

Aircraft Type and Registration:	Piper PA-28-151 Warrior, G-BDGM	
No & Type of Engines:	1 Lycoming O-320-E3D piston engine	
Year of Manufacture:	1974	
Date & Time (UTC):	28 October 2004 at 1430 hrs	
Location:	Netherthorpe, Yorkshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1	Passengers - N/A
Nature of Damage:	Engine fire - damage to both wings and landing gear	
Commander's Licence:	Commercial Pilot's Licence	
Commander's Age:	22 years	
Commander's Flying Experience:	1,550 hours (of which 650 were on type) Last 90 days - 85 hours Last 28 days - 62 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

The aircraft was departing from Runway 24 at Netherthorpe. With approximately 150 metres of the marked runway remaining, the pilot realised that the aircraft would not reach flying speed and aborted the takeoff. However, there was insufficient runway remaining to stop the aircraft before it struck a hedge at the airfield boundary and caught fire.

History of flight

While carrying out an engine run-up before takeoff, the pilot noticed a significant drop in RPM when operating on one magneto and, believing this to be due to moisture in the ignition system, leaned the mixture and continued to run the engine in an attempt to rectify the problem. After satisfying himself that the engine was running normally, he lined up for departure.

The pilot used a "short field" take-off technique, which involved setting two stages of flap and applying full power against the brakes before commencing the take-off run. With the aircraft

stationary the engine produced approximately 2,200 RPM at full throttle and, after the brakes were released, the acceleration appeared normal, with RPM rising as airspeed increased. However, approximately 150 metres from end of the marked runway, the pilot realised that the aircraft would not reach sufficient speed to become airborne safely and decided to abandon the takeoff. He retarded the throttle and applied the toe brakes but, judging that the aircraft would not stop before hitting the airfield boundary, raised the nose slightly in an effort to cushion the inevitable impact. This caused the aircraft to become airborne very briefly before hitting a hedge and catching fire. The pilot, who had been wearing a lap and shoulder harness, suffered light bruising and whiplash. He turned off the battery master switch and fuel before exiting the aircraft. The airfield fire crew, who had been watching the departure, reached the scene shortly after the aircraft came to rest and quickly extinguished the fire using foam.

Airfield

Netherthorpe has four grass runways. Runway 06/24 is 553 metres long, has a take-off run available (TORA) of 490 metres, and slopes uphill with a gradient of 1.9% in the Runway 24 direction. Markings showing the south-western end of Runway 24 are placed approximately 146 metres from the airfield boundary. Runway 18/36 has a total useable length and TORA of 382 metres. The airfield is considered challenging by many that use it and the airfield operator insists on briefing pilots who are unfamiliar with it before their intended flight. Before departure, the pilot noted that Runway 24 was in use by other aircraft and decided that it was the most favourable runway for departure in the prevailing conditions. At the time of the accident the unofficial airfield weather report gave a southerly wind at 10-15 kt and a temperature of 10°C. The pilot assessed the runway as damp.

Aircraft performance

The operator provided performance and weight and balance information for G-BDGM, a PA28-151, which is the least powerful of the Warrior family of four seat tourers. The maximum permitted take-off weight of this aircraft is 1,054 kg. With approximately 98 kg of fuel and one pilot onboard, the estimated all-up weight of G-BDGM on departure from Netherthorpe was 857 kg. The performance section of the flight manual indicates that at this weight, from a dry, level and paved runway the take-off run required (TORR) is approximately 400 metres and the take-off distance required (TODR) to clear a 50 foot obstacle is 497 metres.

Safety Sense leaflet (SSL) 7B titled "*Aeroplane performance*", published by the CAA, advises that take-off distance required should be increased by 30% for wet grass and by a further 10% for an uphill slope of 2%, giving a TODR of 707 metres. Using the same factors, the TORR is 570 metres.

However, the effect of slope and surface condition is proportionally greater on the ground run than on the take-off distance as a whole, and consequently the TORR is likely to be greater than 570 metres. SSL 7B recommends that TODR be increased by a further 33%, as required for Public Transport flights, to account for variations in technique, aeroplane condition and environmental factors, giving a TORR of at least 758 metres and a TODR of 940 metres.

Engineering inspection

After the aircraft was recovered to the airfield parking area, the engine was removed and taken to a repair facility. Unfortunately, the magnetos were returned to the manufacturer before inspection. However, inspection of the remaining components did not reveal any condition that might have contributed to the rough running experienced during the run-up.

Conclusion

It was not possible to determine if the engine was producing normal power during the take-off run. Even if it was, it is likely that there was insufficient runway available for a safe departure in the prevailing conditions.

The pilot reported that, although he considered the runway suitable for a safe takeoff, he thought that the accident might have been caused by a combination of the runway state, the prevailing conditions and a reduction in engine performance that was not obvious at the start of the take-off run.