

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Reims Cessna F152, G-BLZE	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-235-L2C piston engine	
<b>Year of Manufacture:</b>	1979	
<b>Date &amp; Time (UTC):</b>	21 September 2008 at 1545 hrs	
<b>Location:</b>	Farway Common Airfield, Devon	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Damage to wings, engine and nose	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	31 years	
<b>Commander's Flying Experience:</b>	135 hours (of which 130 hrs were on type) Last 90 days - 9 hours Last 28 days - 7 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

## Synopsis

During takeoff from a grass runway the aircraft did not attain rotation speed. The pilot aborted the takeoff but was unable to stop the aircraft before it hit a hedge at the end of the runway.

## History of the flight

The pilot had been carrying out a cross-country flight with numerous legs. Together with his passenger, who was also a pilot, he had departed from Redhill, landed at Manston, then landed at Bembridge where the aircraft was re-fuelled to full, and then landed at Farway Common. Farway Common is an unlicensed airfield approximately 9 nm east of Exeter airport. It has two 550 m grass runways, 10/28 and 18/36. Runway 28

has a downslope of approximately 2.5%. This was the pilot's first time at Farway Common, but the landing on Runway 10 was uneventful. After about half an hour on the ground the pilot and the passenger prepared the aircraft to depart back to Redhill.

The previously light easterly wind was now calm and the pilot elected to depart from Runway 10. The pilot reported that the pre-takeoff engine run-up checks were normal. During the takeoff roll from Runway 10 the aircraft accelerated to about 40 to 45 KIAS, but the pilot did not think he would achieve the normal rotate speed of 50 KIAS and achieve a safe climb in the remaining distance available, so he aborted the takeoff. The aircraft

came to a safe stop. In trying to vacate the runway, full power was insufficient to start taxiing, so they pushed the aircraft off the runway to make way for a landing aircraft. The pilot thought that a brake might have been stuck on and that pushing the aircraft freed it. The pilot spoke with the airfield operator who recommended that they attempt a takeoff from Runway 28 as it was downhill and the wind was calm.

The pilot reported that he applied full power while holding the brakes for the takeoff from Runway 28. The flaps were set to the recommended 10°. He said that the engine sounded normal and the aircraft accelerated to 45 KIAS but then would not accelerate any further. Again he did not think he could achieve a safe departure so he aborted the takeoff. According to a witness the takeoff was aborted about 150 to 200 m from the end of the runway. The pilot reported that one brake did not appear to be working and he could not stop the aircraft from hitting the hedge at the end of the runway. The aircraft suffered damage to its nose and right wing. The right wing fuel tank started leaking but there was no fire.

### Takeoff performance

The aircraft's weight at the time of the accident was approximately 736 kg (maximum takeoff weight was 758 kg), the temperature was 18°C and the pressure altitude was 474 feet. For these conditions the aircraft's Flight Manual lists the takeoff ground roll distance as 252 m and the takeoff distance to 50 feet as 466 m. These figures assume flaps 10°, full throttle prior to brake release, and a paved, level, dry runway with zero wind<sup>1</sup>. The Flight Manual states that for operations on a dry, grass runway the distances should be increased

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#### Footnote

<sup>1</sup> These figures also include the additional 5% increase required by the CAA's additional limitations Change Sheet 101 Issue 2 to the Reims/Cessna 152 Flight Manual.

by 15% of the ground roll figure. Therefore, for dry grass, the takeoff ground roll distance becomes 290 m and the takeoff distance to 50 ft becomes 504 m.

The CAA's Safety Sense Leaflet 7 on Aeroplane Performance recommends that a safety factor of 1.33 is applied to the takeoff distance calculations for all single-engine aircraft where only unfactored data is provided (such as for the Reims F152). Applying this factor increases the ground roll distance to 386 m and the distance to 50 feet to 670 m. The Safety Sense Leaflet also includes a more conservative estimate for the effect of grass on takeoff distance. It recommends adding 20% to the takeoff distance to 50 feet for dry grass up to 20 cm in length. If this factor is used instead of the manufacturer's factor, the takeoff ground roll distance increases to 459 m and the takeoff distance to 50 feet increases to 744 m (including the 1.33 factor).

### Pilot's comments

The pilot could not explain why the aircraft did not accelerate beyond 45 KIAS. He thought that a brake problem or the medium length grass (approximately 5 to 6 cm long) may have been a factor. He reported that the brakes operated normally during the previous two landings and takeoffs which were on paved runways. He also commented that this particular F152 required full power in order to start taxiing on grass surfaces, which was more than that required on other F152s he had flown. Taxiing on paved surfaces had not been a problem. He had not noted any anomalies with the condition of the tyres.

### Discussion

Based on the manufacturer's takeoff performance data, a safe takeoff within the 550 m runway distance available would have been achievable. However, the manufacturer's data assumes that the aircraft and engine

are in good condition. The effects of runway surface condition on a grass runway are difficult to predict and applying the CAA's more conservative estimates for 'takeoff distance required' indicated that a safe takeoff may not have been achievable. However, within the distance available the aircraft should have been able to accelerate to the rotate speed of 50 KIAS and the

reason for the airspeed staying at 45 KIAS could not be explained. It is possible that a slightly 'stuck' brake reduced the aircraft's acceleration. At the point where the takeoff was aborted there was probably insufficient runway remaining for a safe stop, and the downslope would have increased the braking distance.