

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Dragon 200, G-MMAE	
<b>No &amp; Type of Engines:</b>	1 Fuji-Robin EC-44-PM piston engine	
<b>Year of Manufacture:</b>	1983	
<b>Date &amp; Time (UTC):</b>	11 August 2007 at 1010 hrs	
<b>Location:</b>	Sandown Airport, Isle of Wight	
<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>	Undercarriage collapsed, propeller damaged	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	59 years	
<b>Commander's Flying Experience:</b>	876 hours (of which 50 were on type) Last 90 days - 13 hours Last 28 days - 2 hours	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and AAIB inquiries	

**Synopsis**

The aircraft took off from a grass strip, towards rising ground at close to its maximum all up weight. It encountered turbulence and then made a forced landing after the end of the runway and was extensively damaged. Whilst the aircraft's performance figures show that it should have been able to complete this manoeuvre, the aircraft did not perform as expected. One Safety Recommendation has been made.

**History of the flight**

The owner of the aircraft flew from Lee-on-Solent to Sandown Airport to show the aircraft to some prospective buyers. The owner and one of the potential purchasers decided to take the aircraft for a short flight. With the

pilot, his passenger and the fuel on board, the aircraft's takeoff weight was 373 kg; the aircraft's maximum takeoff weight was 384 kg.

Runway 23 was the runway in use at Sandown. It is a grass strip 884 m long. The threshold at Runway 23 is 23 ft amsl, and the threshold of Runway 05 is 55 ft amsl; there is thus an upslope of approximately 1.1 % on Runway 23. Outside the airfield boundary, in the takeoff direction of Runway 23, the ground continues to rise. There are some houses at the top of the rise.

The weather conditions were good, with a light and variable wind, a temperature of 22°C and a QNH of

1018 mb. The aircraft taxied for a departure from Runway 23, utilising the full length of the runway, and the ground run and initial climb were reported as normal. The pilot reported that the aircraft was climbing at 30 mph when, at a height of approximately 50 ft, the aircraft encountered turbulence and the right wing dropped. He corrected the wing drop, but in the turbulent conditions the wing dropped again. After recovering the wing for the second time he realised that the aircraft was descending. The pilot confirmed that his airspeed was still 30 mph, and that the engine was still at full power (6,500 rpm). He assessed that he was unable to clear the obstacles beyond the runway so he decided to land and closed the throttle. He was unable to reduce the subsequent high rate of descent, because of reduced elevator authority at the low speed, and the aircraft struck the ground in a level attitude. The undercarriage collapsed, the propeller struck the ground and the engine stopped. The pilot then switched off the fuel and electrics, and he and his passenger, who were both uninjured, vacated the aircraft normally.

The pilot considered that the most likely cause of the accident was due to the effects of thermal activity. He believed that he had probably flown into a downdraft, which had exceeded 250 ft/min; the aircraft's maximum rate of climb at its takeoff weight. As the airspeed remained around 30 mph he did not consider that the aircraft was stalled.

### Aircraft information

The Microlight type acceptance data sheet No BMO-34 Issue 2, contains information about the Dragon 150 and 200 aircraft. The data sheet includes limitations, performance information, and inspection and flight testing notes. It states the following:

- *During flight testing the stall speed at the maximum authorised weight is to be checked for each aeroplane and recorded (as IAS).*
- *The maximum take off weight for this aircraft is 384 kg.*
- *Minimum performance is a rate of climb of 300 ft per min. (No weight is stated)*
- *Climb speed is 30 kts*
- *Stall speed is 21 kts (idle power)*
- *Maximum rpm of the Fuji-Robin EC-44-PM piston engine is 7,000'*

### Aircraft performance

On 10 April 2007, G-MMAE completed its permit to fly renewal flight. For this flight the aircraft had a takeoff weight of 292 kg. It achieved a maximum engine rpm on the ground of 6,700 and it achieved a rate of climb of 333 fpm. It stalled at 25 mph (21.7 kt).

The designer of this aircraft was asked to extrapolate the results from the test flight to provide an estimate of the aircraft's performance for a takeoff weight of 373 kg, which was the takeoff weight at Sandown on 11 August 2007. His calculations produced the graph at Figure 1.

It can be seen that at a takeoff weight of 373 kg the aircraft designer estimated that the aircraft would have been able to achieve a rate of climb of less than 30 fpm, which is equivalent to a gradient, in still air, of approximately 1%.

The Fuji Robin EC-44-PM engine produced 50 bhp (brake horse power) when certified in the Dragon 200. The designer calculated that a rate of climb of 333 fpm at 292 kg equates to the engine producing only 39.5 bhp.

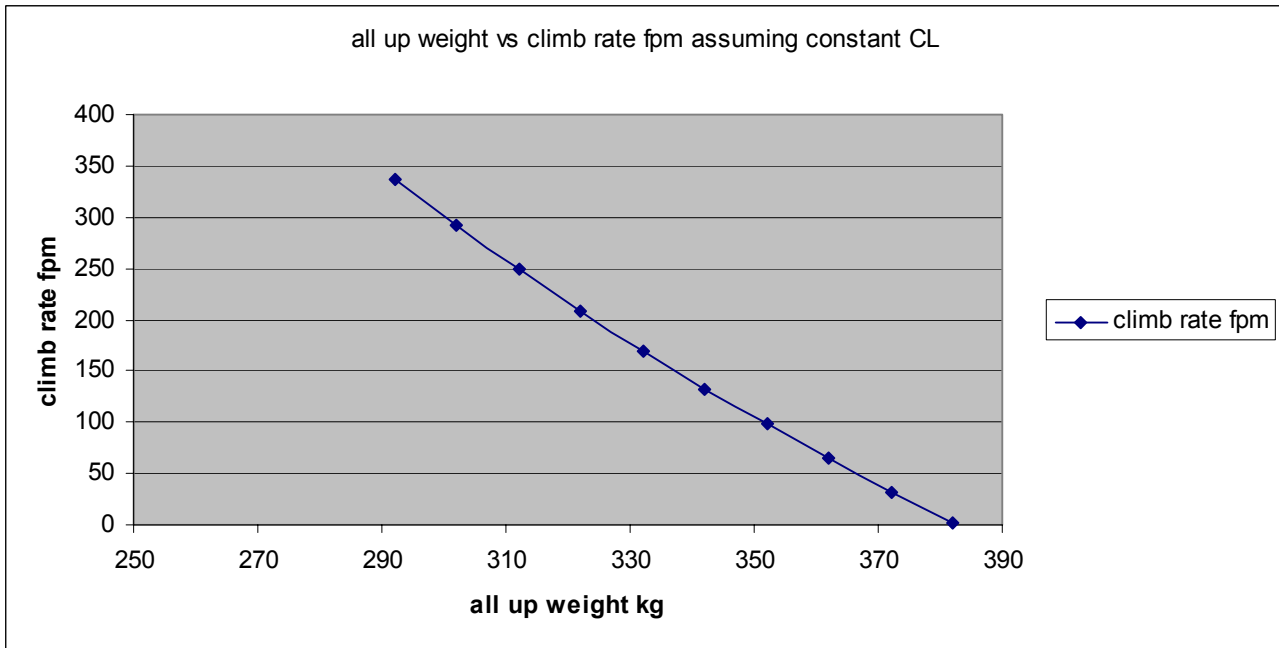


Figure 1

The aircraft has a recommended climb speed of 30 kt. This aircraft was fitted with an ASI that was calibrated in mph. The aircraft should therefore have been flown at 35 mph in the climb. The designer also calculated that the aircraft would stall at 28 mph (24.3 kt) at a weight of 373 kg.

**Comment**

The climb performance of the aircraft, at the takeoff weight of 373 kg, was calculated to be approximately 1%, and the aircraft was flying towards rising ground. The pilot was attempting to maintain 30 mph instead of the recommended climb speed of 30 kt; this would have reduced the margin from the stall speed as well as degrading the climb performance. Shortly after takeoff the aircraft encountered some form of turbulence; given the normal tolerances for an airspeed indicator, it seems possible that the aircraft became partially stalled.

**Safety Recommendation**

This aircraft had completed its BMAA check flight schedule for a permit to fly revalidation four months before the accident. A closer analysis of the figures show that the aircraft was not performing as it was required to, and yet this was not detected. It seems likely that the inadequate performance was as result of the engine not delivering full power. Had the aircraft’s performance at its maximum takeoff weight been recognised, then it would not have had its permit to fly revalidated and this accident would have been avoided. This did not require the aircraft to be tested at its maximum takeoff weight. The data could have been extrapolated to ensure that the calculated climb rate was not seriously below that scheduled in the type acceptance data sheet.

**Safety Recommendation 2008-001**

It is therefore recommended that the CAA, in conjunction with the BMAA and PFA, ensure that during the check flight for a permit to fly revalidation, the aircraft’s performance, at its maximum certified takeoff weight, is confirmed.