

**No: 11/91**

**Ref: EW/C91/9/1**

**Category: 3**

**Aircraft Type and Registration:** Gemini Flash II, G-MNMI

**No & Type of Engines:** 1 Rotax 462 piston engine

**Year of Manufacture:** 1985

**Date & Time (UTC):** 8 September 1991 at about 1150 hrs

**Location:** Ravensworth Grange, Gateshead, Tyne and Wear

**Type of Flight:** Private

**Persons on Board:** Crew - 1 Passengers - 1

**Injuries:** Crew - Fatal Passengers - Serious

**Nature of Damage:** Aircraft destroyed

**Commander's Licence:** Private Pilot's Licences, Aeroplanes and Gyroplanes

**Commander's Age:** 40 years

**Commander's Flying Experience:** 158 hours (Microlight, of which 61 were on type)

**Information Source:** AAIB Field Investigation

### **History of the flight**

The aircraft was bought second hand, in December 1990, and in March 1991 it sustained some damage in a wing ground contact accident. It was sent to the manufacturer, who repaired, rigged and inspected it before it was returned to the owner at Eshott, near Morpeth. It is the policy of the manufacturer to return a repaired aircraft to its owner in exactly the same state of rigging adjustment as when it arrived and in this case, the "Tip Index Adjusters" were set so as to provide the minimum wash-out at the wingtips. Whereas in a new aircraft this would give rise to a higher wingtip stalling speed, the BMAA have indicated that, on an aircraft of this age, it would merely overcome the reduction in cruising speed caused by sail stretch. The aircraft remained rigged, without further adjustments, until the day of the accident.

The aircraft owner, who was not licensed as a pilot, was to be a passenger in his Gemini Flash II piloted by a friend from Eshott to Sunderland and thence to a farmer's field near Sunniside, Gateshead. Three colleagues who were to accompany them assembled at Eshott each flying a Chaser single-seat microlight aircraft. The purpose of the flight was to discuss with the farmer at Sunniside the renting of his field for use as a landing strip. The flight to Sunderland was uneventful and another Chaser pilot joined them there for the flight to Sunniside, where they all landed in the field which they hoped to rent.

The field is bounded by hedges and is nearly square with the four corners roughly aligned with the Cardinal Points. Two power lines, one running north-south and intersecting the easterly side of the field, and the other running along the southwest side, coincide just to the south of the field. The northwest side is hedged by hawthorn with several small trees embedded. The surface is reasonably smooth but undulates and slopes down towards the south at about  $2\frac{1}{2}^{\circ}$  at the southern end, from where Gemini Flash II is believed to have started its take-off run. The slope reduces to about  $1\frac{1}{2}^{\circ}$  near the centre of the field. The available Take-Off Distance from the south corner of the field to the north corner is about 400 metres, but the direction of the ground marks believed to be those of Gemini Flash II take-off run provides only 335 metres to the trees on the northwest boundary. When viewed from the southern corner of the field, these distances appear to be far greater due to the deceptively small size of the trees at the far end.

The wind was estimated to be about 5 kt from the south. Three of the five aircraft took off in a southerly direction, downhill and into wind, and two, one of which was the Gemini Flash II, took off heading north. The first four aircraft took off without event. When the Gemini took off it immediately showed signs of an incipient stall, rocking from side to side and, as it lifted over the trees, the left wing dropped and the aircraft spiralled left, through about  $180^{\circ}$ , into the ground in the next field. Other witness state that the aircraft had just cleared the trees when it appeared to stall into a tight left spiral down to the ground.

After the accident the other aircraft landed and the pilots rendered such assistance as they were able and went to call for emergency help. The ambulance service, who received the emergency call at 1201 hrs arrived at the accident site at 1210 hrs and took the deceased pilot and passenger to hospital. The police and the fire service also attended the accident.

### **Examination of wreckage**

The rescue activities of the emergency services had resulted in the aircraft being moved slightly before it could be examined. However, it was apparent that it had crashed on a southerly heading in a nose down, left wing low attitude. There was a faint imprint in the ground made by what appeared to be the entire length of the left wing leading edge boom. With the impact forces so evenly distributed, the wing itself had suffered little damage, the distorted nose plate (which joins the two leading edge booms together) being the only obvious damage. None of the rigging wires was broken, although the eyelet attaching the middle of the three leech lines to the left wing trailing edge had pulled through the sail cloth. This probably occurred on impact.

The initial points of contact of the trike with the ground were the nose and the left landing gear. Considerable disruption had resulted in the forestay, between the top of the monopole and the front of the keel member on the trike, suffering a compression failure and the left landing gear structure being pushed into the propeller arc. Evidence of propeller rotation was provided by the fact that the propeller tips had fragmented as a result of this contact, with some pieces penetrating the sail.

The front and rear fuel tanks were one third and two thirds full respectively. Although damage to the engine mounts precluded a test run in situ, the engine was free to turn, the magneto produced sparks at the plugs and no pre-impact damage was found in the fuel lines. The propeller fitted to the aircraft was noted to be a “62 x 42” unit, as opposed to the “62 x 44” propeller specified in the aircraft log book. This had no significant effect and the finer pitch may have enhanced the take-off performance. No fault that could have had a bearing on the accident was found in either the engine or the airframe.

### Aircraft performance

The declared Take-Off Distance Required (TOD) [Start of take-off roll to achieving screen height] for this aircraft is 181 metres from a solid, flat, even surface and in still air. The CAA and the British Microlight Aircraft Association have published a table of factors to be applied to the declared TOD if the field in use does not have a solid, flat and even surface. Relevant extracts from these are as follows:

An increase of 1000 feet above msl .....	X 1.1
An increase of 10°C above ISA (15°C at sea level) .....	X 1.1
Dry short grass (< 5 ins) .....	X 1.2
A 2% uphill slope .....	X 1.1
A tailwind component of 10% of lift-off speed .....	X 1.2
Additional safety factor .....	X 1.33

It is necessary to use these factors to assure the safe operation of the aircraft and they are accumulative and to be applied successively. Listed below are these factors which should have been applied to calculate the TOD required by the accident aircraft:

<u>Unfactored TOD Required - 181 metres</u>	500 feet amsl -	(X 1.05) =	190 metres
	5° above ISA -	(X 1.05) =	196 metres
	Dry grass -	(X 1.2 ) =	239 metres
(2½° in 335 metres = 5%) .....	Uphill slope	(X 1.25) =	299 metres
(Lift-off speed 25 mph wind 5 kt (20%)	Tailwind -	(X 1.4 ) =	418 metres
	Safety factor -	(X 1.33) =	556 metres

For a safe take-off, the TOD Required is therefore 556 metres. The TOD Available, for the take-off run which the ground marks suggest was used, was 335 metres.