

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Diamond DA 42 Twin Star, G-CDKR	
<b>No &amp; Type of Engines:</b>	2 Thielert TAE 125-01 piston engines	
<b>Year of Manufacture:</b>	2005	
<b>Date &amp; Time (UTC):</b>	24 March 2010 at 1038 hrs	
<b>Location:</b>	Crossland Moor Airfield, near Huddersfield, Yorkshire	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - None
<b>Injuries:</b>	Crew - None	Passengers - N/A
<b>Nature of Damage:</b>	Aircraft damaged beyond economic repair	
<b>Commander's Licence:</b>	Commercial Pilot's Licence	
<b>Commander's Age:</b>	25 years	
<b>Commander's Flying Experience:</b>	1,213 hours (of which 70 were on type) Last 90 days - 17 hours Last 28 days - 2 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and subsequent AAIB telephone enquiries	

## Synopsis

Whilst taking off, the pilot could not rotate the aircraft and insufficient runway remained in which to stop safely. A runway excursion ensued with the aircraft being damaged beyond economic repair. The pilot was uninjured.

Following the accident no technical or operational deficiencies could be identified.

## History of the flight

The pilot elected to depart from Runway 25 for his intended flight to Elstree Aerodrome. His performance calculations, including an allowance for a 2.6% upslope, resulted in a still air Take Off Distance Required (TODR),

to 50 ft, of 528 m; the ground roll element of which was 363 m. The surface wind was estimated to be from 190° at 13 kt, giving a 7kt headwind. The pilot calculated that this reduced the TODR and ground roll by approximately 20 m. The aircraft's takeoff weight was 1,603 kg and the CG was in the middle of the flight range. All the flying control trims were set to the takeoff position.

Runway 25 consists of a 600 m asphalt surface and a further 250 m of grass at its upwind end. The pilot reported that he had previously flown the aircraft from the runway at higher weights without difficulty, normally becoming airborne with about 100 m of the asphalt surface remaining.

The pilot stated that he conducted a thorough pre-flight inspection, with no defects identified. The engine start and associated checks, which included a check of the trim system, autopilot and elevator variable backstop, were normal and he backtracked Runway 25 to use the full length. The pilot used the Aeroplane Flight Manual (AFM) technique for the takeoff; the flaps were retracted and full power was selected before brake release. Both engines developed the expected (full) power with 2340-2350 rpm indicated and, at that stage, the pilot considered there to be nothing unusual. The aircraft achieved the planned  $V_R$  (the rotation speed) of 70 kt with approximately 100 m of paved runway surface remaining. The pilot then attempted to rotate the aircraft, however, he reported that there was no perceptible pitch change. Having cross-checked the airspeed, now 75-80 kt, with the right seat ASI, he attempted to rotate the aircraft again but there was still no response.

As the aircraft crossed from the paved to grass surface of the runway, the pilot made a third unsuccessful attempt to rotate the aircraft. The increased drag, as the aircraft entered a softer area of grass, reduced the acceleration and the speed remained at around 75-80 kt. The pilot then rejected the takeoff, selecting idle power on both engines and applied the brakes. As the aircraft approached the end of the runway, the pilot turned the aircraft to the right, at a speed of about 50 kt, and the aircraft slid sideways into a gully in the runway overrun.

The pilot shut down both engines, turned off the fuel and isolated the electrical supplies, and evacuated the aircraft via the main canopy, uninjured.

### **Aircraft damage**

The aircraft sustained extensive damage. This included a fracture in the fuselage behind the cockpit, detachment

of the aft fuselage, collapsed landing gear, shattered propellers and damage to the left wing. The cockpit area remained intact, protecting the pilot from injury. There was no fire.

### **Manufacturer's inspection**

The aircraft manufacturer's UK representative conducted a limited survey of the aircraft following the accident. The survey included an inspection of the elevator control runs. Although the pushrod was deformed by the fuselage damage, no other defects were found. Also, the right engine Electronic Control Unit (ECU) was downloaded and no anomalies were revealed. The Left engine ECU could not be downloaded due to damage sustained in the accident.

### **Manufacturer's Airplane Flight Manual**

The DA42 Airplane Flight Manual states:

*'For a safe take-off the available runway length must be at least equal to the take-off distance over a 50 ft (15 m) obstacle...*

***Note** An uphill slope of 2 % (2 m per 100 m or 2 ft per 100 ft) results in an increase in the take-off distance of approximately 10 %. The effect on the take-off roll can be greater.'*

### **Discussion**

No technical defects could be identified by the manufacturer following the accident. Likewise, no operational deficiencies were highlighted by the pilot. As such it was not possible to determine why the aircraft would not take off. The pilot considered that local winds effects may have been involved, although turbulence is usually experienced with northerly winds.