

**No: 1/86**

**Ref: EW/C942/01**

**Aircraft type and registration:** Concorde G-BOAB (multi jet public transport aircraft)

**Year of Manufacture:** 1976

**Date and time (GMT):** 15 November 1985 at 2032 hrs

**Location:** London/Heathrow airport

**Type of flight:** Scheduled passenger

**Persons on board:** Crew — 10                      Passengers — 94

**Injuries:** Crew — None                      Passengers — 2 (minor)

**Nature of damage:** Main landing gear tyre burst, debris damage to underside of port wing, ingestion damage to Nos 1 and 2 engines

**Commander's Licence:** Air Transport Pilot's Licence

**Commander's Age:** 41 years

**Commander's Total Flying Experience:** 10506 hours (of which 284 are on type)

**Information Source:** AIB Field Investigation.

#### History of the flight

The aircraft was taking off from London/Heathrow on a scheduled service to New York. Immediately after initiating rotation for take-off, the flight crew felt an impact on the airframe followed by severe vibration. The wheel light and the No 1 rear brake light illuminated causing the commander to suspect tyre failure on the port main landing gear. The ATC tower controller then advised him that he had seen sparks from the aircraft as it left the runway. The commander decided not to retract the landing gear but to return and land at Heathrow after jettisoning fuel. Having notified his intention to ATC, he continued to an area where he could safely jettison his excess fuel. In the meantime, an inspection of the runway had found tyre and metal fragments, which confirmed the flight crew's assessment of the defect. The commander informed the passengers of the situation and separately briefed the chief steward of the possible need for an emergency evacuation after the landing. He told him that, if an evacuation was necessary, he should expect it to be from the starboard exits.

After dumping fuel, the aircraft returned and carried out a safe landing using slight braking only on the starboard wheels. Fire crews followed the aircraft along the runway and carried out an exterior inspection, reporting that fuel was leaking from the port wing but there was no sign of fire and no cause for panic. The commander, meanwhile, had seen from the cockpit window that a thick column of fuel was flowing from the port wing and considered it prudent to evacuate the aircraft.

When the evacuation alarm was heard in the cabin, the cabin crew checked for exterior hazards and, finding none, opened all 6 emergency exits. The slides at the forward port and centre starboard exits failed to inflate but the evacuation was, nevertheless, completed in less than a minute using the 4 inflated slides. Firemen attended at the bottoms of the slides to assist the passengers and to reduce the risk of injury. Two passengers suffered minor injuries during the

evacuation.

### Survival Aspects

Before landing, the chief steward had personally briefed all the cabin crew. He interpreted the commander's instructions to mean that, if the aircraft were to be evacuated, any problem likely to arise would be on the port side. He thus left a degree of initiative with each of the cabin crew to check the conditions outside the aircraft and to open their exits if there was no visible hazard to passengers using the slides. The chief steward arranged before the landing for all hand baggage to be collected and stowed in the toilet compartments.

When the forward port door was opened, the slide fell from its stowage but did not inflate automatically. The chief steward, who was stationed at that door, attempted to pull the manual inflation strop but without success. The centre starboard slide also failed to inflate, dropping from its stowage and resting on the door sill. The stewardess at that exit tried to force the slide away from the sill with her foot but was unable to dislodge it. Thinking it possible that the slide might inflate in the cabin and block both centre exits, she did not attempt to inflate it manually. Eventually, with the help of the steward at the centre port exit, she kicked the slide on to the wing but this movement did not actuate the automatic inflation sequence. The slide was not inflated manually because by this time all the passengers had left the aircraft. The forethought of the chief steward in stowing away all hand baggage facilitated the very rapid evacuation.

### Further Investigation

Examination of the aircraft showed that the rear outboard tyre on the port main undercarriage bogie had burst, with about threequarters of the tyre staying on the rim. The remaining pieces of the tyre plus parts of the main undercarriage fixed door were recovered from Runway 28R between blocks 11 and 13. The tyre debris showed clear indications of having been punctured in at least one location by a sharp object, but it has not been possible to identify the nature of this object. The forward outboard tyre also showed evidence of two deep cuts but had not deflated.

The undersurface of the port wing had numerous rubber scuffs above and forward of the main landing gear and had a small ( $\frac{3}{4}$  inch  $\times$   $\frac{1}{2}$  inch) puncture as described by the crew. This had evidently been made by some sort of hard metallic object, possibly part of the undercarriage door mechanism, which had been broken off by tyre debris impact. There was also a larger hole in an access panel immediately aft of the port main undercarriage leg, but this was in a dry bay and no fuel was released. The tyre burst had also dislodged the electrical connector which carried the brake temperature information. Both engines 1 and 2 had suffered foreign object damage that necessitated their replacement.

As with the previous days incident to Concorde G-BOAE (see item ref EW/C941 in this edition of the AIB Bulletin), the emergency shut-down procedure resulted in failure of the fire bottle serving No 1 engine bay to discharge extinguishant. Again, subsequent testing of the system did not reveal any fault in the circuit continuity. The reason for failure of the forward port door escape slide to automatically inflate remains obscure because the slide inflated as it was being removed from the aircraft thus destroying any possibility of assessing the rigging tolerance or packing integrity.

The Centre, starboard escape slide, when first examined, had not inflated, although for safety reasons the inflation bottle had been disconnected from the slide. Whilst this slide was being removed, the bottle also fired but discharged to atmosphere without inflating the slide. The bottle was removed, the firing pin re-inserted and the bottle re-installed in the same position. It was then possible to simulate a slide inflation sequence and it was found that the mechanism was correctly rigged. However, by opening the door gently it was possible to latch the door in the open position without firing the bottle. A further, positive, push on the door handle against the resistance of the door rubber bumper was sufficient to cause the bottle to "fire".

As stated previously, the crew did not attempt manual inflation because they felt that the slide had not deployed correctly. Subsequent information has revealed that, although the slide had fallen inside the doorway, the mechanism is such that the initial part of the inflation sequence would have ensured that the slide was ejected outside the door aperture before inflation commenced.