AAIB Bulletin No: 3/94 **Ref: EW/C94/1/1** **Category: 1.3**

Aircraft Type and Registration:	Mooney M20J, G-BSKJ	
No & Type of Engines:	1 Lycoming IO-360-A3B6D piston engine	
Year of Manufacture:	1978	
Date & Time (UTC):	8 January 1994 at 1549 hrs	
Location:	'Needle's Eye', The Wrekin, Shropshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - Fatal	Passengers - Fatal
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence with IMC Rating	
Commander's Age:	53 years	
Commander's Flying Experience:	About 1,000 hours (of which about 400 were on type)	
Information Source:	AAIB Field Investigation	

The accident occurred during a return flight to Sleap, from White Waltham, when the aircraft collided with the top of a hill feature known as The Wrekin.

History of the flight

The aircraft was based at Sleap and, at about 0830 hrs on 8 January, the pilot telephoned White Waltham Airfield operations requesting their present weather and informing them of his intention of flying there later in the morning. He was given an unofficial observation which indicated a visibility of 150 to 200 metres in fog with a clearance, which was suggested by the Heathrow TAF, expected by 1100 hrs. He called again at 1030 hrs and was told that the visibility was 1,500 to 2,000 metres in mist and not expected to improve.

The flight took off from Sleap at about 1230 hrs, carrying a passenger who was an aviation enthusiast. At 1300 hrs the pilot requested the present weather from White Waltham by RTF. The visibility was still 1,500 to 2,000 metres in mist, which fact the pilot acknowledged and, at 1315 hrs, requested joining instructions. He then made a call DOWNWIND and said that he could not see the runway but would GIVE IT A GO NEXT calling BASE LEG and TURNING FINALS before asking AM I IN LINE WITH THE RUNWAY AS I CAN'T SEE IT YET? He was informed by a flying instructor who was in operations that he appeared to be established on finals. An uneventful landing was made at 1325 hrs.

The pilot and passenger took off for the return flight at about 1510 hrs. The aircraft climbed in IMC, eventually to 3,000 feet, and at 1528 hrs, changed frequency from White Waltham to Birmingham who provided a Radar Advisory Service. At 1541 hrs, when 6 nm from the overhead of Halfpenny Green Airfield, the pilot changed to that airfield's frequency reporting that he was south east of the airfield at 3,000 feet in IMC. At this time he was informed that the airfield QNH was 998 mb. He then declared his intention to descend to 2,000 feet, in an attempt to become VMC. When he reported at that height he was heard by another aircraft to say that he was descending to 1,300 feet. The pilot then changed to the Sleap frequency but no transmissions were received at the airfield from the aircraft. At about this time, a witness in another aircraft stated that he heard on the Sleap frequency what he believed to be a truncated message from the aircraft, giving only its call sign, 'G-BSKJ'. No subsequent messages were heard.

Witnesses later reported having seen the accident aircraft flying level in and out of the low cloudbase and having heard its engine running smoothly. One witness saw it flying directly toward The Wrekin and disappear into the cloud covering its top. At Figure 1 is a photograph of The Wrekin taken from just below cloudbase under similar weather conditions to those pertaining at the time of the accident. It illustrates the potential for mis-identifying ground which is rising into cloud as more level ground which is fading into the distance. Figure 2 shows the aircraft's track (in red), derived from radar recordings as it approached The Wrekin, superimposed on a section the 1:500,000 topographical chart. The isolated nature of The Wrekin and the prominent identification of some power station cooling towers (882 amsl) on the aircraft's track a short distance to the south east may be seen clearly. The impact occurred near the spot height of 1,334 feet.

In view of the deteriorating weather, the Halfpenny Green AFISO telephoned Sleap to confirm that they were in contact with the aircraft. Sleap reported that they were not in contact, and neither were Shawbury or Birmingham. Sleap operations then attempted once more to make radio contact with the aircraft and also scanned the radio frequencies of Birmingham, Liverpool, Manchester, Shawbury and Halfpenny Green, thinking that the aircraft may have made a diversion but since no contact was established the Operations controller initiated 'Overdue Action'.

The emergency services were alerted at 1618 hrs. The aircraft wreckage was located by a family walking on The Wrekin. The West Mercia Police, the Shropshire County Fire Brigade, the Mountain Rescue Team (MRT) from RAF Valley and the civilian MRT from Clwyd attended the site and greatly assisted the on-site investigation and recovery phase.

The pilot was moderately experienced in IMC flying but, for navigation purposes, the only instruments which he reportedly used were an ADF, which had been noted as reliable at only very short ranges,

and a Decca Navigator, which he had installed low down on the console between the two front seats. It is reported that the pilot was very enthusiastic about the Decca and tended to spend a lot of time setting and re-setting it during flight.

Post-mortem examination of the pilot did not reveal any abnormalities which could be considered as contributory to the accident.

Impact Parameters

The aircraft had struck a rocky outcrop on the top of The Wrekin, known as the 'Needle's Eye', whilst flying at an altitude of some 1,250 feet. This was approximately 250 metres to the left of the hill's highest point of 1,334 feet amsl, which is identified on the aeronautical topographical charts as a spot height (see Figure 2). The highest ground along the aircraft's track of 320° M was 1,295 feet. It's speed at impact was estimated to have been about 180 mph, the final radar returns indicating a ground speed of 155 kt. As the aircraft struck the rock face, which sloped at approximately 50° to the horizontal, the engine, cockpit and forward fuselage areas were severely crushed. Both wings came off at their roots and were crushed back to the area of their rear spars, and the rear fuselage, complete with tail surfaces, was thrown up the rock face by some 30 feet. Many small fragments were scattered over the rock face and some were carried by the impact and wind over the top of the hill to become widely distributed on its lee side. An examination of the rock face at the point of impact showed the aircraft to have been erect and its roll attitude was within 5° of wings level at the time. There was no fire.

Wreckage examination

The aircraft wreckage was recovered and transported, with the assistance of the RAF Transport and Salvage Flight, to the AAIB at Farnborough. Examination revealed that it had been structurally complete and intact prior to the accident, that it had been configured with the landing gear and flaps fully retracted. The altimeter was recovered almost intact, with the sub-scale being found set at 996/997 mb, and there was evidence from the artificial horizon that the aircraft's pitch attitude had been some 10° nose down at the moment of impact. The nature of the damage to the propeller blades showed that the engine had been producing a high level of power at impact, a witness mark from the pointer on the engine speed indicator suggesting a rotational speed of 2,100/2,200 RPM. The engine controls in the cockpit were found in positions which were consistent with high engine power. Although no evidence of fuel was discovered in the wreckage, a strong smell of petrol was reported by rescue personnel. Filament analysis of the light bulbs, contained in a small warning panel mounted on the instrument panel, revealed that neither left or right 'fuel low' warnings had been illuminated at

impact. Examination of the aircraft's flying control systems revealed only accident related damage, and the pitch trim system was found set close to neutral.

Maintenance history

The aircraft had been imported from the USA and placed on the UK register in the Private Category in early 1991 since when it had flown for some 633 hours. The aircraft's total flying time at the time of the accident was approximately 2,430 hours. The most recent Annual Check had been carried out in March 1993 at 2,241:30 hours, this check being pre-empted by some 33 days. As required under the regulations, it had been certificated in the aircraft's log books by a licenced engineer. Since that time two 50 hour checks were recorded as having been carried out and signed for by the pilot. These being the last maintenance entries in the log books. The next maintenance due was a 150 hour check, which is required to be carried out and certified by a licenced engineer, and this was due at 2,391:30 hours (or 2,406:30 hours if a 10% extension were to be granted). This figure was passed on 4 November 1993 with a pencil written note in the log books of '150 hrs + 10%', but without any signature and licence number of an engineer. No evidence was found to show that this check had actually been carried out but its absence was not considered to be a factor in the accident.

Safety promotion

It has been suggested to the CAA that the circumstances of this accident should be publicised by their Safety Promotion Section in the General Aviation Safety Information Leaflet (GASIL) and at the CAA Safety Evenings. The inherent dangers of 'scud running' and the illusionary misconceptions caused by the conjunction of low cloud with hill tops are demonstrated in this accident which highlights yet again the frequency of Controlled Flight into Terrain (CFIT) accidents.

Figure 1: View of The Wrekin taken from just below cloudbase under similar weather conditions to those on the day of the accident flight.

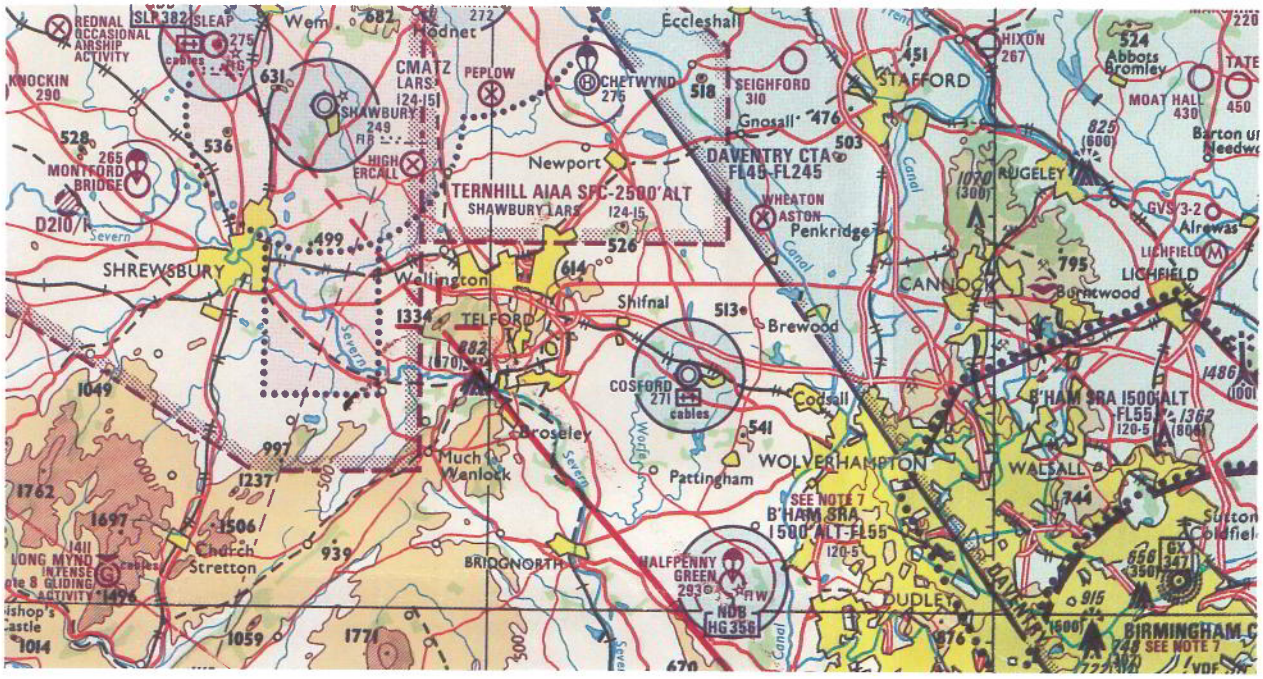

Figure 2: 1:500,000 map showing aircraft track and impact point.