Piper PA-28-161 Cherokee Warrior II, G-BTID

AAIB Bulletin No: 2/2004	Ref: EW/G2003/08/24	Category: 1.3
Aircraft Type and Registration:	Piper PA-28-161 Cherokee Warrior II, G-BTID	
No & Type of Engines:	1 Lycoming 0-320-D3G piston engine	
Year of Manufacture:	1985	
Date & Time (UTC):	3 August 2003 at 1300 hrs	
Location:	Eaglescott Airfield, Devon	
Type of Flight:	Training	
Persons on Board:	Crew - 2	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to left main landing gear, left wing and the stabilator	
Commander's Licence:	Commercial Pilot's Licence with Instructor Rating	
Commander's Age:	34 years	
Commander's Flying Experience:	584 hours (of which 154 were on type)	
	Last 90 days - 165 hours	
	Last 28 days - 55 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

History of flight

The aircraft was departing from Runway 08 on a training flight to return to Exeter Airport. Earlier, it had flown in from Exeter and been shut down for about 20 minutes. There were three people on board; the student who was two-thirds of the way through his PPL course, the instructor and a friend of the student who was travelling as a passenger. The weather was good, with clear skies and a variable surface wind of two to three knots. Runway 08 has an upslope, which is estimated to be about 1°, and the surface consisted of short dry grass on a firm subsoil.

The takeoff was carried out using the full length of the runway, with full power applied against the brakes and the flaps retracted. Before the aircraft commenced its take-off roll the normal checks were completed and the engine speed was observed to be at full RPM. The student was the handling pilot and after the brakes had been released it was reported that the aircraft initially accelerated slowly before gathering speed at a normal rate. Approximately half way down the runway the ASI was observed to indicate 45 kt. After a further 100 metres the indicated airspeed had increased to 50 kt but the aircraft then seemed to stop accelerating, although the engine instruments showed that full power was still being developed.

The instructor considered rejecting the takeoff but delayed his decision to check the airspeed once more and then, having done that, considered that there was insufficient runway left to stop the aircraft. He took control from the student, immediately selected 10° of flap and applied back pressure on the control column. The aircraft pitched up, became airborne and started to climb. However, a few seconds later there was the sound of a 'thud' as the left main landing gear struck a wooden post next to a gate in the boundary hedge, 115 metres beyond the end of the runway. The aircraft descended

rapidly as it crossed a road and landed in a field beyond that. When it touched down the aircraft swung to the left as a result of the damage to the landing gear on that side. The instructor attempted to retain directional control using the rudder and after a few seconds he retarded the throttle and mixture controls. As the aircraft slowed it veered further to the left coming to a halt, still upright, facing 90° to the direction of takeoff. The aircraft was shut down and the occupants exited normally, uninjured. There was no fire but the aircraft had sustained damage to the left main landing gear, the left wing and the stabilator.

Aircraft performance

Earlier in the day the instructor had briefed the student to carry out all the pre-flight planning for the flights to Eaglescott and back before they departed from Exeter. However, they had both completed the performance calculations for the takeoff from Eaglescott because time was running short. It was reported that, using the UK Supplement to the Pilots Operating Handbook (POH), they had calculated that the Take Off Distance Required (TODR) from Runway 08 was 446 metres. The declared Take-Off Run Available (TORA) for that runway is 600 metres. Subsequent calculation of the take-off performance figures gave a TODR of 868 metres and a take-off run required, to the point of lift off, of 657 metres. The figures in the UK Supplement are based on takeoffs with full throttle, flaps retracted and a take-off 'safety speed' of 64 kt.

Analysis

The instructor attributed the accident to incorrectly calculated take-off performance figures and delaying his decision to reject the takeoff until it was too late to do so safely. The reason for the apparent reduction in acceleration when the aircraft had reached 50 kt is unclear. Runway 26 had been in use earlier in the day and it is possible that the surface wind, which was light and variable, presented a tailwind component during the take-off roll.

The company has issued a notice to all instructors reminding them that all performance calculations must be based on the approved performance charts. They are also advised that it is imperative that students, particularly those learning to fly in the PA-28-161 Warrior, are fully conversant with the UK supplement to the POH and its importance as the sole source for take-off and landing data.

This was the first time that the instructor had flown out of Eaglescott. Other than that, he had experience of three flights from short airstrips in the PA-28-161. Following the accident, the company required him to complete further training before he would be permitted to instruct on that aircraft type from short field runways.

The CAA General Aviation Safety Sense Leaflet 7B, entitled *Aeroplane Performance*, gives advice on the importance of selecting a decision point on the runway from which an aircraft can be stopped in the event of engine or other malfunctions during takeoff. It also gives information on the factors to take into account when calculating an aircraft's performance.