ACCIDENT

Aircraft Type and Registration:	Raytheon Beech Bonanza A36, N4VQ
No & Type of Engines:	1 Continental IO 550 piston engine
Year of Manufacture:	1996
Date & Time (UTC):	30 October 2006 at 0850 hrs
Location:	Fenland Airfield, Lincolnshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 3
Injuries:	Crew - 1 (Minor) Passengers - None
Nature of Damage:	Impact damage to the engine, firewall, propeller, wings, undercarriage and underside of fuselage
Commander's Licence:	Private Pilot's Licence
Commander's Age:	45 years
Commander's Flying Experience:	1,527 hours (of which 20 were on type) Last 90 days - 79 hours Last 28 days - 21 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft became airborne too early in the takeoff roll and, at a height of about 15 to 20 ft, it began to roll to the left, reaching an angle of about 45º. The pilot shut down the power, levelled the wings and deployed full flap. He subsequently landed the aircraft, with the wings almost level, in a field beyond the runway before the aircraft came to an abrupt halt against a dyke. All four occupants disembarked safely although the pilot sustained a minor injury.

History of the flight

The aircraft, which was a recent purchase, was taking off from the grass Runway 18 with the pilot and three passengers on board. The pilot held the nosewheel off to prevent it digging in and slowing the aircraft down. About halfway down the runway the aircraft became airborne, and this was earlier than the pilot expected. It touched down briefly before become airborne again. It then reached a height of about 15 to 20 ft and began to roll to the left, reaching an angle of about 45º. The pilot was concerned about the proximity of the ground and he elected to shut down the power, level the wings and deploy full flap. He subsequently landed the aircraft, with the wings almost level, in a field beyond the runway before coming to an abrupt halt against a dyke. All four occupants disembarked safely, although the pilot sustained a minor injury.

The pilot attributed the accident to the aircraft becoming airborne too early as result of holding off the nosewheel for too long, and as a consequence the left wing stalled.

Airfield information

Fenland Airfield is a grass airfield at an elevation of 18 ft amsl and Runway 18 is 512 m long. The Take Off Distance Available (TODA) for Runway 18 is 594 m. South of Runway 18 is a field and this is bounded on its south by a dyke running perpendicular to the runway.

Fenland Airfield has another grass runway, Runway 08/26, and this is 670 m long.

Weather conditions

The pilot reported that the condition of Runway 18 was soft and that the wind was from 220° at 15 kt. A Met Office aftercast estimated the wind to be '*220° at 15 kts, with perhaps gusts to 22- 25 kts'*.

Aircraft performance

The aircraft takeoff roll and distance to 50 ft were calculated using the Pilot's Operating Handbook. These calculations are based on a takeoff mass of 3,600lbs at sea level on a paved runway, with no flaps, and with the local weather conditions being 12ºC and with a 12 kt headwind component (as reported by the pilot).

The CAA's Aeronautical Information Circular (AIC) 67/2002 specifies that *25% or more* be added to these distances for soft ground or snow. For information, 20% is specified for dry grass on firm soil and 30% is specified for wet grass on firm soil. These factors are the same as those specified in LASORS guide for pilots. AIC 67/2002 also strongly recommends that an additional 33% factor is added to the takeoff distance, in keeping with Public Transport operations.

The unfactored distances were achieved by the manufacturer as a result of flight tests using a new aircraft in ideal conditions. The factored distances provide an additional 33% margin of safety to take account of different meteorological conditions or flying techniques from those used during flight testing. The takeoff roll and distance to 50 ft are contained in the table in Figure 1.

Aircraft handling characteristics

The aircraft manufacturer was consulted regarding handling characteristics. They confirmed that the aircraft will yaw to the left and then roll to the left after the aircraft leaves the ground if insufficient right rudder is used to compensate for the propeller slipstream effect. They also noted that the situation can initially be compounded if right aileron, and not right rudder, is used to counteract the turn to the left; this is due to adverse aileron yaw.

	Unfactored distance specified in Pilot's Operating Handbook	1.25 factor for soft ground	With recommended Public Transport factor of 1.33
Takeoff roll m	335	419	557
Distance to 69 ft m	579	724	963

Figure 1

Analysis

This aircraft, when operated in the reported conditions, is expected to lift off after 419 m and to be at 50 ft after 724 m. Therefore on Runway 18 at Fenland, the aircraft would be expected to be at around 30 ft at the end of the available takeoff distance. Note that these figures assume a factor of 1.25 for soft ground, and that the CAA recommends 1.25 or more.

Whilst the aircraft was capable of taking off from Runway 18 at Fenland, the margins were small and the aircraft would be well down the runway at lift off, and low as it passed the end of the runway. The aircraft lifted off too early and, as a result, was at too low an airspeed and possibly at too high an angle of attack. In such a situation it would not accelerate normally and, close to the stall, a wing drop, as described by the pilot, could readily occur. The pilot had only 20 hours on type, and this may also have been a factor.

The wind was from 220°. Therefore a better option would probably have been to use Runway 26 which was 670 m long.