

Mooney M20J, G-MUNI

AAIB Bulletin No: 1/2003Ref: EW/C2002/07/05 **Category:** 1.3

Aircraft Type and Registration: Mooney M20J, G-MUNI

No & Type of Engines: 1 Lycoming IO-360-A3B6D piston engine

Year of Manufacture: 1989

Date & Time (UTC): 6 July 2002 at 1458 hrs

Location: Fair Oaks, Surrey

Type of Flight: Training

Persons on Board: Crew - 2 Passengers - None

Injuries: Crew - None Passengers - N/A

Nature of Damage: Damage to both wings, fuselage and propeller.

Commander's Licence: Commercial Pilots Licence

Commander's Age: 54 years

Commander's Flying Experience: 7,240 hours (of which 10 were on type)
Last 90 days - 101 hours
Last 28 days - 23 hours

Information Source: AAIB Field Investigation

The owner of the aircraft was undergoing a Licence Proficiency Check. He had completed the external checks and was then joined in the aircraft by the examiner, who was the legal commander of the aircraft. The owner indicated to the examiner that the external checks had been completed satisfactorily. After engine start, the aircraft, with the owner as the handling pilot, was taxied to the holding point for Runway 24 and the power checks were completed with no indication either on the engine instruments or aurally of any malfunction. After completing the pre-takeoff vital actions, the takeoff run was commenced with the engine instruments indicating that the engine was developing full power and with the aircraft accelerating normally.

After takeoff, at a height estimated by the examiner to be approximately 100 to 150 feet agl, the engine suffered a sudden very severe power loss. Prior to the power loss there were no other symptoms, such as rough running or misfiring. The aircraft pitch was adjusted to adopt the ideal

glide attitude and to maintain a safe airspeed. With the owner continuing to act as the handling pilot, the appropriate actions for an engine failure after takeoff were carried out. The examiner transmitted a truncated Mayday call and directed the handling pilot to the right of the runway extended centreline, clear of a line of trees that crossed the take-off flight path, to the most suitable area for a forced landing. The area available was in the corner of a field and it was inevitable that the aircraft would pass through fences and continue into adjoining fields. The aircraft stopped, having passed through the fences with no damage to the cockpit area or injuries to the crew, but with substantial damage to both wings. There was no fire. The aircraft was secured and the two pilots exited without difficulty.

The examiner then used his mobile telephone to call the tower at Fair Oaks. The airport fire services arrived on the scene in less than five minutes, which he considered commendable since he could only provide approximate details of the location of the aircraft relative to the airfield, and access had to be gained from a nearby road. Local emergency services arrived shortly afterwards.

The accident was reported to the AAIB and permission was given to recover the aircraft to a hangar at Fair Oaks. Before this was done however, checks on the magnetos and fuel system were conducted. The filler caps of both fuel tanks were removed, and both tanks were found to be full of fuel. The fuel line between the engine driven fuel pump and the fuel injector was disconnected and a large quantity of water was drained out.

The aircraft had been parked in the open at Fair Oaks for a number of months. On 1 May 2002, it had been flown by the examiner from Fair Oaks to Bournemouth; a flight time of 45 minutes. 95 litres of Avgas 100LL had been uplifted the same day. On 10 May 2002, it was flown back to Fair Oaks. On 19 June, a local flight of one hour duration was made without incident. On the day of the accident, the owner had made a telephone call to the airfield, asking that G-MUNI be refuelled. 166 litres of Avgas 100LL was uplifted, and this appeared to fill the tanks to capacity (32 USG per tank). On the same day there was a period of very heavy rainfall. Over this whole period the aircraft had been parked in the open.

The Maintenance Manual for the aircraft draws particular attention to the possibility of rainwater entering the fuel tanks through the fuel filler caps, either because of defective seals on the tanks, or because of a leak at the spindle of the filler cap mechanism. It is also possible for rainwater to enter if the filler cap is not properly seated, or if the cap mechanism is incorrectly adjusted. Checks were made of the condition of the seals on the fuel filler caps, and their seatings. These were all found to be satisfactory. In addition the caps themselves were checked for leaks through the central spindle of the locking mechanism, but no such leaks were found.

The aircraft has fuel drains in each tank and the gascolator. The latter is operated by a pull ring inside the cockpit, located under the front edge of the left front seat. This drain operating ring is not readily visible when the seat is not fully aft. From the gascolator, the fuel passes to an electric fuel pump and then to the engine driven fuel pump.

The design of the gascolator fuel drain, in common with similar systems on some other light aircraft, is such that it is difficult to check without assistance. If alone, the pilot must enter the cockpit to operate the drain and ideally place a suitably bonded container beneath the drain to collect the fluid. The pilot would then have to wait for the contents to settle before being able to positively identify whether it was fuel, water, or a mixture of both. Being centrally placed, this drain is the lowest of the three fuel drains, however it is also the easiest to overlook.

The owner stated that he had carefully carried out checks of the wing drains, as these are at the lowest point of the tanks and would therefore provide the first indication of any water in the system. The fuel system draws fuel from the tanks slightly above this level, to avoid drawing any small quantities of water into the fuel lines. The owner normally checked the gascolator drain every other flight or so, because it was both difficult and unlikely, in his opinion, to contain water if the tank drains were clear of water. He had owned the aircraft since 1993 and over that time, had rarely found evidence of water in the fuel system drains, and then only in minute quantities.