

No: 9/88

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Category: 1c

**Aircraft Type and Registration:** Piper PA-28-140, G-BDZW

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

**Year of Manufacture:** 1976

**Date and Time (UTC):** 19 June 1988 at 1130 hrs

**Location:** Private Strip at Lydney, Gloucestershire

**Type of Flight:** Private

**Persons on Board:** Crew - 2                      Passengers - None

**Injuries:** Crew - Minor                      Passengers - N/A

**Nature of Damage:** Substantial to cabin area, engine and propeller

**Commander's Licence:** Private Pilot's Licence

**Commander's Age:** 24 years

**Commander's Total Flying Experience:** 580 hours (of which 270 were on type)

**Information Source:** Aircraft Accident Report Form submitted by the pilot and further investigation by the AAIB

Some days before the accident a student pilot, who was about to complete his training for a Private Pilot's Licence, booked a pleasure flight for himself and his wife. The flying club with which he booked the flight was not the one where he was undergoing training. On arrival at the club, the student pilot was informed that the instructor who had been detailed for the flight was unavailable but another instructor, who was known to the student pilot, would pilot the aircraft. The student pilot occupied the left-hand seat and was the handling pilot for the take-off and initial part of the flight. When in the area of Lydney, on the west bank of the Severn, the instructor suggested that they land at a farm strip near Chepstow. Since the owner of the strip was related to the student pilot, it was assumed that prior permission was not required. The instructor took control of the aircraft and completed a low inspection pass of the strip. Following a circuit which passed over the strip-owner's house, a landing was made in a northerly direction. During the landing run, it became apparent that the grass was very long since the propeller was chopping it and throwing it back over the aircraft.

The instructor did not consider the amount of grass to be excessive and taxied to the hangar where the aircraft was shut down. Both pilots then removed chopped grass from various parts of the aircraft including the wing leading edge. The aircraft was met by both the owner of the strip and the farmer who farmed the strip. The farmer states that on the day of the accident, the grass on the strip was over 12 inches high and was about to be cut for silage. The instructor was advised by both the farmer and the owner of the strip that the grass was too long for take-off. The instructor then walked half the length of the strip to assess the length of the grass. He concluded that the grass was long but would not

cause a problem on take-off. He estimated the length of the strip as 2200 feet but did not calculate the take-off run required in the prevailing conditions.

The three original occupants then boarded the aircraft and the instructor taxied to the end of the strip. He states that he then performed a run down the strip in the short take-off configuration to assess the acceleration of the aircraft, and having reached 65 mph concluded that a safe take-off could be made and stopped the aircraft. The student pilot states that the speed did not increase to a value at which the aircraft could have become airborne. The aircraft then returned to the start of the strip and the student pilot suggested that his wife leave the aircraft. The instructor said that this was not necessary and commenced a further run down the strip again in the short-field configuration. He states that on this run, from which he again did not intend to take-off, the airspeed reached 60-65 mph although the student pilot states that the airspeed did not exceed 45 mph. At the end of this run, the aircraft was shut-down and, at the insistence of the student pilot, his wife left the aircraft. The instructor states that he decided to de-plane the passenger because, although he was happy that the aircraft could take-off in the distance available, he was concerned about the presence of a hill at the end of the strip which would require an immediate right turn after take-off and it would, therefore, be prudent to reduce the weight.

A further inspection of the aircraft was then made to satisfy the instructor that grass was not blocking the pressure head or clogging the brakes. At this point, both the owner of the strip and the farmer suggested to the instructor that he delay his take-off until the following week when the grass would have been cut. The instructor however, was satisfied that a safe take-off could be made and taxied to the end of the strip for take-off. The conditions for this take-off were:

Take-off run available	2210 feet
Aircraft weight (MTOW 2150 lbs)	1893 lbs
Temperature	+21°C
Wind velocity	Light and variable
Airfield elevation	250 ft amsl
Runway slope	1% downhill (average)

Having completed a satisfactory power check, the instructor commenced his take-off roll again in the short-field configuration. During the take-off roll, ground observers saw large quantities of grass being thrown up around the aircraft as on the two previous attempts. The instructor states that acceleration was similar to the two previous attempts and he achieved an airspeed of 65-70 mph after a ground roll of 2000 feet. The student pilot however, who was calling out the airspeed, states that at the point of rotation the airspeed was 48 mph. The aircraft left the ground after a ground roll of 2210 feet at which point the strip falls away sharply to drop 12 feet in the last 150 feet of the strip. Having become airborne, the instructor almost immediately started a turn to the right using 15° of bank to avoid the hill at the end of the strip, which rose to about 70 feet above the strip within 900 feet. Almost immediately the instructor states that he felt a jolt and became aware of the stall warning operating. The student pilot states that he heard the stall warning operate just as the aircraft became airborne. Shortly after the jolt the aircraft hit the ground. Despite considerable damage to the front of the aircraft both pilots received only relatively minor injuries and were able to escape via the right hand window. There was no fire.

Post accident examination of the crash site revealed that the aircraft had hit the top of a small tree some 90 feet beyond the end of the strip, the top of which was at the same elevation as the point at which the aircraft left the ground. Examination of the wreckage one month after the accident revealed considerable deposits of grass on the leading edge of all flying surfaces including the fin.

Calculation of the take-off run and take-off distance required using the factors in Aeronautical Information Circular 52/1985 for up to 10 inches of grass produced the following:

	Initial Attempts	Final Attempts
Take-off Run Required	1520 feet	1410 feet
Take-off Distance Required	2750 feet	2562 feet
Runway length available	2210 feet	2210 feet

Aeronautical Information Circular 52/1985 states:

1. "The pilot should always ensure that, after applying all the relevant factors including the safety factor, the take-off distance to a height of 50 feet does not exceed the runway length available."
2. "For surface and slope factors remember that the increases shown are to the take-off distance to a height of 50 feet. The correction to the ground roll will be greater" (The Take-off Run Required quoted above is calculated on 55% of the Take-off Distance Required as required by the Flight Manual. No additional factor has been applied).
3. "A take-off should not be attempted if the grass is more than 10 inches high".