

AAIB Bulletin No: 3/94 **Ref: EW/C93/8/7** **Category: 1.3**

Aircraft Type and Registration: Mooney M20K, G-BYRD

No & Type of Engines: 1 Continental TSIO-360-GB1 piston engine

Year of Manufacture: 1981

Date & Time (UTC): 30 August 1993 at 1430 hrs

Location: East Winch, Norfolk

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 Licence with Night and IMC ratings

Commander's Age: 62 years

Commander's Flying Experience: 980 hours (of which 267 were on type)
Last 90 days - 6 hours
Last 28 days - 4 hours

Information Source: AAIB Field Investigation

History of the flight

The aircraft departed Newcastle Airport at 1309 hrs with full fuel tanks for a VFR flight to a grass strip at East Winch near King's Lynn. There were no radio communication facilities at the strip, use of which required the prior permission of the operator. The strip operator stated that the pilot had not requested permission for this particular visit. The weather for the flight was fine with a moderate easterly wind at destination. The passenger, himself a pilot, was not wearing a headset as the pilot had told him that the intercommunication system was not working properly. However, the passenger stated that there did not appear to be any problem with the aircraft upon departure from Newcastle and in particular that the engine run-up and check of the constant speed propeller was satisfactory.

The initial part of the flight was flown at 4,000 feet in VMC and was uneventful. At about 1400 hrs the aircraft arrived in the vicinity of East Winch having descended to about 2,000 feet. Despite having visited the strip on several previous occasions, the pilot could not locate it and having circled the area at least once, he took the advice of the passenger and flew to King's Lynn, some six miles from East Winch, from where he flew an intercept track for the strip. Having located the runway, the pilot noted

the easterly wind and turned downwind to land. The aircraft was high on the downwind leg and the passenger advised the pilot to extend downwind before turning onto the final approach. The pilot either did not hear this advice or chose to disregard it.

Having heard and seen the aircraft at various altitudes in the vicinity of the strip, witnesses on the ground saw it approaching the easterly runway with its landing gear and flaps extended. It was seen to level off at a height of about 200 feet and fly along the runway centreline with the landing gear and flaps still extended. The strip was routinely used by model aircraft flyers and it was standard procedure for arriving aircraft to fly along the runway at a safe height to warn the model flyers of an impending landing. None of the witnesses considered that the aircraft's engine sounded other than normal during the flight along the runway but the passenger stated that "the aircraft was misbehaving in some way" which he could not explain. As the aircraft approached the upwind end of the runway, it was seen to lose both height and speed and the passenger stated that it began to yaw from side to side and that he could no longer see over the nose. Having crossed the upwind end of the strip the aircraft began a gentle turn to the left. Shortly after the start of the turn the rate of roll to the left rapidly increased and the aircraft spiralled into the ground. Only one witness mentioned a change in engine noise during the last few seconds of the flight. Both occupants suffered serious injuries in the impact and the pilot died of these injuries six weeks later.

Engineering investigation

The aircraft crashed in an open field of stubble approximately 100 metres beyond the end of Runway 10 and 200 metres to the left of the runway centreline. It had hit the ground at low speed in a steep nose-down and left banked attitude. The left wingtip had made the first ground contact and the aircraft had then cartwheeled onto its nose and the right wing, the rear fuselage detaching in the process. The aircraft came to rest 25 metres from the first ground contact on a bearing of 015°M about 75° left of the runway heading. There was no post-crash fire.

The landing gear had been extended and all three legs had collapsed in the impact but the inboard wing structure and the cabin remained only lightly damaged. The engine support structure had been crushed in the nose impact but, as the aircraft had rotated, the engine had been separated from the fuselage.

In this aircraft the cabin basic structure is of welded steel tube construction and this had suffered only minor crushing and distortion at the front but damage to some of the instruments showed that the pilot had come into contact with the panel during the crash. All the harness attachments had remained intact and the pilot's harness, including the diagonal strap, showed evidence of stretching and appeared, therefore, to have taken load in restraining the pilot during the impact.

The fuel selector was found selected to the left tank. That tank had been punctured by the detached left landing gear leg and no fuel was recovered from it. The water drain had also been opened by some local distortion of the fuselage floor and fuel had also drained from the pipework and left tank by that route after the aircraft came to rest. Nineteen gallons of Avgas 100LL were recovered from the right tank. The fuel strainer was clear and all the fuel pipework was found to be intact.

Both propeller blades had suffered severe rotational damage and exhibited some forward bending which indicated that there was a significant amount of power being transmitted through the propeller at impact. Nevertheless the engine was bulk stripped and its fuel system and magnetos rig checked. No faults, other than accident damage, were found. The throttle, mixture and propeller control cables had all been pulled when the engine separated from the airframe and each cable outer was found detached from the body of the slider assembly of the pilot's control knob. The throttle's inner cable had also broken in tensile overload. When the failure of the throttle outer was examined it was found that there were some irregular marks over the original swageing by which the outer had been retained in the throttle body. This suggested that a repair had been carried out at some time in the past. Also, within the swaged tube carrying the throttle outer there was some material which appeared to be an adhesive. There was no adhesive attached to the cable outer itself showing that adhesion to the outer had been poor. Further, the surface of the adhesive within the slider tube was formed in helix matching the wires of the cable outer. This showed no evidence of any traumatic rupture such as might have occurred if the cable had been violently pulled out of the slider during the crash. This evidence raised the possibility that the outer had become disengaged before the crash through lack of proper retention. This would have introduced lost motion into the throttle control: had the pilot's control been pushed fully forward, full throttle opening at the engine might not have been achieved. However, no direct evidence was found that the cable outer had been detached from the slider before the crash.

No disconnection or defect was found in the flying controls and the elevator trim was found to be in a mid-range position. Though eyewitnesses reported that the flaps had been deployed during the aircraft's approach to the airstrip they were retracted as found. The flap switch was found broken and this appeared to be due to local damage to the instrument console. The switch is positioned in a recess in the central control console below the main instrument panel and is adjacent to the left leg of the right seat occupant. Though the switch is spring-loaded to OFF (central position) from the DOWN position, if selected UP it will not return to OFF when released and must be returned to the neutral position to prevent the flaps retracting fully.