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AIB Bulletin 10/84

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Aircraft type and registration:	Handley-Page HP7 Dart Herald G-BEZB (twin engined turbo-prop transport aircraft)
Year of Manufacture:	1964
Date and time (GMT):	13 March 1984 at 1736 hrs
Location:	Guernsey Airport, Channel Islands
Type of flight:	Non-scheduled cargo
Persons on board:	Crew — 2 Passengers — Nil
Injuries:	Crew — Nil Passengers — N/A
Nature of damage:	Abrasion damage to fuselage underside, port propeller and gearbox damaged, minor abrasion of wing and tailplane tips.
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	62 years
Commander's total flying experience:	20,122 hours (of which 2,300 hours were on type)
Information Source:	AIB Field Investigation

The aircraft was operating a freight service. It took off from Bournemouth for Guernsey at 1554 hrs and arrived on the downwind leg of a visual circuit to runway 09 at Guernsey Airport at approximately 1620 hrs. The wind at Guernsey was given as 070°/16 kt with 7 nm visibility in haze and 1 octa of cloud at 2200 feet.

As the aircraft turned onto the base leg, the landing checks were carried out but the down selection of the undercarriage produced only two green lights and one red, indicating that the port main undercarriage was not locked down. The crew made several reselections but were unable to lower the port undercarriage and, at 1624 hrs, informed air traffic control (ATC) who directed them out of the circuit under radar surveillance to the West of the airport in order to further examine the problem.

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At 1636 hrs, the crew reported to ATC that repeated re-selection of the normal undercarriage lowering system had failed to release the leg and that they had operated the emergency system without effect. At this time the ATC Officer declared a full emergency and took the appropriate action. Following a visual inspection though the cabin windows, the commander decided that the port main undercarriage was in the fully retracted position although the undercarriage doors were open. In order to confirm his assessment of the problem, the commander then requested a low fly past up the runway and past ATC. To make a better evaluation, the senior ATC officer then requested the chief engineer of the aircraft's handling company to position himself beside the fire vehicle situated at the western access track to the runway. This enabled the engineer to transmit if necessary and listen on the radio telephony frequency (RTF) common to both the aircraft and ATC. When the fly past was complete, the commander was informed that the visual inspection appeared to indicate that the leg was locked up.

By this time, several aircraft were awaiting departure clearance and so the commander again left the circuit and orbited at 4000 feet under radar surveillance to the south west of the aerodrome. The crew used this period to nearly empty the port outer wing fuel tank, and to study the Operations Manual so as to acquaint themselves fully with the procedure for a one main wheel landing. In the meanwhile, ATC had contacted the Managing Director of the operating company who, together with the commander, decided on an attempt to release the port undercarriage leg by 'bouncing' the other wheel on the runway during two touch-and-go circuits. This was carried out but without success. Following these attempts, the fuel quantities were less than 100 kg in the port wing and 500 kg in the starboard and the commander decided to land.

Duuring this period the Head of Aviation Operations decided to turn off the high voltage supply to the radar scanner lying close to the edge of the runway and, as the aircraft touched down, to turn off the runway lights. These actions were taken as a precaution against a live cable or an electrically ignited fire should the aircraft plough into the ground beside the runway.

In the event, the crew made a fully controlled and gentle touchdown on the left side of the runway. The commander chose this position so as to place the wingtip where it would contact the ground on grass rather than concrete, thereby avoiding unnecessary sparks around the fuel tank. He was able to maintain directional control until the rear port side of the fuselage undersurface scraped along the runway. The port side propeller tips then struck the ground and the wingtip lowered itself onto the grass. When the wing touched the ground the aircraft gently slewed to the left and came to rest at about 45° to the runway with the main part of the fuselage on the grass and the tail hanging over the hard shoulder of the runway some 2,800 feet from the threshold. Having completed the necessary drills, the crew evacuated the aircraft without injury.

The Airport Fire Service (AFS) positioned the appliances around the aircraft and were able to begin applying foam within 30 seconds of the aircraft coming to rest. Although there was no fire apparent, there had been considerable frictional sparking during the impact and the source of a small amount of smoke was quickly foam sealed. When the AFS had completed their task, the crew returned to the aircraft and noticed a smell of fumes in the cockpit area so, at the request of the co-pilot, the handling company's chief engineer disconnected the main and standby batteries. It has not been possible to determine the precise sources of the fumes but it may have been either residual from the earlier scraping of the fuselage or an electrical fault generated by the impact.

During the course of the investigation it was reported that the local radio station had quickly broadcast news of the impending emergency landing. The result of this action was that many of the airport access roads were blocked with sightseers thereby denying free passage to the emergency services.

Inspection of the port main undercarriage mechanism confirmed that the oleo leg was indeed locked up but could be extended when the lock was released. The leg could not be released by the aircraft's hydraulic systems because of failure of the associated door jack sequence valve operating arm. As the undercarriage doors open, movement of the door jack depresses two plungers of a sequence valve which port pressure from either the normal or emergency hydraulic systems to the up lock release and undercarriage extension jacks. Since the operating arm between the door jack and the sequence valve had fractured, there was nothing the flight crew could do to unlock and extend the oleo leg.

The broken striker arm exhibited signs of a long term crack having been present through nearly 80% of the section prior to final overload failure. Detailed metallurgical examination of the fracture confirmed the presence of a long-standing fatigue crack but was unable to explain the reason for its initiation, since no material defects were apparent nor any indications that abnormal loads had been applied such as by mal-rigging or a stiff sequence valve action. The total numbers of hours flown are not known although the unit was 2871 hours within the 8000 hours overhaul life for the door jack/sequence valve assembly and represents the only known instance of failure of this part.

Following a "once-off" inspection of all remaining aircraft for cracks in this area, the responsible design authority will be issuing a service bulletin recommending a safe life of 10,000 flights with non-destructive tests every 1000 flights subsequently.