ACCIDENT

Aircraft Type and Registration:	Mainair Blade, G-CDAG
No & Type of Engines:	1 Rotax 582-2V piston engine
Year of Manufacture:	2004 (Serial no: 1325-0502-7-W1120)
Date & Time (UTC):	4 March 2014 at 1600 hrs
Location:	Over Farm, Gloucester
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Serious) Passengers - 1 (Serious)
Nature of Damage:	Damage to wing, monopole, front strut and propeller
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	46 years
Commander's Flying Experience:	105 hours (of which 87 were on type) Last 90 days - 3 hours Last 28 days - 3 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

Synopsis

During the takeoff run the aircraft did not accelerate normally due to soft ground. At a point about three-quarters along the runway the pilot decided to abort the takeoff, but the nosewheel dug in and the aircraft inverted.

History of the flight

The pilot was planning a solo flight to assess the runway suitability before taking a passenger flying later in the afternoon. He walked along the grass runway, which was later estimated as 410 m[1] long, and noted that it was soft everywhere with occasional patches of standing water. He had taken off in similar wet conditions before, so he chose a line and prepared for a takeoff at about 1330 hrs. There was a light crosswind, of about 5 kt. With a full tank and a 20 litre jerry can of fuel strapped to the passenger seat as ballast, the takeoff weight was 348 kg (42 kg below the maximum takeoff weight). The takeoff proceeded normally and the aircraft became airborne after using about a third of the runway. The flight lasted 1 hour and 15 minutes which was followed by an uneventful landing.

For the second flight, with his passenger, the pilot removed the jerry can and siphoned some fuel from the main tank so that 25 litres remained – this resulted in a takeoff weight of

Footnote

[1] From Google Earth

370 kg (6% greater than the previous takeoff). The wind was calm and during the takeoff run the pilot chose a different line to avoid rutting the runway. At a point about three-quarters along the runway the aircraft had not become airborne so he decided to abort the takeoff. He estimated the airspeed at the time of abort at about 45 mph. On later reflection he believed that the nosewheel had probably just become airborne as he closed the throttle. He also believed that he probably pulled back on the bar when he closed the throttle and this caused the weight on the nosewheel to increase. Due to the soft ground the nosewheel dug in and "in the blink of an eye" the aircraft flipped inverted and came to rest. The passenger suffered broken ribs but was able to vacate quickly, while the pilot suffered a broken shoulder and sternum and took some time to get out.

Pilot's comments

The pilot considered that in taking a different line for the second takeoff, to avoid rutting the runway, he probably encountered softer ground which reduced the aircraft's acceleration. He stated that the engine was operating normally. He thought that he could stop the aircraft in the distance remaining when he aborted the takeoff, but the soft ground and slight down slope resulted in the aircraft inverting.

Civil Aviation Authority (CAA) advice

The CAA's Safety Sense Leaflet on '*Aeroplane Performance*'[2] provides the following advice about a takeoff decision point:

> ***'Decision point:*** *you should work out the runway point at which you can stop the aeroplane in the event of engine or other malfunctions, e.g. low engine rpm, loss of ASI, lack of acceleration or dragging brakes. Do NOT mentally programme yourself in a GO-mode to the exclusion of all else.*
>
> *If the ground is soft or the grass is long and the aeroplane is still on the ground and not accelerating, stick to your decision-point and abandon take-off. If the grass is wet or damp, particularly if it is very short, you will need a lot more space to stop.'*

The CAA's Safety Sense Leaflet '*Good Airmanship Guide*'[3] provides the following advice about a takeoff acceleration check point:

> *'Choose an acceleration check point from which you can stop if the aircraft hasn't achieved a safe speed. If you haven't reached for example 2/3 of your rotate speed by 1/3 of the way along the runway, abandon the take-off!'*

Footnote

[2] Safety Sense Leaflet 07, version C, January 2013
[3] Safety Sense Leaflet 01, Version E, January 2013, Section 20 on '*Take-Off*'