

Boeing 767-304, G-OBYA

AAIB Bulletin No: 5/2001 **Ref:** EW/C2000/10/05 **Category:** 1.1

INCIDENT

Aircraft Type and Registration: Boeing 767-304, G-OBYA

No & Type of Engines: 2 General Electric CF6-80C2B7F turbofan engines

Year of Manufacture: 1996

Date & Time (UTC): 10 October 2000 at 1829 hrs

Location: Runway 26L London Gatwick Airport

Type of Flight: Public Transport

Persons on Board: Crew - 11 - Passengers - 154

Injuries: Crew - None - Passengers - None

Nature of Damage: damage to two main wheel tyres, left engine fan blades and left engine thrust reverser.

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 51 years

Commander's Flying Experience: 13,518 hours (of which 5,601 were on type)
Last 90 days - 131 hours
Last 28 days - 55 hours

Information Source: AAIB Field Investigation

History of the incident

The crew, consisting of two flight deck and nine cabin crew, reported for duty at Manchester at 1630 hrs to operate a two sector flight to Abu Dhabi via London Gatwick. For the short flight to Gatwick the aircraft carried 10,000 kg of fuel as well as 2,230 kg of freight. The first officer was designated as pilot flying (PF) and the departure from Manchester, cruise and descent into Gatwick were carried out normally. The crew had studied, and carried with them, the relevant 'Notices to Airmen' (NOTAMS) concerning Gatwick and had noted the current Automatic Terminal Information Service (ATIS) information 'Oscar' for Gatwick prior to their approach.

ATC gave the aircraft radar vectors for an ILS approach to Runway 26L. The crew were instructed to maintain 160 kt to 4 DME and they were visual with the runway at approximately 7 nm from touch down. When he had sight of the airfield the commander commented to the first officer on the floodlights associated with the 'work in progress' (WIP) around the threshold of Runway 08L. The

location of this WIP had not been mentioned in the Gatwick NOTAM (see Figure 1) or on the ATIS. The commander considered that this WIP might affect the later exits from the runway and therefore decided that an earlier exit via the second rapid exit turn-off (RET) 'F' would be desirable.

All the landing lights were selected 'ON' for the touch down, which was on the runway centreline in the correct position, and at a 'last look' speed of 133 kt (Vref 128kt). The aircraft weight was some 30,000 kg below its maximum landing weight. Prior to landing autobrake level 3 had been selected and operated normally, together with the speedbrakes, as the aircraft touched down. The first officer selected 60% reverse thrust but during the 'rollout' it became apparent to the commander that autobrake level 3 would not achieve the required deceleration to use RET 'F'. The commander therefore increased the autobrake level to 4 in order to reach an acceptable speed for the turn.

The aircraft slightly overshot the second RET centreline as it decelerated through 40 kt. The commander states that at 35 kt he initiated the right turn to clear the runway using the nose wheel steering tiller. He stated that he could see that the aircraft was about to enter an area of tarmac albeit obliquely and to the left of the turn-off centreline. There was no requirement for edge lights to be installed on the RET and there were none, but the commander could see the RET centreline lights. The painted runway and paved surface markings were not visible due to the glistening of the lights from the WIP on the damp runway surface and puddles on the waterlogged grass. He was not aware of a further RET positioned at an angle of 20° to the runway centreline which was under construction just beyond RET 'F'. The construction of this RET was not mentioned in the NOTAMs.

During the manoeuvring turn and as the cockpit came over the RET centreline the aircraft suddenly 'bucked' and stopped. The commander looked to his left and saw that the surface was lighter in colour than the tarmac he was expecting. He applied the brakes and immediately became aware that some of the landing gear wheels were not on the paved surface and that the aircraft could not move. He cancelled reverse thrust, stowed the speedbrakes, and raised the flaps. The No 1 (left) engine was shut down and the APU started. The No 2 (right) engine was left running whilst the crew contacted their handling agents to organise a recovery. As soon as it became apparent that this would take some considerable time No 2 engine was shut down and passenger disembarkation was arranged. The passengers exited the aircraft into waiting coaches using mobile steps positioned at door Right 1. The operating crew remained on board for some 4 hours until the aircraft had been recovered and towed to the terminal. The ATC log indicated that the runway was re-opened for normal operations at 2242 hrs.

The aircraft had come to rest with the left main landing gear in soft grass approximately 10 metres from the edge of the western side of the second 26L RET 'F'. The nose wheel and right main landing gear were on the hard surface of the RET (see Figure 3)

Meteorology

A weather observation taken at 1829 hrs gave the surface wind as 120°/04 kt (varying between 090° and 160°), with light rain, scattered cloud at 2,600 feet, broken cloud at 3,500 feet, temperature 9°C, dewpoint 6°C and a sea level pressure of 979 mb.

Flight Recorders

The two solid state recorders fitted to the aircraft retained information from the period of the incident landing. The aircraft had been configured for landing with Flap 30, gear down,

speedbrakes armed and autobrake level 3 selected. The aircraft was at a radio altitude of 50 feet over the threshold and touched down 11 seconds later with an airspeed of 129 kt (see Figure 2). The touchdown point was calculated to be approximately 100 metres beyond the end of the touchdown zone. Ground spoilers deployed automatically at touchdown.

At 123 kt airspeed, as aircraft pitch attitude was being reduced, idle reverse thrust was selected. Some 9.5 seconds after the main gear touched down, reverse thrust was rapidly increased until readings of 70% N_1 were recorded from both engines as the nose gear contacted the runway. One and a half seconds later, as the airspeed was reducing through 90 kt, autobrake level 4 was selected and aircraft retardation increased. Typical longitudinal accelerometer values were recorded as changing from -0.2G to -0.26G at that point. The commander commented on the desirability of making the next high speed exit and stated that he would do it and that he would steer the aircraft.

The rate of deceleration was maintained over the next 5 seconds by which time airspeed was reducing through 61 kt. At that point the aircraft heading began to increase, indicating the start of a turn to the right. Over the next five seconds the airspeed reduced to 36 kt, the heading had increased by 15° from runway heading and the progressive applications of right rudder and clockwise control wheel were recorded. Also at that point, reverse thrust was reduced to give 64% N_1 on both engines and autobrake level 3 was selected.

A maximum right rudder deflection of 18° was recorded as airspeed reduced through 30 kt and the heading increased through 20° to the right of the runway heading. Further values of airspeed were not recorded as the system was designed only to provide accurate readings down to this value.

From the perturbations in the recorded values of roll attitude and normal acceleration it is considered that the main landing gear departed the paved surface five seconds later with the aircraft heading 45° right of the runway and with 63% N_1 thrust reverse applied. At that time autobrake level 2 was selected.

Within four seconds the aircraft had come to rest; reverse thrust was cancelled and the autobrakes disarmed. The crew then advised the aerodrome controller that they had run onto the grass. The final aircraft position was with a roll attitude of 2.4° left wing low, a level pitch attitude and on a heading of 311°M.

The flaps and speedbrakes were stowed 45 seconds after the aircraft came to a halt and the left engine was shut down a minute and a half later. The shutdown of the right engine four minutes after that terminated operation of both flight recorders.

Post incident action by the airport

The airport operator discussed with the CAA Safety Regulation Group (SRG) the issues raised by the incident. They also held a meeting with representatives of airlines based at Gatwick with a view to establishing the best solution for additional edge lighting for the RET under construction and all other RETs.

In the short term the airport authority placed temporary blue 'Metalight' lighting across the entrance to the new RET and either side of RET 'F' where it joined the outer edge of the runway shoulder. Furthermore temporary paint markings showing that the new RET was not yet in use were to be

applied with the same markings being used when RET 'F' was decommissioned in early 2001. Revisions were also made to the Gatwick NOTAM covering the construction work.

Post incident action by the operator

The operator conducted an internal investigation into the incident. Besides identifying some Crew Resource Management (CRM) issues as having a minor contribution to the incident, the investigation identified several issues concerning the airfield. These were that:

the WIP being carried out close to the runway was not mentioned in the NOTAM and the presence of bright lights at the construction site could have been a distraction.

there were no edge lights or markings at the sides of the RET.

the area between the RET and the runway was sprayed with black bitumen which under certain conditions could look like tarmac.

the new RET under construction was not mentioned in the NOTAM or marked on the airfield chart.

The operator's recommendations included, publication of their report for dissemination by other company pilots, the publishing of guidance material on maximum speeds to be used on RETs and the use of RET centreline guidance. It was also recommended that the appropriate authority should re-examine the spraying of black bitumen on non load bearing surfaces close to the runway edge, the installation of taxiway edge markings, closer control over the positioning and lighting of areas of WIP close to operational areas and the policy regarding the publication of information on new runway/taxiways adjacent to operating areas.

Conclusion

The commander perceived that, although the aircraft had travelled just beyond the centreline of the RET, the surface ahead and to the right of the aircraft appeared to be capable of bearing the aircraft's weight. In the prevailing conditions he could not see any surface markings delineating the edge of the load bearing surface and there were no lights or edge markers available for his guidance. He was aware of the position of the WIP only when he first became visual with the airfield during the final approach. Without definitive information as to its location and affect on the airfield taxiways in use he assumed that an exit from the runway at the second RET 'F' would be the most expeditious and lead to an uninterrupted taxi run to the terminal. Furthermore, the lighting associated with the WIP was directly ahead of him as the aircraft turned to clear the runway. The reflection of the lights in water on the runway and adjacent grass areas led to his difficulty in differentiating between the load and non load bearing surfaces close to the RET. Moreover the area of grass between the RET and the runway had been sprayed with black bitumen thus disguising its true nature in terms of load bearing.