

No: 3/88

Ref: 1a

**Aircraft type and registration:** Boeing 747-243B N605PE

**No & Type of engines:** 4 Pratt & Whitney JT9D-7A turbofan engines

**Year of Manufacture:** 1978

**Date and time (UTC):** 1 February 1988 at 1058 hrs

**Location:** Gatwick Airport, Crawley, Sussex

**Type of flight:** Scheduled passenger

**Persons on board:** Crew — 20                      Passengers — 425

**Injuries:** Crew — None                      Passengers — None

**Nature of damage:** No 4 engine overtemperature

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

**Commander's Age:** 38 years

**Commander's Total Flying Experience:** 7300 hours (of which 850 were on type)

**Information Source:** AAIB Field Investigation

The aircraft was prepared for a transatlantic flight to Miami although initial fuel and load calculations were based upon a destination of Washington/Dulles with an en route diversion to the original destination. With passengers and cargo loaded, the aircraft was pushed back from Stand 36 at 1040 hrs and taxied to the runway holding point Alpha North. Whilst waiting for one landing and one departing aircraft, the crew queried their final dispatch figures with the handling agent who confirmed that the correct number of passengers had boarded. A small adjustment was made to the weight manifest resulting in a take-off weight some 1043 lb below the calculated Maximum Gross Take-off Weight. Take-off performance was planned on a flap setting of 20° with all air conditioning packs off and no ice or rain protection selected. Maximum permitted thrust was to be used which required engine pressure ratios of 1.45.

There was a strong wind blowing across runway 26L with a mean recorded direction of 210° at 20 kt gusting to 30 kt and warnings of wind shear were being broadcast on the ATIS. The surface temperature was +8°C and QNH 986 mb. Squally showers were present in the area although it was not raining at the time of take-off.

The aircraft turned onto the runway, was passed its take-off clearance together with a reported wind of 210°/10 kt, and it began its take-off roll at 1057 hrs. The commander, who was the handling pilot, rotated the aircraft at 160 kt indicated airspeed. As the main wheels left the runway a loud bang was heard and the second officer (flight engineer) announced a loss of power from No 4 engine. The landing gear was retracted and the throttles of 1, 2 & 3 engines were pushed fully forward. It was noted that the EGT of No 4 engine was off the scale of the gauge with the amber warning light illuminated. The second officer then initiated fuel dumping by opening all the valves and operating the appropriate pumps. The commander was

aware that the flight profile was flat and that the aircraft was approaching rising ground. He tried to minimise the loss of height whilst attempting to increase airspeed and reported that the stick shaker, giving warning of an imminent stall, was in operation for some 30 seconds. When sufficient speed had built up to permit flap retraction, the aircraft was able to climb eventually to 4000 feet where the dumping of fuel continued over an area near the south coast. The air (tower) controller, who had witnessed the loss of height together with an abnormal pitch up and 20° right roll, sounded the crash alarm since it appeared to him that the aircraft had disappeared below the horizon and was about to crash. Other eye witnesses had seen the aircraft make a normal rotation some two thirds along the runway and then flames were seen to issue from the tail pipe of No 4 engine. The aircraft was seen to pitch up and roll to the right as it continued on a flat flight path towards rising ground. Some witnesses saw flames issuing from No 1 engine and a cabin attendant seated by door 2L saw flames coming from the fan area of No 1 engine. A resident near the brow of Russ Hill, 2500 metres from the threshold of runway 08, saw the aircraft appear from her left at a low height just clearing a neighbouring farm house before disappearing in a cloud of vapour towards the west.

Having dumped about 80 tonnes of fuel to achieve the required landing weight the aircraft landed uneventfully at Gatwick at 1150 hrs. Shortly before touch down the No 4 engine was restarted and maintained at a reduced thrust setting in readiness for the application of go-around power should the gusty conditions have required it.

An inspection of the aircraft after landing showed no fire damage in the area of No 4 engine. There was no evidence of the aircraft having struck any object on the ground during its departure. The No 4 engine was removed and is being stripped for examination and performance testing at the manufacturer's base in the United States under AAIB supervision.

Both the Cockpit Voice Recorder (CVR) and ARINC 573 Digital Flight Data Recorder (DFDR) were removed for examination. The CVR, which has a recording duration of 30 minutes, did not include any information pertaining to the take-off since the aircraft had continued in flight for some 57 minutes. The DFDR was replayed satisfactorily and the data obtained is being evaluated.

The Chief Inspector of Accidents has ordered an Inspector's Investigation into this incident.