

AAIB Bulletin No: 7/95

Ref: EW/C95/5/5

Category: 1.1

Aircraft Type and Registration: De Havilland Canada DHC-8-311 Dash 8, G-BRYJ

No & Type of Engines: 2 Pratt & Whitney PW-123 turboprop engines

Year of Manufacture: 1991

Date & Time (UTC): 23 May 1995 at 1102 hrs

Location: Jersey Airport

Type of Flight: Public Transport

Persons on Board: Crew - 2 + 2 Passengers - 42 + 2

Injuries: Crew - None Passengers - None

Nature of Damage: Underside of rear fuselage abraded

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 58 years

Commander's Flying Experience: 10,600 hours (of which 3,300 were on type)
Last 90 days - 200 hours
Last 28 days - 65 hours
Last 24 hrs - 1 hour 30 minutes
Previous rest period - 36 hours

Information Source: AAIB Field Investigation

History of the flight

The commander states that the first officer flew a well conducted approach to Runway 27 at Jersey, where the wind was 280°/15 kt. However, the first officer reports that the normal flare to about 4° nose-up did not arrest the rate of descent, so he continued to increase the pitch angle. The ensuing touchdown was firm and the underside of the rear fuselage contacted the runway.

The Flight Data Recorder readout shows that, over the 30 seconds prior to touchdown, the speed had gently reduced from V_{REF} plus 10 kt to V_{REF} (105 kt). It remained at this until two seconds before touchdown, when the speed dropped to V_{REF} minus 5 kt, as the pitch attitude was increased from the original 4° to 8°. The initial touchdown registered 1.9 g and resulted in a small bounce, which was followed by a 1.3 g touchdown as the pitch angle was increased to 9.7°. At this point, the underside of the rear fuselage scraped along the runway and activated the "TOUCHED RUNWAY" warning light. Following this, despite up-elevator being progressively increased to almost full deflection, the pitch angle rapidly decreased and the nose gear contacted the ground. The landing run was continued and the aircraft was taxied to the apron and shut down without further event.

Having disembarked the Jersey passengers, the commander and first officer went outside to inspect the damage, as did a Station Engineer. It was agreed that the scrapes were superficial and mainly a matter of paint loss and no damage was visible from inside the hull. The commander then consulted the Minimum Equipment List and went to telephone the company Flight Operations Manager and the Chief Engineer to describe the damage, returning with the information that the flight could be continued, unpressurised, provided that the damaged area was inspected after every sector flown.

The flight schedule was therefore continued and the sector to Paris flown unpressurised at FL 90. At Paris, the commander and two British Airways engineers made another thorough inspection of the damage, which confirmed the previous diagnosis. The return sectors, Paris to Jersey and Jersey to Bristol, were flown in the same manner, with inspections after each. At Bristol, ground engineers made another inspection and suggested that, as a precaution, the aircraft should be flown directly to its main engineering base at Plymouth. This was done.

Examination of aircraft

It was apparent that the underside of the fuselage had been scraped over a length of 19 inches in the area of frame No 642.50. Aft of this point the underside of the fuselage begins to slope upwards to the tail. The area of interest, which is ahead of the rear pressure bulkhead, is illustrated in the accompanying diagram.

A photograph of the damage is also appended, although it should be noted that at the time of the AAIB inspection, the damaged area had been treated with paint stripper in preparation for the structural repair. The damage would definitely have appeared more superficial when it was inspected immediately after the sectors flown. In particular, it was apparent that the paint quality was such that it was difficult to discern the rivet lines, and in consequence, the locations of the frames and stringers. Inspection of the fuselage interior in the affected area revealed no evidence of damage.

The fuselage skin panels in this area consisted of two alloy sheets bonded together. These in turn were conventionally riveted to the frames and stringers. The left and right panels butted together on the aircraft centreline, the join being covered by internal and external butt straps. The inner strap was considerably wider than the outer, which had been abraded away where it straddled frame No 642.50. The skin either side was also severely abraded, slightly more so on the right-hand side, and the two layers of the skin panel had worn away, exposing the inner butt strap. The skin was scratched as far forward as the next frame, with the damage again being slightly more severe on the right-hand side. The TOUCHED RUNWAY switch mounting plate, mounted to the left of the centreline, and which stood slightly proud of the skin, had been abraded on its rear corners. The frangible disk that covered the switch, together with the external switch components, were missing.

Additional information

Although the aircraft had been equipped with a tail bumper, the ground/fuselage "contact line", at a high pitch angle whilst landing, passes closer to the fuselage underside than to the tail bumper. The operator has now removed the bumper (and had planned to do so prior to the accident), in accordance with Service Bulletin No 832111.

According to the operator, the aircraft manufacturer had received no reports of similar events on this type of aircraft. However, a note in the Maintenance Manual cautions that the fuselage shell can contact the runway in the event of a heavy landing. Although tail bumper contact had not occurred in the operator's experience, it can occur in the event of over-rotation during takeoff, when the main gear oleos are at maximum extension.

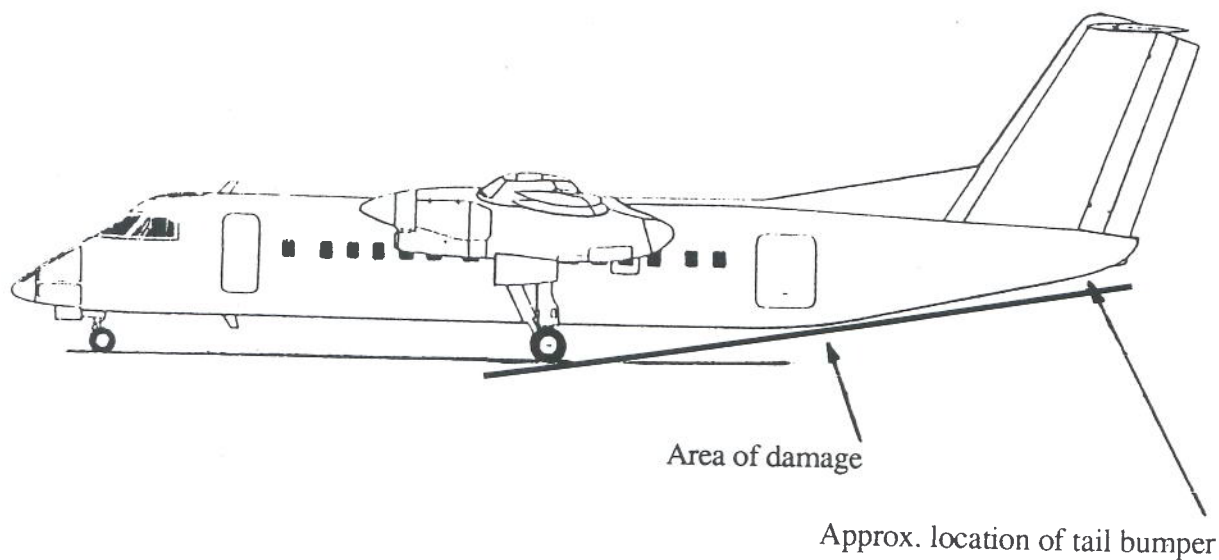


Diagram showing ground contact line at a high pitch attitude



View on underside of G-BRYJ looking forward. Note "touch runway" switch mounting plate to the left of the centreline

(NB. Surface treated with paint stripper at time of photograph)