

## ACCIDENT

<b>Aircraft Type and Registration:</b>	Piper PA-28-140 Cherokee, G-BAKH	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-E2D piston engine	
<b>Year of Manufacture:</b>	1972 (Serial no: 28-7325014)	
<b>Date &amp; Time (UTC):</b>	9 September 2017 at 0835 hrs	
<b>Location:</b>	Near City Airport, Manchester	
<b>Type of Flight:</b>	Private <sup>1</sup>	
<b>Persons on Board:</b>	Crew - 1	Passengers - 3
<b>Injuries:</b>	Crew - 1 (Minor)	Passengers - 1 (Serious) 2 (Minor)
<b>Nature of Damage:</b>	Aircraft destroyed	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	51 years	
<b>Commander's Flying Experience:</b>	15,000 hours (of which 10,000 were on type) Last 90 days - 13 hours Last 28 days - 4 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

## Synopsis

The aircraft took off above the certified MTOW from a runway with insufficient takeoff distance available for the prevailing conditions. After takeoff it failed to accelerate or climb and in order to miss a set of overhead power lines ahead the pilot made a forced landing with power in a field.

## History of the flight

The pilot was planning to fly three passengers from Manchester City Airport to Oban. There had been a significant amount of rain during the morning at the departure airfield leading to patches of standing water forming. The ATIS advised pilots to avoid the centreline and southern part of Runway 26R, the active runway, and a NOTAM had also been issued advising that further heavy rain might lead to the short notice closure of the airport.

The pilot had fully refuelled the aircraft before departure and waited while a further runway inspection was carried out. The inspection confirmed the runway was very wet and these results were relayed to the pilot. The pilot then requested permission to conduct an accelerate and stop run to check he could make rotate speed within the area available.

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### Footnote

<sup>1</sup> In subsequent legal action by the Crown Prosecution Service it was determined that the flight was being operated illegally on a commercial basis.

He was cleared to do so and stated that, having successfully managed to achieve rotate speed, he then back-tracked along the runway for takeoff.

The pilot was cleared for takeoff and reported he adopted a short field technique that used two stages of flap. He stated that during the takeoff roll he kept the aircraft to the right of the runway centreline, becoming airborne between half and three quarters along its length. The aircraft was seen by a witness to “crawl” into the air in a nose-high attitude. The pilot further stated that, once airborne, the aircraft failed to climb or accelerate and that it was heading towards an overhead power line situated about 1,400 m beyond the end of Runway 26R. In order to miss the power line he began a left turn, in so doing also avoiding the M62 motorway that ran across the normal take-off flightpath about 600 m beyond the end of the runway. The pilot reported he then carried out a forced landing in the only field available.

The field was planted with potatoes and on landing the aircraft landing gear sunk into the soil, causing it to come to an abrupt stop with the pilot and front-seat passenger both hitting their heads on the instrument panel. The rear seat passengers were also injured in the landing, but all the occupants were able to vacate the aircraft unaided. Despite severe disruption of the left wing there was no fire and the emergency services were in attendance within about ten minutes of the accident.

### **Engine inspection**

An inspection carried out by an independent aircraft engineering company found no significant faults with the engine or ancillaries. It did however find some wear of the camshaft which was described as typical for such an engine. The report quoted from tests carried out by the AAIB during another investigation (G-AVRP AAIB Bulletin 10/2008 ref EW/C2007/08/01) involving the same engine type and estimated there would have been a reduction in available power of 5-8%.

### **Aircraft weight and balance**

The aircraft had a basic weight of 1,370 lbs (621 kg). The pilot had refuelled the aircraft so that it had full tanks prior to departure, giving a total fuel weight, according to the published fuel capacity, of 288 lb (131 kg). The pilot, three passengers and their baggage were all weighed after the accident, giving a total weight of 899 lb (408 kg). Items found in the aircraft weighed 19 lb (9 kg) giving a total takeoff weight for the aircraft of 2,576 lb (1,169 kg).

The actual takeoff weight would have been slightly lower, taking into account the fuel used for the taxi, power check and the accelerate-stop manoeuvre performed prior to the final takeoff.

The maximum takeoff weight (MTOW) for this aircraft, as stated in the Airplane Flight Manual, is 2,150 lbs (975 kg).

The aircraft was within its centre of gravity limits.

## Aircraft performance

By reference to the Airplane Flight Manual, the factored takeoff distance required (TODR) for the aircraft at its MTOW of 2,150 lb under the prevailing conditions to achieve a screen height of 50 ft was 2,090 ft. Referring to Civil Aviation Publication (CAP) 1535P, '*The Skyway Code*', to allow for the wet grass this figure would increase by a factor of 1.3 to give a revised TODR of 2,717 ft.

An estimate of the TODR, taking into account the additional weight above MTOW, gives a TODR of 3,912 ft (1,192 m). The UK Aeronautical Information Publication gave a declared Take Off Distance Available (TODA) for Runway 26R of 641 m.

## Analysis

The aircraft was significantly overweight when it took off. With the four occupants and their baggage on board, the aircraft was already overweight before the uplift of any fuel. The TODR was also nearly double the TODA of the runway in use.

The takeoff technique used is not described in the Airplane Flight Manual although it is used by some pilots to reduce the takeoff run required. The high nose attitude witnessed and the additional flap selected would have created significant drag and with the aircraft already at slow speed would have made acceleration difficult without reducing the aircraft's attitude, something that may have been counter-intuitive at such a low altitude.

The condition of the engine would have contributed to the aircraft's inability to accelerate and climb, but such was the level of overloading and lack of runway length available it is likely the outcome would have been the same had it been performing without any power loss at all.

It is possible that without the presence of the power line the pilot might have been able to gradually accelerate the aircraft, but this would have led to the aircraft passing low over the adjacent motorway. As it was, the pilot had no practical option other than to turn away from the pylon line and motorway, further reducing the opportunity to accelerate and leading to the forced landing in the field.