

# Spectrum Microlight, G-MWWY

## AAIB Bulletin No: 3/98 Ref: EW/C97/8/8 Category: 1.4

<b>Aircraft Type and Registration:</b>	Spectrum Microlight, G-MWWY
<b>No &amp; Type of Engines:</b>	1 Rotax 503-2V piston engine
<b>Year of Manufacture:</b>	1992
<b>Date &amp; Time (UTC):</b>	12 August 1997 at 1350 hrs
<b>Location:</b>	Netherthorpe Airfield
<b>Type of Flight:</b>	Private
<b>Persons on Board:</b>	Crew - 1 - Passengers - None
<b>Injuries:</b>	Crew - Fatal - Passengers - N/A
<b>Nature of Damage:</b>	Aircraft destroyed
<b>Commander's Licence:</b>	Basic Commercial Pilot's Licence
<b>Commander's Age:</b>	46 years
<b>Commander's Flying Experience:</b>	2,908 hours
	Last 90 days - Not known
	Last 28 days - Not known
<b>Information Source:</b>	AAIB Field Investigation

## History of the flight

The pilot had intended to fly from Netherthorpe Airfield to Cromer. The meteorological conditions were good with no significant weather or cloud, the visibility was 20 km, there was a light south westerly drift and, although the surface temperature was +28\_C, there was no significant thermal activity reported. The pilot removed the aircraft from the hangar, readied it for the flight and completed the pre-flight checks; it had about 27 litres of fuel on board. The take off, from Runway 24, appeared to be normal until at a height of about 150 feet the engine note altered, suggesting a reduction in power. The aircraft appeared to level off briefly before recommencing the climb as the sound of the engine returned to normal for climb power. The aircraft then levelled off again and after a brief period of straight flight it entered a turn to the left at a low altitude, the angle of bank continued to increase until the aircraft dived into the ground. The aircraft crashed about 1,000 metres

from the threshold of Runway 24 and 500 metres to the left of the extended centreline. Although the pilot had a hand held radio with him no emergency call was made.

A small group of people from the airfield immediately went to the scene and they were joined shortly afterwards by the airfield fire truck. Elements of the wreckage were then cut away in order to free the pilot whilst one of the rescuers tried to minimise a fuel leak. The emergency services arrived shortly afterwards but the pilot had already died of severe multiple injuries. A post mortem found no evidence of any disease or alcohol which may have contributed to the cause of the accident.

### **Description of the aircraft**

This Spectrum was a two place, tandem seat, three axis trainer with conventional wing, tail and control surfaces of composite construction. It was powered by a Rotax 503 piston engine. An approved major modification had been completed in 1995 to incorporate a three bladed IVO propeller and a second carburettor. The aircraft was fitted with dual controls. The front cockpit controls consisted of a conventional stick and rudder, the throttle was on the left hand side and the engine instruments, ignition switches and chokes were in the roof above the instrument panel. The rudder pedals for use by a pilot in the rear seat were situated either side of the front seat and the rear stick was placed just outboard of the front pilot's right hip position. The fuel tank was mounted behind the rear seat and held a maximum of 35 litres of petrol/oil mix (50:1). The pilot had recently purchased this microlight and this was to be his first flight in it.

### **Pilot experience**

The pilot had obtained his Private Pilot's Licence in 1989 and had upgraded this to a Basic Commercial Pilot's Licence in 1991. The last recorded entry in his flying log book was for 10 July 1997 and it is therefore not possible to define the hours flown in the period prior to the accident. However, in the two months prior to 10 July 1997 he had recorded 38 hours of flying. His flying had been in light single engine aircraft and his only recorded flying in microlight aircraft had been in April 1997 when he had completed six flights in a Pegasus AX2000 for a total of 5 hours and 15 minutes. This microlight also had conventional three axis controls albeit with side by side seating for the pilots.

### **Examination of the wreckage**

The aircraft had struck the ground in a nearly vertical attitude with the left wing leading. It was heading roughly north-west but tracking about 045 (M) with little speed over the ground but a high rate of descent. The wreckage travelled about 15 metres to the north east during the impact. It was completely destroyed in the impact, but there was no fire.

Damage to the engine was minor and plenty of fuel was found in the lines to the two carburettors. No mechanical distress or evidence of pre-impact malfunction was found. The propeller is of rather unusual construction, being composite with internal metallic reinforcing. This, together with the very steep impact attitude and soft ground, combined to make assessment of engine power from the propeller difficult. One effect of the very steep impact was to provide a reliable indication of engine speed from the tachometer, this was solidly jammed at 6,500 RPM. Maximum RPM is 6,900. It was concluded that the engine was delivering normal power at impact. There was limited evidence that the engine had not been running for very long before take off, and this could possibly have caused somewhat erratic behaviour until it had completely warmed up.

Other indications from the instruments were that the altimeter subscale was set to 1021 millibars but the altimeter was reading 500 feet. The Air Speed Indicator was reading 58 kt but the nature of damage to the aneroid mechanism made this an unreliable indication.

A large bag weighing 20 lbs whose contents included: a large plastic container and a 1 gallon container, a fuel funnel and some other small items were found in the wreckage, together with a quantity of blue nylon rope which, together with the rear seat belts had been used to secure the load. The 1 gallon container was found beneath the rear seat, in an area where flying control cables and the pitch and roll control mechanisms run. The handle of the container had been broken outwards in a manner which was consistent with it having been tied through the handle with the rope. The damage to the handle included large amounts of permanent deformation and appeared to have been a result of large forces. Tests showed that the forces required to do this type of damage were larger than could be applied manually which would have occurred, for example, if it had been jammed in the area of the flying controls, and it was concluded that this was an impact feature. Due to splitting of both containers, it was not possible to establish if they had contained any fluids before impact, but neither contained any residual fluids on site. Both containers appeared to have been used for fuel at some time.

The baggage, containers, funnel and other small items found were loaded into a similar aircraft. It was found that the bag and large container could be conveniently lashed into the rear seat, but there was no practical means of stowing the other items. The only possible locations were to either side of the rear seat, behind the rear seat or at the pilot's feet. The latter was discounted and behind the rear seat control runs were visible and items would have to be tied to prevent them falling either through the run or through an aperture at the bottom of the aircraft. It was felt that this was an improbable location, although anything stowed in this area could move under the rear seat. The 1 gallon container was found to fit snugly to the right of the rear seat, without necessarily fouling the rear seat control column, just forward of it. This would have left the funnel and loose items to be stowed. To the left of the rear seat was a similar aperture with, at first sight, no control cables although the controls were just out of sight and unprotected. It was possible to secure the remaining items in this location. This would have permitted movement of any of these items on either side of the seat to provide a distraction due to control restrictions, or even a control jam. Although the location of all these items on the accident flight will never be known, it is difficult to see how they could have otherwise been stowed. With the weight of the pilot and the weights of the bag and containers on board, the weight and balance was calculated and found to be well within limits.

In summary, no technical malfunction could be found which may have caused the accident but the possibility exists for interference between the items on board and the flying controls in all three axes.

## **Analysis**

Shortly after the take-off the engine noise was heard to reduce as the aircraft levelled off briefly. The previous owner explained that it was normal for the pilot to ease back on the throttle at this stage in order to ensure that the fuel tank would provide an adequate fuel flow to the high mounted engine throughout the take-off and climb. The previous owner had briefed the pilot on this requirement. The engineering evidence concludes that the engine was delivering normal power at impact and it is therefore probable that this perceived power reduction after take-off was a deliberate action by the pilot.

The physical evidence indicates that the aircraft struck the ground with a high rate of descent and little forward speed. The eyewitnesses describe the angle of bank increasing throughout the turn until the aircraft dived into the ground. These accounts are consistent with the pilot having experienced a problem in the turn which led to either an aerodynamic stall or an inability to recover from a spiral dive.

The pilot would have experienced unusual pitch attitude cues when seated in the Spectrum since it has a very low coaming. These cues would have been significantly different to those that he would have been familiar with in light aircraft. This may have caused the pilot some minor problems in controlling the airspeed initially and thus his proximity to the stall. Furthermore, the margin of pre-stall buffet in this aircraft is only about 3 kt. However, centralising the controls at the onset of the stall warning results in an immediate recovery and the recovery from a spiral manoeuvre is also straightforward for a pilot of this experience. It is therefore probable that the pilot's failure to retain control of the aircraft during the turn may have been due to a control restriction, or other distraction, and this may have been directly related to the manner in which he had loaded the various items of baggage.