

**INCIDENT**

<b>Aircraft Type and Registration:</b>	Bombardier CL600-2B19 CRJ200, D-ACHH	
<b>No &amp; Type of Engines:</b>	2 CF-34-3B1 turbofan engines	
<b>Category:</b>	1.1	
<b>Year of Manufacture:</b>	2000	
<b>Date &amp; Time (UTC):</b>	16 March 2005 at 1419 hrs	
<b>Location:</b>	En route to London Heathrow Airport from Cologne	
<b>Type of Flight:</b>	Public Transport (Passenger)	
<b>Persons on Board:</b>	Crew - 4	Passengers - 33
<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>	36 years	
<b>Commander's Flying Experience:</b>	3,936 hours (of which 1,812 were on type) Last 90 days - 160 hours Last 28 days - 67 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

**Synopsis**

During the cruise, the Engine Instrument and Crew Alerting System (EICAS) gave a “SMOKE CARGO” warning. The crew carried out the appropriate emergency procedure and made a priority landing at London Heathrow Airport. A normal but expeditious disembarkation was conducted with the airport fire services in attendance. Fire crew checked the cargo compartment but were unable to find any sign of smoke, fire or heat damage. The investigation concluded that the warning was probably caused by the smoke detector reacting to dust, condensation or electromagnetic interference. This aircraft had been fitted with a revised

design of smoke detector, which was intended to reduce its susceptibility to these factors. It appears not to have been effective in this case.

**History of the flight**

The aircraft was on a scheduled flight from Cologne to London Heathrow Airport. While cruising at an indicated airspeed of 250 kt, the EICAS gave a “SMOKE CARGO” warning. The crew carried out the appropriate emergency procedure using the Quick Reference Handbook and briefed the cabin crew and passengers. ATC were informed of the nature of the

emergency and coordinated a priority ILS approach to a landing on Runway 27L at Heathrow. The aircraft stopped immediately after vacating the runway, in order to conduct a normal but expeditious disembarkation, with the airport fire services in attendance. Fire crew checked the cargo compartment but were unable to find any sign of smoke, fire or heat damage.

### Previous occurrences

There have been several instances of spurious cargo smoke indications on CRJ200 aircraft. Studies carried out jointly by the aircraft manufacturer and the smoke detector manufacturer identified two likely causes:

1. The smoke detector works by reflecting light off smoke particles entering the detection chamber. Any dust or condensation present within the detection chamber will also reflect this light and activate the detector.
2. There have been instances of electromagnetic interference, such as from hand held walkie-talkies and mobile telephones, causing the detector to produce a warning.

These studies concluded that the first cause could not be prevented completely and that cargo with high moisture content was likely to contribute to false warnings. They found, however, that because dust particles usually form the nuclei of condensation water droplets, condensation was less likely to occur if the detection chamber was clean. Many of the detector units that had produced apparently spurious warnings were found to be contaminated with dirt, and the aircraft manufacturer responded by issuing service letter RJ-SL-26-001, which recommended annual cleaning of the detector.

The smoke detector was also redesigned to incorporating features intended to reduce its susceptibility both to dust ingress and electromagnetic interference. Airworthiness directive TC AD CF-2001-21 was issued in September 2001 (the year after D-ACHH was manufactured), requiring replacement of older smoke detectors with units of the new design within 18 months. Although the operator had complied with this directive on all its CRJ 100/200 aircraft by 31 December 2002, it has since recorded four instances of cargo smoke warnings on D-ACHH, the most recent of which is the subject of this investigation. Two of the other occurrences were attributed to interference from mobile telephones.

The AAIB investigation did not establish whether the new design of smoke detector had reduced the incidence of spurious cargo smoke warnings on the worldwide CRJ fleet. However, these further occurrences suggest that the new design has not been effective on the subject aircraft. The AAIB has written to Transportation Safety Board of Canada, informing them of these findings.

The cargo smoke detector on D-ACHH was replaced again after this latest incident and there have been no further reports of similar occurrences.

### Conclusion

The cargo smoke warning was almost certainly spurious and was probably caused by the smoke detector reacting to dust, condensation or electromagnetic interference. The revised design of the smoke detector, which was intended to reduce its susceptibility to these factors, appears not to have been effective on the subject aircraft.