S1/2000 - Boeing 757-204, G-BYAG

AAIB Special Bulletin No: S1/2000

Aircraft Type and Registration:	Boeing 757-204, G-BYAG
No & Type of Engines:	2 Rolls-Royce RB211-535E4 turbofan engines
Year of Manufacture:	1993
Date & Time (UTC):	14 September 1999 at 2147 hrs
Location:	Girona Airport, Spain
Type of Flight:	Public Transport
Persons on Board:	Crew - 9 - Passengers - 236
Injuries:	Crew - 1 Minor - Passengers - 2 Serious - 41 Minor
Nature of Damage:	Substantial, fuselage broken in two places, landing gear and both engines detached
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	57 years
Commander's Flying Experience:	16,700 hours (of which 3,562 on type)
	Last 90 days - 195 hours
	Last 28 days - 65 hours
First Officer's Licence:	Commercial Pilot's Licence (Frozen ATPL)
First Officer's Age:	33 years
First Officer's Flying Experience:	1,494 hours (of which 1,145 on type)
	Last 90 days - 160 hours
	Last 28 days - 60 hours
Information Source:	Spanish Air Accidents Investigation Commission

History of the flight

All times in this report are UTC (Universal Time Co-ordinated)

The aircraft was operating a holiday charter flight from Cardiff Airport, UK, to Girona Airport, Spain. The commander was the pilot flying (PF) for the approach and landing phase of the 2 hour flight. On arrival in the Girona CTR (Control Zone) at around 2120 hours, the aircraft routed to the GRN VOR (radio navigation aid) and, because of the wind direction and the fact that the runway was wet, the crew elected to fly a VOR/DME procedure to Runway 02. Flight conditions were turbulent. There was thunderstorm activity in the area at the time and the Girona Meteorological Report (METAR) for 2130 hours included: 'Surface wind 350/6 kt, visibility 4 km, thunderstorm with heavy rain, cloud 3-4 octas at 1,500 feet, 1-2 octas cumulonimbus at 3,000 feet, 5-7 octas at 4,000 feet, temperature 20°C/ dewpoint 20°C, QNH 1010 mb, remarks recent rain.'

Upon becoming visual the aircraft was not adequately aligned with the runway and a change in wind direction now favoured the reciprocal runway so a missed approach was carried out. The aircraft was positioned for an ILS (Instrument Landing System) approach to Runway 20. The autopilot and autothrottle were engaged throughout the flight until a decision to land had been made. Twenty seconds prior to touchdown the surface wind reported by Air Traffic Control (ATC) was 150°/6 kt (6 kt from 150 degrees).

The commander saw the runway lights at about 500 feet agl (above ground level) and made the decision to land at the decision height of 251 feet (altitude 720 feet). At some point after this he lost outside visual references. Two automatic audio cautions of excessive sink rate were given by the Ground Proximity Warning System (GPWS) just before touchdown. Information from the Flight Data Recorder (FDR) showed that the aircraft contacted the runway very hard in a 2° nose down attitude with an airspeed of 141 kt, bounced and touched down again approximately 140 metres further on. Both the FDR and CVR (Cockpit Voice Recorder) recordings stopped shortly after the second touchdown. Reception of the ILS signal continued up to the point at which the recorders stopped. Interruptions of the electrical power supply to the airport and the surrounding area were reported at around the time of the accident; the airport emergency supply established within the required time interval.

Engineering examination

Examination of the aircraft wreckage and the crash site showed that the nose landing gear (NLG) had collapsed as the result of failure of its supporting structure. The right engine nacelle and parts of the forward fuselage had then contacted the runway surface. The first structural contact on the runway (Point B, Figure 1 occurred when the aircraft was 557 metres from the start of Runway 20 and 2 metres right of the runway centreline. The evidence suggested that Point B was close to the position of the second touchdown. The runway was 2,400 metres long and 45 metres wide.

Runway markings showed that from Point B the aircraft tracked along the runway close to the centreline for 630 metres before veering to the right and departing from the paved surface 1,556 metres from the start of the runway.

After a run of approximately 343 metres across flat grassland beside the runway, the aircraft ran diagonally over a substantial earth mound adjacent to the airport boundary, becoming semi-airborne as a result. At the far side of the mound a number of medium sized trees were struck and severed, predominantly by the right wing, and the right engine nacelle struck the boundary fence. The aircraft, yawed considerably to the right of its direction of travel, then passed through the fence, re-landed in a field and both main landing gears collapsed.

It came to rest after a 244 metre slide across the field, with the fuselage almost structurally severed at two points, the NLG and both engines detached and the underside of the left wing torque box split open near the wing root. The aircraft came to rest outside the airport boundary approximately

35 feet below the level of the runway's southern end, 171 metres right of the runway centreline and not far short of abeam the runway end, after a total ground run from Point B of approximately 1,730 metres. The three fuselage parts remained upright, connected by cables, wires and other services, but rolled to the left between 8-16°. There was no fire.

Injuries and evacuation

The aircraft was fitted with 235 passenger seats; 233 passengers, 3 infants and a crew of 9 were on board. Cabin crew members described the first touchdown of the aircraft as a heavy landing, which was followed by a second much heavier impact during which some overhead lockers and passenger support units opened. The main interior lights failed at the second touchdown but the emergency lighting appears to have illuminated immediately in all cabin sections.

Considerable floor and seat disruption had occurred in the regions of the fuselage breaks and in the flight deck, and some cabin overhead equipment had been displaced, but all of the cabin occupants remained conscious and without incapacitating injury. Externally it was dark and raining heavily. Evacuation commenced by the light of the emergency lighting system, with assistance being required by some passengers in the areas of disruption around the fuselage breaks. Difficulty was experienced in opening some of the cabin doors; three of the eight available exits could not be opened.

Evidence from the passengers and crew indicated that the aircraft had been evacuated rapidly without external assistance. Rescue and Fire Fighting Services had difficulty locating the aircraft and reaching the site. They arrived on the scene about 20 minutes after the accident, and spent a further 50 minutes in recovering the occupants to the terminal. Forty-four persons, including the aircraft commander, received hospital treatment.

Further information

The Spanish Air Accidents Investigation Commission is investigating the accident in accordance with the International Civil Aviation Organisation (ICAO) provisions of Annex 13 to the Chicago Convention on Civil Aviation. Accredited representatives from the UK, as the State of Registry, and the USA, as the State of Design and Manufacture, are participating in the investigation.

The investigation will continue to examine all aspects of the accident, including the reasons for the aircraft having landed heavily and left the runway, the failure mechanism of the NLG structure and the possible effects of this failure on aircraft electrical and control systems. An assessment of cabin and flight deck features relevant to occupant survivability will also be included.

When the final report has been published by the Spanish Commission it will be translated into English and distributed in the United Kingdom.