In-flight electrical smoke, Boeing 737-229, G-CEAI

Micro-summary: **This Boeing 737-229 diverted after detecting electrical smoke.**

Event Date: **2002-11-26 at 1833 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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Boeing 737-229, G-CEAI

AAIB Bulletin No: 6/2003	**Ref: EW/G2002/11/17**	**Category: 1.1**
INCIDENT		
Aircraft Type and Registration:	Boeing 737-229, G-CEAI	
No & Type of Engines:	2 Pratt & Whitney JT8D-15 turbofan engines	
Year of Manufacture:	1975	
Date & Time (UTC):	26 November 2002 at 1833 hrs	
Location:	Bournemouth International Airport	
Type of Flight:	Positioning flight	
Persons on Board:	Crew - 2	Passengers - None
Injuries:	Crew - None	Passengers - N/A
Nature of Damage:	Minor	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	55 years	
Commander's Flying Experience:	10,287 hours (of which 277 were on type)	
	Last 90 days - 147 hours	
	Last 28 days - 36 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

History of the flight

The aircraft was departing from Bournemouth on a positioning flight to London Gatwick Airport. On the initial taxi there were failures of the first officer's IVSI (Instantaneous Vertical Speed Indicator), the weather radar transmitter/receiver and the wheelbrakes ANTISKID INOP failure captions had illuminated. The aircraft returned to its departure stand where the engineers replaced the IVSI and weather radar. They also traced the anti-skid problem to a loose connection at a terminal block and rectified this problem. G-CEAI then taxied out again and took off.

Shortly after being cleared by London Area Control Centre (LACC) from FL70 to FL80 the first officer selected ALT SEL on the autopilot mode control panel. The ALT ACQUIRE caption illuminated rather than the expected ALT SEL caption so the crew reselected, with the same outcome. The antiskid failure captions then illuminated brightly, although the panel was selected for dim illumination.

As the pilots discussed returning to Bournemouth because of these anomalies, all the remaining captions illuminated accompanied by a distinct smell of electrical burning. The crew immediately declared a MAYDAY to LACC, announced their intention of returning immediately to Bournemouth, donned their emergency oxygen masks and started their descent. LACC requested a transponder code of 7700 and handed control of the flight to Bournemouth Approach. The crew were unable to locate

the source of the fumes so they concentrated on the normal checklists and landing safely as soon as possible.

After the landing, the crew shut down the aircraft with the fire service in attendance. No fumes were detected so the aircraft was evacuated via a fire ladder at the front left passenger door. The pilots were both given oxygen because they were suffering from light-headedness and tingling in the fingers.

Technical examination

After the crew left the aircraft the ground engineers disconnected the battery and the aircraft was towed back to the hangar.

The initial visual examination did not reveal any evidence of burning so the investigation continued, initially with the battery, then the APU and finally with both engines running, with their respective generators connected. No smoke or fumes were detected so the engines were shut down and the other aircraft systems were then functioned in turn.

When the Altitude Alert Unit (AAU) was checked, the warning lights flickered and the circuit breaker for Zone 6 popped. Examination of the AAU control unit did not show any fault but when the co-pilot's annunciator was examined, there was evidence of burning in the connector. With the annunciator disconnected, the system functioned without disturbing the circuit breaker.

The burning appeared to have been caused by water ingress into the flight deck. A check with a hose pipe playing water over the windscreen area (with power off!) showed a slight leak from the co-pilot's windscreen and a larger leak from the windscreen wiper sealing boot. After the windscreen was resealed and the boot replaced subsequent further leak checks were satisfactory.

The aircraft maintenance company considers that the failure of the IVSI was probably also an indication of water ingress as it is the only electrical unit in that area with cooling holes. The company also decided to check for water ingress behind the instrument panel at the next hangar visit for the remainder of the Boeing 737 fleet and the inspection will be repeated at each C check.