No: 3/91 **Ref: EW/G90/10/08** **Category: 1b**

Aircraft Type and Registration:	Beech 200, G-HAMA
No & Type of Engines:	2 Pratt and Whitney PT6A-41 turboprop engines
Year of Manufacture:	1975
Date and Time (UTC):	13 October 1990 at 1752 hrs
Location:	RAF St Mawgan, Cornwall
Type of flight:	Private (training)
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Minor damage to the landing gear doors, inboard flaps and fittings on the lower fuselage
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	57 years
Commander's Total Flying Experience:	15,302 hours (of which 1,299 were on type)
Information Source:	Aircraft Accident Report Form submitted by the pilot and an engineering report submitted by an aircraft maintenance organisation

The aircraft took off from Humberside at 1431 hrs on 13 October 1990 for a training exercise to cover stalling and general handling. Immediately after take-off, Waddington Radar was contacted in order to give radar coverage in the area of the FIR where the training was to take place.

At approximately 1450 hrs, a stall was carried out with landing gear down and full flap selected. The instructor noted that at the stall the right hand wing dropped and the aircraft side-slipped to the right. While this was occurring, the student recovered by applying full power and called for the landing gear to be raised and the flap to be raised to the take-off position. The flaps retracted to the selected position normally, but the red unsafe warning light in the landing gear selector remained on. At the same time, a smell of burning was apparent and a considerable amount of smoke emanated from under the floor in the region where the landing gear electric motor was situated, just forward of the main spar. Both pilots donned oxygen masks and smoke goggles. The transponder was set to 7700 to alert Waddington Radar. The fire drill was carried out and the smoke in the cockpit was dispersed by opening the dump valve and the side windows. Satisfied that there was no further danger of fire from the suspected burnt out landing gear motor, the instructor elected to divert to Gamston which was close by and where there was a Beechcraft servicing organisation. Another Beech 200 had just got airborne from Humberside

and, upon inspecting this aircraft, its crew confirmed that the left landing gear was not fully retracted and that the right landing gear and nosewheel doors were open, with the wheels appearing to be fully retracted. The emergency landing gear system could not be operated, since it appeared to be jammed. No Beechcraft engineers were on duty at Gamston to give advice by radio and so, whilst overhead Gamston, communication was established with a Beechcraft engineering organisation at Plymouth (the organisation responsible for the aircraft's servicing) which advised the instructor to divert to Plymouth. With the assistance of both civil and military radar units, the aircraft was flown at FL100, in VFR conditions and with at least 30 miles visibility, on a direct track to Plymouth and in close proximity to other airfields into which the aircraft could have been diverted if there had been any further evidence of smoke, or fire.

However Plymouth ATC appeared somewhat unreceptive to the prospect of an emergency landing on their airfield. Nevertheless, several Beechcraft engineers were in the Control Tower and two passes were made at a moderately low altitude enabling the engineers to confirm the previous information and to offer some suggestions to the crew. The student raised the relevant floor board and carried out the instructions, but to no avail.

The aircraft was diverted to RAF St Mawgan at approx 1710 hrs and arrived overhead at approx 1720 hrs. Further attempts were made to lower the landing gear without success. With 750 lb of fuel remaining and dusk approaching, the aircraft was landed on runway 13 some 3000 to 4000 feet from the threshold, in accordance with ATC instructions, in order to avoid any possible collision with various installations adjacent to the runway. Contact with the runway resulted in damage to the landing gear doors and flaps, and the loss of most of the underside aerials.

The RAF Fire and Ambulance Services were quickly on the scene, but there was no fire and the crew were unhurt.

An engineering team from Plymouth went to RAF St. Mawgan and, with the help of the RAF, the aircraft was lifted from the runway, the landing gear manually extended and the aircraft towed to a hangar where it was subsequently placed on jacks.

Initial inspection of the aircraft, prior to the manual extension of all three landing gears, revealed the following: all three landing gears were partially extended *ie* the wheels were protruding from their respective bays; the nose, right main and left outboard main landing gear doors were in their fully open positions; the left inboard main landing gear door was folded into the bay and torn near its mid position.

An emergency extension of the landing gear was attempted, but without success. It was apparent that the left main inboard landing gear door had jammed that landing gear in the partially extended position. This door was released, the emergency landing gear extension system was activated and the landing gear was successfully lowered to the fully down-and-locked position.

The aircraft was then recovered to the Beechcraft servicing organisation at Plymouth, where a thorough investigation was carried out. The following is from their report:

"After the aircraft had been lifted it was seen that the left inboard main landing gear door had jammed the left main landing gear. The cause was that the door had been prematurely retracted by the left inboard wheel and not the retract mechanism. It was also seen that the retract rollers on the left main landing gear were still below contact with the door retract hooks. The width of the landing gear bays with the doors fully open gives approx 1" clearance between the outside edges of the tyres. The pilots clarification of the stall/recovery procedure indicates that the landing gear was retracted while the aircraft was in a side-slip to the right. We believe that the air loads exerted on the left inboard main landing gear door held it slightly retracted, positioning the door in the path of the retracting inboard wheel. As the gear retracted it dragged the door up into the bay, the door split at the torque link location, (the point at which the door was unsupported by the top casting), the retract mechanism was bent, the pick up roller was misaligned with the slot of the retract hook and jammed on the lower link. During recovery of the aircraft, the other 5 gear doors were checked to see if they could be pushed in. We were unable to force any door to retract by pushing externally. We can only assume that the left inboard door would not have retracted using the same test, as it was not possible to check due to damage to the door and retract mechanism. Based on the above we can only assume that during the extension of the gear prior to the stall training the left inboard door did not in fact fully extend and the retract mechanism did not extend fully over-centre. A full inspection of the retract mechanism, design, functioning and the maintenance manual was carried out with the CAA Chief Surveyor, Bristol, on G-HAMA and another Beech 200. We cannot conclusively explain why the door retract/extend mechanism did not hold the door fully open but we assume that air loads affected the operation during the extension of the door and air loads in the side-slip held the door partially closed. A review of the aircraft log books and Engineering Deferred Defects has been carried out in order to ascertain any work carried out on the landing gear/gear doors. Apart from routine inspection, lubrication and functional checks no further work has been carried out on these systems. The pilot reported a burning smell and a considerable amount of smoke emanating from the floor area. He carried out the emergency procedure as laid down in the aircraft's flight manual which was effective (as regards the smoke problem). The landing gear motor electrical protection system in this aircraft is a bimetallic cut-out. The smoke, we believe, was caused by a combination of motor heat and residue oil around the motor casing, the residual oil originating from the nose gear aft retracting chain which is a regularly lubricated area. An electrical operation of the landing gear was not attempted, but upon inspection the gearbox/motor was free to turn by hand. The motor had not seized internally. Service Bulletin 2035 incorporates a 60 amp circuit breaker which replaces the bimetallic cut-out in the landing gear motor electrical power system. This circuit breaker is incorporated to prevent the landing gear motor from being damaged in a manner restricting the operation of the manual landing gear system".