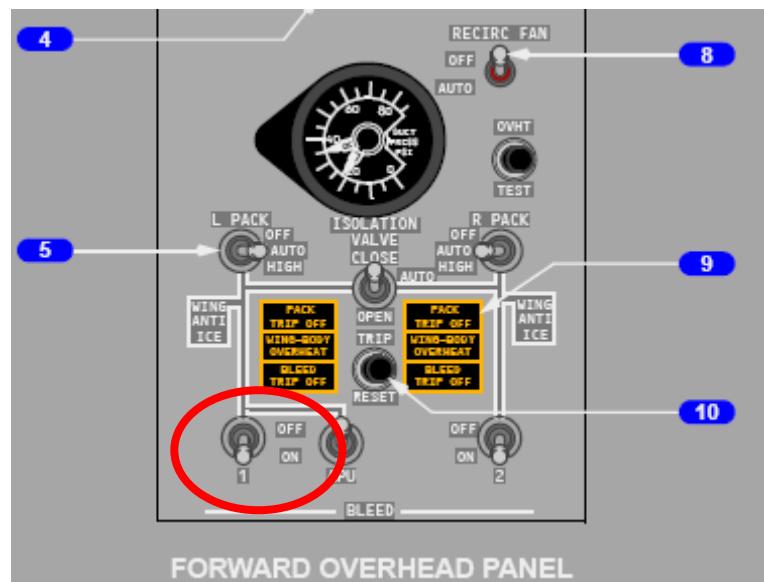
After the checklist was completed, the crew discussed whether to cruise at their planned flight level or a lower one. As they had dispatched with the minimum fuel required, they elected to continue the climb to their flight planned level of FL390. A short time later, while still in the climb, the right BLEED TRIP OFF caution message illuminated. Upon looking at the overhead panel the commander observed that the cabin altitude was climbing at approximately 3,000 ft/min. She stopped the climb and asked the co-pilot to request an immediate descent from ATC. The commander alerted the cabin via the passenger address system to prepare for a rapid descent. Initially there was no response from ATC, but after a PAN call was transmitted ATC instructed the aircraft to descend and to transmit the appropriate emergency transponder code. At about this time the CABIN ALTITUDE warning horn sounded, so the crew donned their oxygen masks and initiated an emergency descent. The aircraft was now in the vicinity of Nantes, France.

After the aircraft levelled at FL100 and the checklist had been completed, the crew removed their masks and established that there were no injuries to the cabin crew or passengers. They then elected to return at FL080 to London Luton Airport, where they landed without further incident.

### Co-pilot's comments

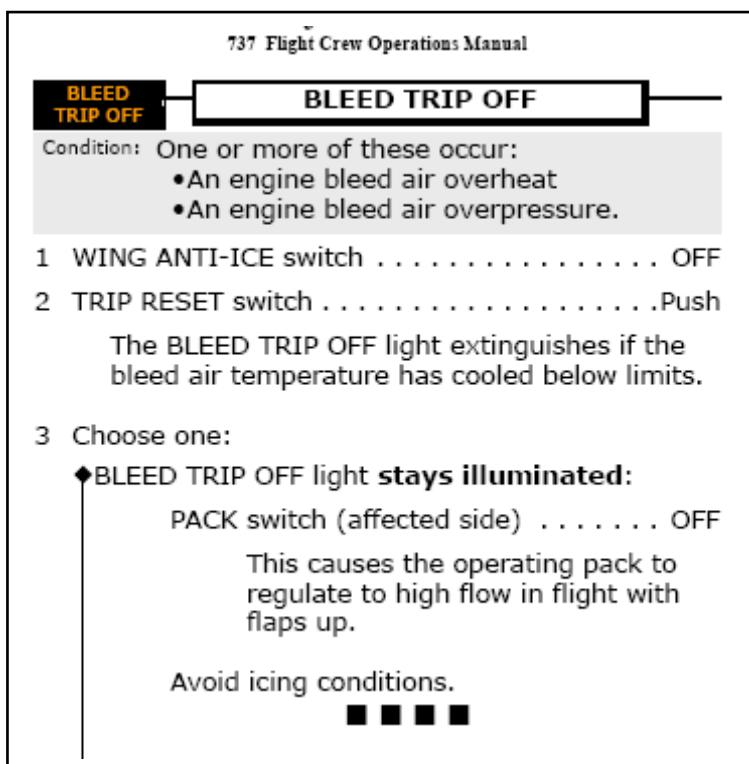
The co-pilot stated that he had incorrectly selected the bleed switch to OFF instead of the pack switch to OFF when he completed the left BLEED TRIP OFF checklist. Recorded data confirmed this. The bleed system was then configured with one engine bleed supplying two air conditioning packs. The right engine bleed was unable to meet the demand from two packs and tripped off, resulting in the loss of cabin pressure.

The co-pilot commented that within the given procedure (Figure 2), the words "BLEED TRIP OFF" may have caught his attention, because they appear several times in the checklist.



**Figure 1**

Bleed air section of Boeing 737-700 overhead panel.

**Figure 2**

## BLEED TRIP OFF checklist

**Commander's comments**

The commander commented that the co-pilot had conducted the BLEED TRIP OFF checklist alone in a “read and do”, rather than “challenge and response” manner. She did not monitor the full procedure while issuing the “Standby” instruction to the cabin crew by interphone. She regarded this as a priority because she thought they might be concerned, following the discussion prior to departure, about potential pressurisation problems. She sought to reassure them and consequently was distracted from monitoring the co-pilot.

The commander added that the decision to continue the climb to FL390 with a single engine bleed source operating was influenced by a previous simulator training experience involving a similar scenario, in which it was strongly suggested that the appropriate course of action was to continue the climb.

**Engineering information**

As a result of this incident several components of the bleed system were replaced. The aircraft subsequently re-entered service with no reported reoccurrence of this fault.

Six passenger oxygen hoses became detached from their chemical generators when deployed automatically during this event. As a result, the operator has checked these components on all of its Boeing 737 aircraft and applied additional fastenings with the intention of preventing a reoccurrence, in accordance with a manufacturer’s service letter which the operator considered relevant.

**Safety actions**

The co-pilot subsequently demonstrated to the operator his understanding of the BLEED TRIP OFF procedure and the consequences of selecting the bleed switch.

The operator recognised that a previous training experience influenced the commander’s decision to continue the climb with a degraded pressurisation system. This observation was forwarded to their training management.

The commander underwent training which examined all technical and non-technical aspects of this event and explored management strategies to deal with threats and errors associated with it. She also conducted a supervised flight duty with a training captain to verify confidence and competence.

The operator advised its training pilots to consider the implications of offering unique responses to situations for which in practice there might be several acceptable solutions.