

No: 4/89

Ref: EW/C1083/01

Category:1a

Aircraft Type and Registration: Aviasud Mistral 532 GB Ultralight, 83-CP

No & Type of Engines: One Rotax 532 watercooled 60 HP piston engine

Year of Manufacture: 1988

Date and Time (UTC): 4 September 1988 at 1120 hrs

Location: Barnes Surges, Sidbury, Devon

Type of Flight: Private (pleasure)

Persons on Board: Crew - 1 Passengers - 1

Injuries: Crew - 1 (serious) Passengers - 1 (fatal)

Nature of Damage: Aircraft destroyed

Commander's Licence: Private Pilot's Licence Landplanes Group A and Self Launching Motor Gliders

Commander's Age: 53 years

Commander's Total Flying Experience: 250 hours (of which 29 were on type)

Information Source: AAIB Field Investigation

History of the flight

The aircraft was registered in France in the Ultralight category. Being above the weight limit for inclusion on the United Kingdom register as a Microlight it had been operated with special permission under the terms of an Exemption Order issued by the CAA pending its acceptance for a Permit to Fly under revised regulations for microlight aircraft. The pilot had collected the machine from its manufacturer in France on 16 February 1988 and had since flown it extensively throughout the UK.

On the day of the accident the pilot and his partner, also an ultralight pilot, flew the aircraft from a private airstrip at Lamberhurst, Kent to another private airstrip at Sidbury, Devon. This 3 hour flight was uneventful and the aircraft landed at 1012 hrs. No fuel was uplifted since some 20 litres remained which was judged sufficient for the next flight. This was to be a short demonstration flight for a farmer whose land adjoined the airstrip and who had expressed an interest in the aircraft. At 1110 hrs, following an inspection of the aircraft, the pilot and passenger strapped themselves into the cockpit and the aircraft was taxied to the north eastern end of the grass runway 22 which is 514 metres long. A line of trees about 30 feet high crossed the southwestern end of the strip, although a small gap was immediately opposite the upwind end. The routine meteorological observation made at 1118 hrs at Exeter Airport (13 miles west of the airstrip) included a wind velocity of 220° at 10 kts and temperature

of +18°C. The engine was run up to 5700 rpm, which was correct for the fixed pitch to which the propeller had been set, and the pilot began the take-off roll. The aircraft appeared to accelerate slowly at first, the pilot checked that the brake lever was fully released and continued the take-off run. At about two thirds the length of the strip the aircraft bounced into the air and its speed increased. The pilot was surprised to find that the aircraft drifted to the left on a flight path that took it to the left of the gap in the trees. He was later unable to offer any explanation for this deviation from the normal runway heading.

Onlookers had realised that the take-off run was abnormally long but it appeared as if the aircraft would just clear the trees. However, the left lower mainplane contacted the upper branches of a tree and the aircraft rolled through 360° before falling heavily to the ground. Onlookers ran to the scene to find both occupants severely injured.

Examination of the wreckage

The wreckage of the aircraft lay in a ploughed field some 36 metres from a single track road bordered by hedgerows and a few trees. This position placed it some 60 metres to the left of the extended centreline of runway 22 and some 20 metres from the end. Examination of the runway surface showed faint but just discernible marks of the landing gear commencing at about the beginning of runway 22 and running to a point some 134 metres before the end - a total ground run of 383 metres. The final 10 metres of the ground marks showed the mainwheel imprint becoming suddenly somewhat more distinct before the aircraft became airborne, with some tearing of the grass evident, particularly on the left wheel. There also appeared to be a slight veering to the left at this point.

A search of the road running across the end of the runway revealed a branch which was roughly 2 cm in diameter and recently broken from a tree in the hedgerow. The branch bore signs of abrasion by a white coloured object that had caused it to detach from the tree which rose to a height of about 15 metres from the ground. This tree was about 32 metres to the left of the runway centreline.

The aircraft itself bore evidence of impact with a tree on the lower left wing leading edge. It had struck the ground at a relatively low airspeed but with a high rate of descent and banked to the right. More detailed examination of the structure strongly suggested that the left lower wing main attachment fitting had broken due to impact with the tree. Although remaining attached at mid-span by the interplane strut to the top wing, the lower wing appeared thereafter to have 'folded up', feeding very high loads through this strut to the upper wing which was consequently also on the verge of failure on impact. The combined effect of the tree impact and the collapsed lower wing would have caused the aircraft to both yaw and roll violently to the left. Since the aircraft struck the obstacle in a right wing low attitude, it would appear that it had rolled through almost 360° before striking the ground. There were no indications of structural failure having occurred prior to striking the tree. Similarly there were no indications of malfunction of the aircraft's flying controls and the condition of the propeller blades suggested that the engine was developing considerable power prior to impact.

Despite the severity of the ground impact, the Rotax engine appeared to have suffered little damage and it was despatched to the main UK agent for testing under the supervision of AAIB. After reconnecting those components which had been disconnected by impact or the rescuers, the engine was started and ran without fault. Full power capability was demonstrated during the course of these tests.

The aircraft's main wheel brakes were adapted from a typical motorcycle system. The initial ground marks were not consistent with a locked brake or brakes but the reason for the sudden change in the appearance of the marks immediately prior to the aircraft lifting off remained unclear. During testing it was not possible to produce any condition of brake self application or significant binding and no defect in the system were found upon strip examination. Verbal reports have, however, been received that there had been at least two instances of Mistral aircraft fitted with the optional hydraulic brake system suffering binding or locked brakes for reasons unknown.

Performance

After the accident the combined weight of the two occupants was calculated to have been 424 lb (191 kg). Loose equipment found in the cockpit including a hand held radio transceiver and navigation

receiver totalled 22 lb (10 kg). The basic weight of the aircraft was given as 382 lb (173 kg), thus the total weight of the aircraft at take-off, including 35 lb (16 kg) of fuel, was 863 lb (392 kg). The maximum permitted weight at take-off is shown in the User's Manual to be 858 lb (390 kg) including a maximum passenger weight of 407 lb (185 Kg). The User's Manual indicated that the take-off distance required to clear a 50 ft obstacle in nil wind conditions and at a temperature of +18°C was 215 metres.