

Piper PA-28-151, G-BTIH

AAIB Bulletin No: 3/2000 **Ref: EW/G99/11/08** **Category: 1.3**

Aircraft Type and Registration: Piper PA-28-151, G-BTIH

No & Type of Engines: 1 Lycoming O-320-E3D piston engine

Year of Manufacture: 1976

Date & Time (UTC): 14 November 1999 at 0845 hrs

Location: Belle Vue, Barnstaple, Devon

Type of Flight: Private

Persons on Board: Crew - 1 - Passengers - 3

Injuries: Crew - 1 Serious - Passengers - 3 Serious

Nature of Damage: Aircraft broken in two halves

Commander's Licence: Private Pilot's Licence

Commander's Age: 46 years

Commander's Flying Experience: 420 hours (of which 320 were on type)
Last 90 days - 12 hours
Last 28 days - 6 hours

Information Source: Aircraft Accident Report Form submitted by the pilot

History of the flight

The aircraft was refuelled 'up to the tabs' at Blackbushe Airport giving an approximate fuel load of 30 US gallons. The pilot and one passenger then flew to Belle Vue Farm, Devon in order to collect two friends and return with them to Blackbushe. The outbound flight and landing were uneventful, taking about one hour. There was no fuel uplift at Belle Vue Farm where the pilot collected the passengers and taxied out to take off on Runway 08. This runway had a damp grass surface, was 625 metres (2,050 feet) long and was at an elevation of 675 feet amsl. There was a hedge and fence bordering the eastern end of the runway. The weather conditions were clear with cloud at 2,500 feet and a surface wind estimated to be 5 kt from the north.

The pilot considered that the take off was normal with the aircraft becoming airborne about two thirds of the way along the runway. After lift off the pilot levelled the aircraft at 20 to 25 feet intending to accelerate before climbing over the hedge at the end of the runway. During the level

acceleration, a short distance before the hedge, the aircraft dropped back onto the ground. The pilot realised that there was no possibility of stopping the aircraft and so he pulled back on the control column and climbed it over the hedge clipping a fence post as he did so. The aircraft dropped into the next field and the pilot closed the throttle and attempted to stop the aircraft. Seeing another hedgerow coming up he pulled hard back on the control column and the underside of the aircraft hit an earth bank and the hedge. The nose of the aircraft came to rest in a ditch on the far side with the fuselage broken aft of the cabin area. The front seat passenger who was also a pilot switched off the magnetos, master switch and the fuel. The aircraft did not catch fire.

Two bystanders were quickly on the scene and called the emergency services who arrived within a few minutes. All four persons on board were wearing seatbelt lap restraints without shoulder harnesses, although they were available for the front seats. All the occupants of the aircraft received injuries and needed assistance to get out of the aircraft. The pilot was able to exit through the broken forward windscreen; the front and rear seat passengers had to be cut out of the aircraft.

Aircraft performance

The aircraft maximum permitted take-off weight is 1,054 kg. It was not possible to determine the exact weight of the aircraft at the time of the accident but it would have been at or close to the maximum. Performance data given in the flight manual indicates that at maximum weight under the prevailing conditions the aircraft would have required a take-off run of 1,740 feet and a total take-off distance to clear a 50 foot obstacle of 2,160 feet. This data is for a dry level paved runway and includes a correction for airfield elevation but not for other less favourable conditions.

The CAA publication General Aviation Safety Sense Leaflet 7B "Aeroplane Performance" gives a table of factors that should be taken into account when operating under different conditions from those used for aircraft certification. There is also a reminder that the performance data supplied by the manufacturer is that achieved with a new aeroplane in ideal conditions flown by an experienced pilot. Using this information the take off distance to 50 feet would have been increased by a factor of 1.2 for a dry grass surface, giving a revised distance required of 2,590 feet. The leaflet also strongly recommends that an additional safety factor, equivalent to that which is required for Public Transport flights, of 1.33 is included to account for lack of practice, incorrect technique, aeroplane and engine wear and tear and less favourable conditions. Had this factor been used the calculated take off distance required would have been 3,450 feet.

The owner's handbook includes the following information regarding take-off technique: "After take off let the aircraft accelerate to the desired climb speed by lowering the nose slightly." The use of 25° flap is recommended for short or soft fields and the pilot reported that he thought some flap was selected. He was surprised that after an apparently normal take off the aircraft dropped back onto the ground whilst he was trying to accelerate. There could be several reasons for this happening. Firstly the aircraft was a low wing type and would have been influenced by ground effect. It is possible that as the aircraft accelerated it climbed out of ground effect and consequently dropped back onto the runway. Ground effect reduces the induced drag on an aircraft significantly at heights of up to one half of the wingspan. G-BTIH had a wingspan of 35 feet and would be subject to this effect at heights of up to about 17 feet. Secondly there was a hangar located on the airfield at the north eastern corner which may have had a local wind effect at the east end of the strip where the aircraft became airborne. The performance may have been adversely affected by a downdraft or tailwind in the lee of the hangar.