

Aircraft type and registration: Shorts SH5 Belfast G-BFYU
4 Rolls Royce Tyne 515-101W turbo-prop engines

Year of Manufacture: 1965

Date and time (GMT): 22 April 1986 at 1430 hrs

Location: Southend Airport

Type of flight: Positioning

Persons on board: Crew — 2 Passengers — None

Injuries: Crew — None Passengers — N/A

Nature of damage: Right main landing gear cylinder fractured, airframe dented and holed

Commander's Licence: Airline Transport Pilot's Licence

Commander's Age: 28 years

Commander's total flying experience: 6037 hours (of which 3687 were on type)

Information Source: AIB Field Investigation

The aircraft was on an unladen positioning flight from Stansted to Southend, with the landing gear down, for rectification of a nose landing gear oleo defect. After radar vectoring for Runway 24 at Southend, final approach from 1000 feet above ground level was visual. The runway is 4770 feet long and provided with PAPI's (Precision Approach Path Indicators). The final weather report passed to the crew before touchdown included wind 240°M at 15—20 knots, 4 octas of strato-cumulus at 2000 feet and visibility greater than 10 km, with local showers. It was raining at the time of the landing, which was in daylight. Landing weight was approximately 159,000 lb against a Maximum Landing Weight of 215,000 lb.

Touchdown was described as firm and followed by a bounce and normal second touchdown. Flight Data Recorder data indicated that the landing flare commenced only approximately one second prior to touchdown and peak normal acceleration recorded was 2.75 g. After coming to a halt it was found that the aircraft failed to move in response to power application. Inspection showed that the cylinder of the right side main landing gear oleo had shattered. The oleo piston remained generally in position but rotated 40° about its axis, thus allowing the bogey to rotate the same amount. Parts of the shattered cylinder struck the airframe causing a dent in the fuselage undersurface, denting and holing of the right main landing gear door, and punching of a 6 inch diameter hole in the right main landing gear pintle beam web.

The main landing gear cylinder was a DTD 5024 forging. Metallurgical examination revealed evidence of two pre-existing cracks emanating from a grease nipple hole on the forward side of the cylinder. The cracks were identified as the result of stress corrosion, originating from the outside surface and were 1.5 inches and 0.2 inches long. No evidence was found to positively indicate for how long the cracks had been present. The landing gear had been last overhauled in November 1983, since when it had been installed for 4 months and had accumulated 36 flying hours/11 landings at the time of the accident.

Eddy current inspection of other Belfast main landing gears after the accident revealed a 1 inch crack emanating from one of the grease nipple holes on the leg used to temporarily replace G-BFYU's failed leg.

Forgings of this material are known to be susceptible to stress corrosion cracking. No previous cases of cylinder disintegration are known. A Civil Aviation Authority Mandatory Alert Service Bulletin AS B Belfast A32-2 issued 20 October 1980 required dye penetrant inspection of the upper portion of the cylinder. This does not include the area of the grease nipple holes.