

No: 8/88

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Category: 1b

**Aircraft Type and Registration:** Beech 58 Baron, G-BDWK

**No & Type of Engines:** 2 Continental Motors Corp IO-520-C piston engines

**Year of Manufacture:** 1976

**Date and Time (UTC):** 20 May 1988 at 1815 hrs

**Location:** Derby (Burnaston) Airfield, Derbyshire

**Type of Flight:** Private (business)

**Persons on Board:** Crew - 1                      Passengers - None

**Injuries:** Crew - None                      Passengers - N/A

**Nature of Damage:** Damage to fuselage underside, flaps and propellers

**Commander's Licence:** Private Pilot's Licence with IMC and Night Ratings

**Commander's Age:** 27 years

**Commander's Total Flying Experience:** 157 hours (of which 41 were on type)

**Information Source:** Aircraft Accident Report Form submitted by the pilot and AAIB examination of the aircraft

The aircraft, which had been with its maintenance organisation at East Midlands Airport for re-painting, was being positioned to Nottingham (Tollerton) Airfield where it was normally hangered. On take-off from East Midlands Airport the pilot reported that the aircraft swung to the right at the start of the run, an event he attributed to differential engine thrust, but otherwise he was not aware of any handling difficulties. During the short flight to the north the pilot contacted Tollerton and obtained joining instructions. After descending to 1000 feet, the first stage of flap was selected followed shortly by the landing gear. It was soon apparent to the pilot that only two green lights had illuminated, those for the nose and left main landing gear. Despite re-cycling several times, the right main landing gear light did not illuminate, and the tower confirmed that the right landing gear appeared to be in the "fully-up" position.

After trying several times to extend the right landing gear, including use of the manual lowering system, the pilot was informed that the airfield at Derby (Burnaston) would accept him for a gear-retracted landing. The aircraft was flown in the vicinity of the airfield for approximately one hour, during which time the pilot confirmed the aircraft's stalling speed and made several practice glide approaches. During the last attempts to re-cycle the landing gear, the flap system circuit breaker began

to trip, so further attempts were abandoned in order to avert the possibility of a landing with only the nose and left landing gears extended.

The final approach was made with the first stage of flap selected, and at approximately 300 feet agl the pilot closed the engine mixture levers and turned the fuel and magneto switches to 'OFF'. The aircraft settled gently onto the grass runway in a level attitude and skidded for approximately 150 metres, damaging the flaps, fuselage underside and both propellers. There was no fire and the pilot escaped uninjured.

The landing gear on this aircraft is operated by a fuselage-mounted electric motor, driving through a gearbox. Outputs from this gearbox, in the form of mechanical links, are connected to each landing gear and their respective doors. Examination of the mechanism revealed that the main operating rod to the right landing gear had suffered compression instability failures at two points along its length, the most severe being at the gearbox attachment end. This had resulted in the self-aligning bearing housing becoming detached from this end of the rod. The foreshortening of this rod suggested that the damage had occurred with the landing gear in the retracted position, its length being effectively reduced by the same amount as the maximum travel within the gearbox.

The UK distribution company for Beechcraft advises that the design of the landing gear retraction mechanism is such that if any stiffness in the mechanism occurs due to inadequate lubrication, and/or any malrigging or excessive wear is present, then it has been known for high loads to be fed into the operating rod during landing gear selections. Failure of landing gear to unlock from the 'UP' position can therefore result in compression damage to the operating rod.

The aircraft was recovered by engineers from the maintenance organisation. After raising it on airbags, they were able to lower all three landing gears after disconnecting the operating rods and manually releasing the up-locks. No detailed examination was carried out at this time.

During the period that the aircraft was being repainted it was supported on jacks so that painting of the underside could be effected, with the landing gear in the retracted position. The landing gear was functioned several times during this period, with no problems apparent. In addition, the same organisation stated that prior to the aircraft being released back to service the landing gear system was lubricated. The last inspection of this system was recorded as having been carried out in September 1987.