

Aircraft Type and Registration:	Mooney M20J, G-DESS	
No & Type of Engines:	1 Lycoming IO-360-A3B6D piston engine	
Year of Manufacture:	1982	
Date & Time (UTC):	14 October 2004 at approximately 1427 hrs	
Location:	Wadswick Airstrip, near Corsham, Wiltshire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - 1 (Serious)	Passengers - 1 (Serious)
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence with IMC Rating	
Commander's Age:	60 years	
Commander's Flying Experience:	Approximately 1,250 hours (of which 1,000 were on gliders and 160 were on type) Last 90 days - 19 hours Last 28 days - 5 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The aircraft crashed following a go-around during an approach to a private airstrip. The aircraft was in the landing configuration when the pilot suddenly realised that he was too low on approach and applied full power to go-around. On the go-around, the aircraft stalled accompanied by a left wing drop. The pilot was unable to recover from the subsequent incipient spin before ground impact.

History of flight

The owner of G-DESS had planned to move his aircraft from Old Sarum Aerodrome to a private airstrip at Wadswick. He had spoken to the airstrip operator and agreed that he would fly to Wadswick on the afternoon of 14 October to review the facilities. He was aware of the advice contained within '*LASORS Safety Sense 12 Strip Sense*' and the need to adhere to Rule 5 of the *Rules of the Air* (often referred to as the 500 foot rule). As he had not flown there before, he arranged that

a friend would accompany him on the flight. The friend was not a pilot but was familiar with the local area.

Accordingly, on the morning of 14 October the owner and his friend went to Old Sarum for the flight. The plan was that they would fly to Wadswick where the pilot would make a couple of fly-pasts to familiarise himself with the airstrip, and then return to Old Sarum. The friend would disembark and drive the owner's car to Wadswick, while the owner would fly back and land at Wadswick. The weather was good with a forecast westerly surface wind of 10 to 15 kt at Wadswick. On arrival at Old Sarum, the pilot completed his normal checks and started the aircraft. He then taxied to the fuel area, where he filled his aircraft to full fuel. The subsequent takeoff from Runway 24 was uneventful as was the transit towards the north. The pilot was seated in the left cockpit seat and his friend was seated to his right. The pilot subsequently confirmed that the aircraft appeared fully serviceable and both occupants confirmed that the passenger made no control inputs during the flight.

After takeoff, the pilot made contact with Lyneham Radar at 1411 hrs on frequency 123.40 MHz and agreed a Flight Information Service (FIS). As Wadswick Airstrip was within the Lyneham Control Zone (CTR), the pilot advised Lyneham of his intention to make a pass over the airstrip before returning to Old Sarum. At 1421 hrs, Lyneham Radar advised the pilot of G-DESS that the surface wind at Lyneham was 290°/5 to 10 kt. In the area, the pilot had some trouble locating the airstrip but, at 1424 hrs informed Lyneham that he was on "*Finals for Wadswick Runway 27*". Following the subsequent acknowledgement, there was no further communication between G-DESS and Lyneham. Shortly after, with the gear down and full flap selected, at an indicated airspeed of 70 kt and with the aircraft trimmed, the pilot suddenly realised that he was much lower on the approach than he intended. He immediately applied full power. He could not subsequently recall any details between that point and then being aware of the aircraft in a nose down attitude. By then, G-DESS was banked to the left with full power set and with control inputs applied in accordance with an attempted recovery. It appeared obvious to the pilot that the situation was not recoverable. He called to his passenger that they were going to crash and was then aware of the aircraft striking the ground. When the aircraft came to rest the pilot, although badly injured, used his mobile telephone to alert the emergency services.

The passenger had previously flown with the pilot and considered him safe and conscientious. On the approach to the airstrip, the passenger was aware of power being applied and the nose of the aircraft rising quickly. He also confirmed hearing the sound of a warning horn. He subsequently stated that he had heard the same noise on a previous flight with the pilot when the pilot had been practising stalling.

Emergency Services

A police helicopter had been operating in the local area with Lyneham Radar and had landed to the south of Melksham, some 4 km from the crash scene, at 1427 hrs. Following the initial call to the emergency services the police helicopter crew lifted off and contacted Lyneham Radar. They arrived at the crash site at 1434 hrs. By then, the passenger had managed to extricate himself from the wreckage but the pilot was still trapped and badly injured.

With the serious injuries to the pilot and difficulties in extricating him from the wreckage, it was considered necessary to airlift a medical team to the scene. At 1607 hrs, the police helicopter reported that the pilot was being airlifted to hospital.

Weather information

The Meteorological Office at Exeter provided an aftercast for the crash location. This indicated that the surface wind was 270°/ 10 kt and the wind at 2,000 feet amsl was 300°/ 15 to 20 kt. The surface visibility was generally 20 to 30 km. Cloud was scattered to broken Cumulus base 2,000 to 2,500 feet amsl and scattered to broken Stratocumulus base 3,000 to 5,000 feet amsl. There was occasional broken Cumulonimbus over the area with a base of 1,500 to 2,000 feet amsl. Rain showers had been noted in the area.

Airstrip information

The airstrip has an elevation of 400 feet amsl and is just within the Lyneham CTR. It has a grass runway orientated 280°/ 100°M; the grass was short and dry at the time of the accident. The runway is approximately 700 metres long and 25 metres wide with a hedge at the eastern perimeter. There is also a power line crossing the runway near the eastern threshold but one span of the electric cable is buried below the runway. The airstrip has a windsock.

Recorded data

A Bendix/King Skymap model IIIC Global Positioning System (GPS) was recovered from the aircraft. The unit was successfully downloaded by the AAIB and a track log for the accident flight was recovered. The track log contained the following data points: date, GPS time, GPS position, GPS altitude, groundspeed and track. The unit was configured to record data points at twenty-second intervals.

Secondary radar was also available for the accident with position and altitude data recorded at eight second intervals. Ground speed was calculated using radar data and then compared with the GPS ground speed. The speeds did not typically differ by more than 6 kt at coincident data points.

The final secondary radar point was recorded at approximately 1423:40 hrs, groundspeed was approximately 90 kt and Mode C altitude was 1,700 feet. GPS data continued to be recorded after the final radar point. At 1424:07 hrs, GPS groundspeed was 68 kt and the track was 281°. The aircraft remained on a track of approximately 280° and groundspeed gradually reduced until the final data point, which was recorded at 1425:07 hrs, when the ground speed was approximately 47 kt. With the reported aftercast wind, the airspeed would be some 10 to 15 kt above the calculated groundspeed.

Examination of the wreckage

The aircraft and the accident site were examined the next day. The aircraft had come to rest in a newly-sown field some 80 metres to the south of the airstrip and about 50 metres west of the threshold. The right wing was completely detached, with the main landing gear in the extended position. The left wing was still attached and the left gear appeared to be retracted.

There had been some disturbance of the wreckage due to the activities of the emergency services but it was clear that there had been major impacts on the wingtips and the nose. This corresponded to the initial ground impact marks which indicated that first contact had been with the left wingtip, followed by the nose/propeller and then the right wingtip, with the aircraft in a steep nose-down attitude; a manoeuvre commonly called a 'cartwheel'. After this, the aircraft had slewed sideways and come to rest approximately on the heading of the runway.

The disruption to the nose and instrument panel was severe but it could be seen that the nose landing gear had been DOWN. There was considerable chordwise scratching of the propeller, suggesting that it had been turning at speed at impact. The right wing fuel tank had ruptured and the fuel had drained away but the left tank remained full of fuel. There had been no fire. The 'as found' condition of the controls suggested that full power, fully rich mixture and fully fine propeller pitch had been selected.

After removal to a hangar at the AAIB examination of the flap, landing gear and pitch trim actuators showed that the flaps were fully extended, the landing gear was down and locked and the pitch trim was slightly more nose-up than the normal take-off range. A subsequent flight in the same aircraft type by an investigator indicated that this 'as found' trim position may have resulted in a slight push force being required during an approach at 70 kt. The apparently retracted condition of the left main gear was due to sideways loading during impact, which had caused partial failure of the mounting trunnions.

In the cabin, both occupants' seats and lap-and-diagonal restraints had remained secure and it was evident that their injuries had been caused by rearward movement of the instrument panel/control columns and severe crushing of the floor structure.

Pilot's Operating Handbook (POH)

The POH contained the following relevant information:

1. Spin warning:

'Up to 2,000 feet of altitude may be lost in a one turn spin and recovery; therefore stalls at low altitude are extremely critical.' Note: Aerobatic manoeuvres, including spins are not approved.

2. Caution during approach:

'From a flaps retracted trimmed condition, the force required for nose up pitch control will rapidly increase when power is reduced to idle and as flaps are fully extended. Timely trimming action should be accomplished to minimize forces.'

3. Caution during a go-around:

'From a flaps extended and power at idle trimmed condition, the force required for nose down pitch control will rapidly increase when Maximum Continuous Power (MCP) is applied and as flaps are fully retracted.'

4. The indicated airspeed on finals with full flap is 71 kt.

5. Initial airspeed on a go-around is 65 kt and flaps should be retracted once the climb is established.

6. The indicated stall speed with gear down, full flap and zero bank angle would be about 52 kt at the assessed aircraft weight of 2,500 lb. Note: The assessed weight and CG position were within normal flight limitations.

7. The electrical stall warning system uses a vane-actuated switch, installed in the left wing leading edge, to energise a stall warning horn located in the cabin. The stall warning provides an aural warning some 4 to 8 kt before the actual stall is reached and will remain on until the aircraft flight attitude is changed.

Analysis

In preparation for a possible move of location for his aircraft, the pilot had made reasonable plans for the move. He had reviewed the advice within LASORS '*Safety Sense 12 Strip Sense*' and arranged for a friend to accompany him on an initial flight to locate and survey the new site. The weather was suitable and the pilot had received permission from the airstrip operator. Prior to, and during the flight, there was no indication of any technical problem with G-DESS. Fortunately, both occupants survived the serious impact and both were very honest and open in their recollection of the events leading up to the accident.

The pilot had identified the airstrip and was established on his approach in the normal landing configuration. He was not aware of the elevation of the airstrip and so was relying on visual cues to determine his approach path. His recollection was that the aircraft was correctly trimmed at approximately 70 kt. Post-crash investigation confirmed that the aircraft had gear down and full flap extended at ground impact. The impact marks were also indicative of an incipient spin. It was apparent that control of the aircraft had been lost close to the point of the go-around. This was confirmed by the occupants' recollection of hearing the stall warning activate during the go-around and by the pilot's recollection of the aircraft rolling to the left. Following the loss of control, there was insufficient altitude to recover from the developing spin.

On approach, the pilot suddenly had the impression that he was too low and had immediately applied full power for a go-around. In that perceived situation, he made the correct decision but the manoeuvre resulted in a loss of control. Without exact information on the airspeed, pitch trim setting and the control input at the time, it was not possible to determine precisely the reason for the loss of control. However, GPS evaluation indicated that the airspeed may have been slowly decreasing over the last period of flight from approximately 80 kt to about 60 kt. Any reduction of airspeed below the normal approach speed of 71 kt would have resulted in a reduced margin from the stall speed of 52 kt.

Additionally, for any go-around, a pitch control input is required to stop the descent and start a climb. The force input required can be dependent on the existing pitch trim position. Post-crash analysis revealed a trim position, which would have resulted in a slight push force being required to keep the aircraft on the required flight path prior to the go-around. It is possible for this trim position to have been changed between the loss of control and impact. However, any such out of trim position could have resulted in a gradual speed reduction on approach and an increased tendency for the aircraft to pitch up during a go-around.

Finally, any change in engine power would require the use of rudder to keep the aircraft balanced. A rapid change of power would require a positive rudder input in the correct sense. Any imbalance would result in an unplanned roll / yaw and have an adverse effect on the stall speed.

In summary, it is likely that a go-around, initiated earlier and lower than planned, resulted in a stall and loss of control from which the pilot could not recover in the height available. It is possible that the airspeed had reduced below the target speed and, if the aircraft had been slightly mistrimmed, then the rapid application of power, together with any control input by the pilot, would have resulted in a rapid nose-up pitch change. The accident highlights the need for appropriate and detailed planning for all flights, using all available information and to consider possible problems. The information contained within *LASORS Safety Sense 12* is comprehensive and sensible.

Aircraft Type and Registration:	MW5D Sorcerer, G-MZEI
No & Type of Engines:	1 Rotax 503 piston engine
Year of Manufacture:	1997
Date & Time (UTC):	2 September 2004 at 1648 hrs
Location:	Belle Vue Farm, Great Torrington, Devon
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Serious) Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	63 years
Commander's Flying Experience:	420 hours (of which 10 were on microlights) Last 90 days - 5 hours Last 28 days - 3 hours
Information Source:	AAIB Field Investigation

Synopsis

The pilot had recently purchased the aircraft and on the day before the accident, he had assembled it and carried out some taxiing trials to familiarise himself with it. On the day of the accident the pilot once again confirmed that the aircraft was properly assembled and following further taxi practice, he elected to carry out his first flight on the type. The aircraft accelerated quickly and became airborne after what seemed like a short take-off run following which, the pilot experienced difficulty in controlling the aircraft, mainly in pitch but also in roll. Despite having inadvertently applied substantial nose-down trim before takeoff and having applied full forward control column after becoming airborne, the pilot was unable to lower the nose of the aircraft. After a short distance, the right wing dropped and the aircraft impacted the grass area to the north of the runway in an inverted attitude, seriously injuring the pilot.