

AAIB Bulletin No: 11/93

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Category: 1.1

**Aircraft Type and Registration:** Concorde Type 1 Variant 102, G-BOAF  
**No & Type of Engines:** 4 Rolls Royce Olympus 593/610 turbojet engines  
**Year of Manufacture:** 1979  
**Date & Time (UTC):** 2114 hrs on 15 July 1993  
**Location:** London Heathrow Airport  
**Type of Flight:** Public Transport  
**Persons on Board:** Crew - 9 Passengers - 41  
**Injuries:** Crew - None Passengers - None  
**Nature of Damage:** Substantial damage to No 3 engine and puncturing of No 8 fuel tank  
**Commander's Licence:** Airline Transport Pilot's Licence  
**Commander's Age:** 50 years  
**Commander's Flying Experience:** 15,056 hours (of which 1,765 were on type)  
Last 90 days - 131 hours  
Last 28 days - 35 hours  
**Information Source:** AAIB Field Investigation

At the conclusion of a scheduled flight from New York, the aircraft made a reduced noise approach to Runway 27L at Heathrow in good weather conditions with a slight crosswind in light rain; the runway surface was wet. Touchdown was smooth and idle reverse thrust was selected in accordance with normal procedures. The nosewheel was lowered and shortly afterwards the wheelbrakes were gently applied. Almost immediately the flight crew felt a slight thump and a warning light associated with the outer right hand wheelbrake system illuminated; at the same time the aerodrome controller saw a shower of sparks coming from the aircraft. The commander reduced wheelbraking to almost zero and used reverse thrust to stop the aircraft after a longer than normal ground run but well before the end of the runway. After stopping the flight crew were unable to cancel reverse thrust on number 3 engine and so it was shut down. The airport fire services attended the scene and some minutes later the fire service escorted the aircraft as it taxied to the stand without further problems.

The tyre on the No 4 main gear wheel (Outboard front right) had burst and showed damage which was consistent with sudden full brake application to that wheel. The runway state was wet, but there was no evidence of aquaplaning. Consequential damage consisted of:

Substantial ingestion damage to the No 3 engine, and damage to the lower skin of the right wing which had been holed in two places, puncturing fuel tank No 8. The tank was empty at the time of landing. The wing puncture marks corresponded to the shape of part of the landing gear strut door latch which was recovered from inside No 3 engine..

The right landing gear water deflector bar was found to have separated and was recovered later from Runway 27L at Heathrow.

The loss of green hydraulic system contents was caused by a ruptured pipe on the right main gear adjacent to the burst tyre. There was minor damage to the brake wiring conduit.

The Flight Data Recorder (FDR) and the Cockpit Voice Recorder (CVR) were removed from the aircraft and sent to the AAIB at Farnborough, however the CVR tape was found to have recycled, overwriting the landing recording. The aircraft operator made available the Quick Access Recorder (QAR) data, which was more comprehensive than that recorded on the FDR. Analysis of the QAR data showed that the landing was normal, with reverse thrust being selected 9 seconds after landing; brakes were then applied, followed by a tyre deflation warning 3 seconds later.

The normal brake system provides braking on all eight main wheels, the brakes are electronically controlled by operation of the pilot's pedals giving progressive and differential braking with anti-skid and torque control. The anti-skid system modulates the pressure at the wheels during normal braking so as to keep the resultant pressure consistent with the maximum adherence between the tyre and the runway surface. An anti-skid system is provided for each wheel and an overload and safety system controls the torque developed by a brake in relation to the amount of brake pedal movement and transmits a full brake release signal in the event of either:

A maximum torque figure being exceeded.

The loss of a brake control signal.

Loss of the electrical supply to the safety system.

Failure of the torque measuring system.

Examination of the brake system for possible faults was undertaken after the minimum work necessary to restore the hydraulic system had been carried out. Functional checks on the brakes were performed without any indication of a fault. The brake system components had no significant history of defects and after removal were bay tested and the wiring and hydraulic circuitry were checked for continuity; no relevant faults were found. The removed components were replaced with new equipment, and the aircraft performed a satisfactory airstest and has since flown without a recurrence of the defect.