**INCIDENT**

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|---|---|
| **Aircraft Type and Registration:** | Boeing 767-31K, G-DAJC |
| **No & Type of Engines:** | 2 General Electric Co CF6-80C2B7F turbofan engines |
| **Year of Manufacture:** | 1994 |
| **Date & Time (UTC):** | 15 August 2010 at 0750 hrs |
| **Location:** | Gatwick Airport, West Sussex |
| **Type of Flight:** | Commercial Air Transport (Passenger) |
| **Persons on Board:** | Crew - 11 Passengers - 324 |
| **Injuries:** | Crew - None Passengers - None |
| **Nature of Damage:** | Electrical overheating of an oven controller module |
| **Commander's Licence:** | Airline Transport Pilot's Licence |
| **Commander's Age:** | 51 years |
| **Commander's Flying Experience:** | 13,650 hours (of which 8,630 were on type)<br>Last 90 days - 155 hours<br>Last 28 days - 34 hours |
| **Information Source:** | Aircraft Accident Report Form submitted by the aircraft commander |

## Synopsis

Shortly after reaching cruise altitude, an electrical short circuit occurred in the oven controller module of the forward galley's right oven. Smoke caused by the overheating circuit board dispersed around the periphery of the left and right ovens in the forward galley, causing confusion regarding its source. The oven controller's 5 amp circuit breaker tripped, preventing further damage, and the aircraft diverted successfully to London Gatwick Airport. The source of the electrical overheating was traced to the connection between the oven controller's ON-OFF switch and its printed circuit board.

## History of the flight

The aircraft was operating a passenger service between Manchester Airport and Dalaman Airport, Turkey. At 0710 hrs, shortly after the aircraft had reached its cruising altitude of FL370, the cabin manager informed the commander that smoke was emanating from an oven in the forward galley. The commander instructed the cabin manager to pull the forward galley ovens' circuit breaker and to check whether the smoke had cleared. A cabin crew member pulled the ovens' circuit breaker, but as acrid smoke continued to emanate from the ovens, a second cabin crew member discharged one bromochlorodifluoromethane (BCF) extinguisher into the right oven. The commander, having been informed of the situation, isolated the utility busbar. He made

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a PAN call to Maastrict ATC informing them of his intention to divert to London Gatwick Airport.

Smoke continued to issue from the forward galley ovens and cabin crew members discharged five additional BCF extinguishers into the left and right ovens. This was not effective, as the smoke appeared to originate from around the exterior of the ovens. The cabin manager assessed the situation and decided not to move any passengers as she had not received any complaints regarding smoke inhalation from either passengers or cabin crew members.

Maastrict ATC transferred the aircraft to London ATC, who offered the commander a direct approach to Runway 26L at London Gatwick, rather than Runway 08R which was in use. The commander accepted Runway 26L and the aircraft landed normally at 0750 hrs.

The aircraft vacated Runway 26L via Taxiway FR and parked on Taxiway J, to await an inspection from the AFRS. Owing to the narrowness of Taxiway J, the AFRS could not use steps to gain access to the aircraft and instead entered the aircraft at door L1, using a ladder. They confirmed that no fire was present and the aircraft was towed to a remote stand.

**Description of the forward galley ovens**

The aircraft was equipped with eight ovens: two in the forward galley and six in the aft galley. The forward galley ovens were mounted next to each other, as a pair. Each oven is an assembly of the oven unit and an oven controller module, mounted on top of the oven unit, as shown in Figure 1. The two ovens in the forward galley are supplied with 115 volt AC electrical power and are protected by a circuit breaker, rated at 15 amps, that is accessible to the cabin crew. Each oven controller module is additionally equipped with a circuit breaker rated at 5 amps, installed on the rear of the controller. This circuit breaker is not accessible without removal of the oven from the galley.

**Examination of the right oven**

Following the incident, both forward galley ovens were removed from the aircraft by the operator's maintenance engineers. Whilst the left oven was undamaged, inspection of the right oven revealed that an electrical short circuit had occurred within the oven's controller module, and the controller's 5 amp circuit breaker had tripped. The controller's printed circuit board (PCB) assembly exhibited electrical overheat damage where the ON-OFF switch was mounted to the PCB, as shown in Figure 2. Localised burning of the PCB copper tracks and soldered connections at the ON-OFF switch location prevented examination of pre-existing defects in this area of the PCB.

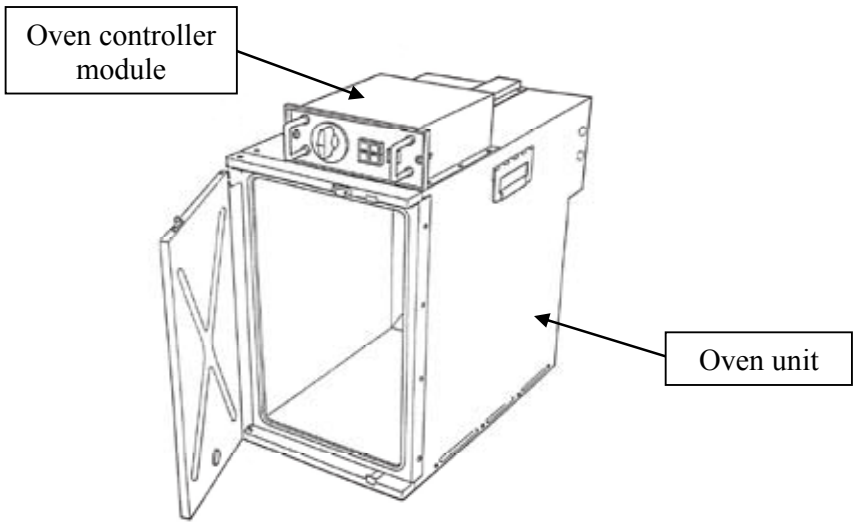


**Figure 1**

Oven assembly

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**Figure 2**

Electrical overheating damage to the oven controller PCB

The oven unit was taken to an approved repair facility for testing. It was fitted with a replacement oven controller module and was functionally tested. These tests demonstrated that the oven unit was serviceable.

The oven controller's 5 amp circuit breaker was tested by a specialist agency and shown to perform within the manufacturer's specifications for current and cut-out time parameters. Tests were also performed on the oven controller's panel-mounted switches and timer switch that demonstrated the serviceability of these components.

**Maintenance information**

The oven had been installed in the aircraft eight days prior to the incident occurring. Following installation, the aircraft had completed 30 flight cycles and 108 flying hours. No defects relating to the oven were recorded during this period.

In May 2010, prior to installation of the oven in the aircraft, the oven was serviced by an approved repair organisation. This service included cleaning, inspection and testing of the oven controller in accordance with the oven manufacturer's component maintenance manual. The inspection report covering this testing recorded that the oven was serviceable.

**Analysis**

The damage to the oven controller's PCB indicates that an electrical short circuit occurred at the connection between the PCB and the oven controller's ON-OFF switch. The nature of the damage to the soldered connections and copper PCB tracks at this location prevented further investigation into the cause of the short circuit. The oven controller's 5 amp circuit breaker, which was operating within its design specification, tripped and prevented further current from flowing and intensifying the electrical overheating.

The overheating damage was limited to the oven controller's PCB and was contained within the controller enclosure. Smoke caused by the overheating circuit board escaped from the controller enclosure and circulated around the forward galley ovens, causing confusion regarding its source.

A review of the maintenance history of the oven controller module did not reveal any defects that may have contributed to the initiation of an electrical short circuit, which is the most likely cause of the electrical overheating damage to the oven controller's PCB.

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