

AAIB Bulletin No: 6/94

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Aircraft Type and Registration: DH114 Sea Heron C Mk 1, G-AORG

No & Type of Engines: 4 De Havilland Gipsy Queen 30 Mk 2 piston engines

Year of Manufacture: 1956

Date & Time (UTC): 2 April 1994 at 1442 hrs

Location: Jersey Airport, Channel Islands

Type of Flight: Private

Persons on Board: Crew - 2 Passengers - 1

Injuries: Crew - None Passengers - None

Nature of Damage: Propellers bent, lower fuselage, engine cowls and left aileron damaged

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 50 years

Commander's Flying Experience: 15,431 hours (of which 47 hours were on type)
Last 90 days - 154 hours
Last 28 days - 37 hours

Information Source: Aircraft Accident Report Form submitted by the pilot and engineering examination by the operator

The purpose of the flight was to carry out a functional check of the aircraft and its systems prior to the carriage of passengers. The crew met and started preparations for the flight, and after completing all checks from the checklist, the engines were started. After engine warm-up and 'dead-cut' magneto checks, taxi clearance was obtained and the aircraft taxied to Stand 22 for engine run-up. The latter was completed satisfactorily, and the aircraft taxied to the holding point for Runway 27. The pre-takeoff checklist was completed and departure clearance obtained from ATC. The aircraft became airborne normally with no flap and at 200 feet agl the landing gear was selected 'UP' by the commander. This action resulted in the nose landing gear retracting, but the two red position indicator lights illuminated for the two main landing gears. Observers on the ground reported seeing the main landing gears partially retract and then return to the extended position. The commander re-selected the landing gear 'UP', with the same result as previously. He selected 'DOWN' again, and obtained a nose landing gear positive down lock indication light (green), and two main landing gear 'unsafe' indication lights (red). The pneumatic system pressure was checked and the gauge observed to register approximately 500 psi for both systems. At this stage the commander elected to follow ATC's clearance to the south east corner of Jersey 'not above 3,000 feet' to investigate the problem. The aircraft was flown at 110 kt and climbed to 1,500 feet.

The aircraft's flight manual was consulted in an effort to identify the cause of the problem, and the emergency checklist was also consulted. The crew checked the mechanical indicators for all three landing gears, and they appeared from the cockpit to indicate that the landing gears were probably 'DOWN' as all three indicators were in their correct, locked down, position (main gear indicators 'UP', and nose gear indicator 'DOWN'). However, closure of the throttles for Engine Nos 2 and 3 gave a landing gear 'unsafe' warning horn, which was considered to confirm that the landing gear electrical position indication system may have been faulty. The alternate bulbs on the landing gear indicator light system were also tried. A previous history of incorrect landing gear position indications was known to the commander, and with this in mind he elected not to use the aircraft's emergency landing gear lowering system. Instead, a request was made to fly past the ATC tower to verify the position of the landing gear, which was granted.

The aircraft was flown past the tower at a height of 200 feet agl and at ATC's request the pilot of a Fokker F27 aircraft also observed the landing gear position. Both the F27's crew and ATC reported that the landing gear appeared to be locked down. The commander then climbed the aircraft to circuit height and briefed the crew that he intended to make a landing as gently as possible and that, if the landing gear appeared to hold 'firm', he would complete the landing. In the event of an apparent 'collapse' the intention was to 'go-around' from the landing attempt and investigate the problem further. ATC was also notified of this intention and the emergency services were alerted.

The approach and landing were planned to be flown with 20 degrees of flap because of the prevailing gusty wind conditions, and an approach speed of 105 kt selected with the intention of using 95 kt as a threshold speed. On selection of 20 degrees of flap, no flap indication was observed on the flap gauge, and so the crew were briefed that this would be a 'flapless' landing. All pneumatic pressures appeared normal. The approach and landing were completed successfully with a smooth touchdown some 300 metres from the runway threshold. The landing gear appeared to hold firm initially and the nosewheel was lowered onto the runway. However, as the speed decreased through approximately 70 kt the commander felt the aircraft slowly subside to the left as the left main gear collapsed. After the left wing touched the ground, directional control was lost and the aircraft left the paved surface and swung across the grass in front of the terminal building. After leaving the runway, the right main gear slowly collapsed, and the aircraft came to rest with the fuselage supported by the nose gear only.

The emergency services arrived quickly on the scene. The crew, who were uninjured, switched off the fuel, magneto and battery master switches before vacating the aircraft.

The aircraft was subsequently recovered by the airport emergency services. It was raised by crane, the main landing gear extended by hand and all three gears locked in position by use of the ground locks. The operator, together with an aircraft maintenance company and the insurance assessor, carried out a detailed examination of the aircraft and its systems. With the aircraft supported on jacks and air

pressure supplied to its pneumatic system from a ground rig (via the ground pressurising points on the aircraft) it was found that the landing gear cycled normally. However when the master air valve was turned off, with the landing gear locked down and flaps retracted, the retained system pressure of 550 to 600 psi was able to retract the nose gear satisfactorily into its uplock, but both main gears only partially retracted as had occurred after the takeoff. In addition, when the gear was selected 'DOWN' on this ground test, there was sufficient residual air pressure in the pneumatic system to lock down the nose gear, but the main gears did not achieve a down locked condition, although both legs were sufficiently close to this condition that the associated mechanical indicators on the upper surface of the wings had extended into the 'DOWN' indication.

The master air valve is a spring loaded toggle type switch with detents in both the 'UP' (OFF) and 'DOWN' (ON) positions. It was found possible for the switch to remain in an intermediate unlocked position, and that it would pass pneumatic pressure from a position halfway down. From this intermediate position the switch would return readily to the 'UP' (OFF) detent, and it was felt that this movement could be achieved by vibration, when engines were running. A more positive effort was required to move the switch from an intermediate position to lock it in the 'DOWN' (ON) detent.

The tests thus revealed no defects in the aircraft, or its systems, which would have resulted in the main gear failing to lock down and it was concluded that the flight had been conducted with the aircraft's master air valve in the 'OFF' position.