



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8313	
Aircraft Registration	ZS-EUF	Date of Accident	21 Aug. 2007	Time of Accident	1540Z	
Type of Aircraft	Mooney M20F		Type of Operation	Private		
Pilot-in-command Licence Type		Private Pilot	Age	55	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	2315,2		Hours on Type	203,0
Last point of departure		Kimberley Aerodrome, Northern Cape				
Next point of intended landing		Kimberley Aerodrome, Northern Cape				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
On farm, approximately 5 km north west from Kimberley.						
Meteorological Information		Wind direction 020°/5kt; Temperature 20 °C; Visibility >10km; CAVOK				
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	0	
Synopsis						
<p>On 21 August 2007, at approximately 1540Z, the pilot who was the sole occupant onboard the aircraft, departed from Kimberley Aerodrome on a private flight in order to conduct some test circuits at the aerodrome.</p> <p>The pilot stated that after takeoff, the aircraft climbed to approximately 800 ft AGL when the engine started to splutter and stopped. He turned the boost pump on to restart the aircraft and identified a possible area for a forced landing. He then selected the opposite fuel tank and again attempted to restart the engine with the fuel mixture at full rich, and then leaned the mixture in case of flooding, but the engine failed to restart.</p> <p>The pilot immediately notified Kimberley ATC by way of a distress call prior to the forced landing on an open field. Upon landing on the grass surface with the undercarriage retracted, the left wingtip hit a tree, causing extensive damage to the aircraft.</p> <p>The pilot was not injured during the forced landing.</p>						
Probable cause						
<p>The engine failure was caused by fuel starvation due to fuel mismanagement.</p> <p>Contributory factor:</p> <p>Unsuccessful forced landing after engine stopped after takeoff due to fuel starvation.</p>						



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Coetzee WJ
Manufacturer : Mooney Aircraft Incorporated
Model : M20F
Nationality : South African
Registration Marks : ZS-EUF
Place : Kimberley Aerodrome
Date : 21 August 2007
Time : 1540Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (1997) this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and **not to establish legal liability.***

Disclaimer:

This report is given without prejudice to the rights of the CAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of flight

- 1.1.1 On 18 August 2007, the pilot departed from Kimberley Aerodrome to Plettenberg Bay on a private flight after the aircraft was refueled to its maximum capacity of 64 US galls. After an overnight stay at Plettenberg Bay, the pilot returned to Kimberley from Plettenberg Bay without putting any fuel into the aircraft.
- 1.1.2 During the return flight from Plettenberg Bay to Kimberley, the pilot experienced a rough-running engine for a few seconds. After an AMO inspected the engine on 20 August 2007 and carried out a satisfactory ground run on the engine, the pilot elected to fly some circuits with the aircraft the next day.
- 1.1.3 On 21 August 2007 at approximately 16h00, the pilot carried out a pre-flight inspection on the aircraft. As he could not visually observe the fuel level in the fuel tanks, he then shook the aircraft and heard fuel "sloshing" around in the tank.

According to the pilot, the left tank's fuel gauge indicated just over ¼ full and the right gauge just under ¼ full at the time.

- 1.1.4 As the pilot only intended to fly some circuits at Kimberley, he was therefore satisfied that the amount of fuel in the tanks was sufficient for the flight.
- 1.1.5 The pilot stated that after takeoff, the aircraft climbed to approximately 800 ft AGL when the engine spluttered and stopped just as he was about to turn to the left for downwind. He then turned the boost pump switch to 'ON' for a restart and identified a possible area for a forced landing. He then selected the opposite fuel tank, and attempted to restart the engine with the fuel mixture at full rich and then at a leaner mixture setting in case of flooding, but the engine failed to restart.
- 1.1.6 The pilot immediately notified Kimberley ATC by way of a distress call prior to the forced landing on an open field. Upon landing on the grass with the undercarriage retracted, the left wingtip hit a tree, causing extensive damage to the aircraft.
- 1.1.7 The pilot was not injured during the forced landing. The aircraft sustained extensive damage to the fuselage structure, wing and propeller, including the engine.

1.2 Injuries to persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	1	-	0	-

1.3 Damage to aircraft

- 1.3.1 The aircraft sustained extensive damage to the fuselage structure, the propeller and engine, and the left wing.



PHOTO 1: VIEW OF DAMAGE TO UNDERCARRIAGE, ENGINE AND LEFT WING

1.4 Other Damage

1.4.1 There was no other damage.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	55
Licence Number	*****	Licence Type	Private pilot		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Night Rating				
Medical Expiry Date	07 Sept. 2008				
Restrictions	Corrective lenses				
Previous Accidents	None				

Flying Experience:

Total Hours	2315,2
Total Past 90 Days	5,6
Total on Type Past 90 Days	5,6
Total on Type	203

1.6 Aircraft Information

1.6.1 Airframe:

Type	Mooney M20F	
Serial Number	670241	
Manufacturer	Mooney Aircraft Incorporated	
Date of Manufacture	1967	
Total Airframe Hours (At time of Accident)	4120,5	
Last MPI (Date & Hours)	02/08/2007	4104,0
Hours since Last MPI	16,5	
C of A (Issue Date)	22 December 1969	
C of A (Expiry Date)	21 December 2008	
C of R (Issue Date) (Present owner)	14 September 2007	
Operating Categories	Standard	

1.6.2 Engine:

Type	AVCO Lycoming IO-360-A1B6
Serial Number	L-7709-51A-C
Hours since New	4120,5
Hours since Overhaul	984,5

1.7 Meteorological Information

1.7.1 Weather information as obtained from the pilot questionnaire.

Wind direction	020 °M	Wind speed	5 kt	Visibility	>10 km
Temperature	20 °C	Cloud cover	None	Cloud base	N/A
Dew point	-				

1.8 Aids to Navigation

1.8.1 The aircraft was fitted with the standard navigational instrumentation for the aircraft type.

1.9 Communications

1.9.1 The aircraft was fitted with a standard very high frequency (VHF) radio. The pilot immediately notified Kimberley ATC by way of a distress call on RF 118,6 MHz.

1.10 Aerodrome Information

Aerodrome Location	Kimberley Aerodrome	
Aerodrome Co-ordinates	S 28°48'05" E 24°45'50"	
Aerodrome Elevation	3949 AMSL	
Runway Designations	02/20	10/28
Runway Dimensions	3000 x 46 m	2439 x 46
Runway in Use	02	
Runway Surface	Asphalt	
Approach Facilities	VOR, UHF/DME, NDB	

1.10.1 The pilot took off from Runway 02 at Kimberly Airport when the engine failed at approximately 800 ft AGL.

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a flight data recorder (FDR) or cockpit voice recorder (CVR), neither were these required to be fitted according to the regulations.

1.12 Wreckage and Impact Information

1.12.1 The pilot was committed to executing a forced landing on an open field after takeoff. The aircraft subsequently landed on its belly with the undercarriage retracted. The aircraft sustained extensive damage to the fuselage, left wing, engine and propeller.



PHOTO 2: VIEW OF AIRCRAFT LEFT WING, EXTENSIVELY DAMAGED

1.13 Medical and Pathological Information

1.13.1 The pilot was in possession of a valid medical certificate at the time of the accident.

1.14 Fire

1.14.1 There was no pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The accident was considered survivable as the pilot was properly restrained with a seat belt and fairly low impact forces were involved upon landing.

1.16 Tests and Research

1.16.1 During the on-site investigation, 15 liters (3,9 USG) of fuel was drained from the left wing tank and only 1 litre from the right wing tank. There were no ruptured fuel lines or fuel tank ruptures that would account for any post-accident loss.

1.16.2 The pilot did not use any reliable method of checking the remaining fuel quantity, other than hearing that there was fuel “sloshing around” in the tanks and noting that the cockpit fuel gauges indicated $\frac{1}{4}$ full on the left and just below $\frac{1}{4}$ on the right.

1.16.3 Considering that the aircraft has a useable tank capacity of 64 US gallons and that the engine fuel burn off is approximately 8,5 USG/h, the maximum endurance with no reserves would be around 7,5 hours. The pilot refueled the aircraft to capacity at a tachometer reading of 4113,4 hours and the tachometer reading at the time of the accident showed 4120,5 hours, thus giving an elapsed time of 7,1 hours.

1.16.4 The fuel selector system is a simple manual cock that feeds individually from either the left or the right tank as selected by the pilot. It appears that the pilot selected the right tank for takeoff, which coincidentally was the tank that contained the least amount of fuel. Almost immediately after takeoff, at a height of about 800 ft AGL, the engine stopped. Due to the low height above the ground, the pilot did not have sufficient time to attempt a restart.

1.16.5 The engine was recovered to an approved engine overhaul facility and ground tested on a test bench and found to be operating satisfactorily in all respects.



PHOTO 3: VIEW OF ENGINE TEST IN TEST STAND AT APPROVED ENGINEOVERHAUL FACILITY

1.17 Organizational and Management Information

1.17.1 This was a private flight.

1.17.2 The aircraft was properly maintained by an approved aircraft maintenance organization (AMO) which had a valid certificate at the time of the accident.

1.18 Additional Information

1.18.1 None.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

2.1 According to the pilot, the engine spluttered and stopped at a height of 800 ft AGL after takeoff.

2.2 According to available information, the aircraft was serviceable prior to the accident and no record of any malfunction or defect was recorded that could have contributed to the cause of the accident.

- 2.3 The engine was recovered to an aircraft engine overhaul facility at Grand Central Aerodrome for further investigation. The engine was tested on a test bench and found to be operating satisfactorily in all respects.
- 2.4 The pilot did not do a proper pre-flight inspection to ensure that he had a sufficient amount of fuel in the fuel tanks. In addition, it appeared that he selected the right hand tank for takeoff which was coincidentally the tank that contained the least amount of fuel. After the accident approximately 15 litres or 3,9 US galls were drained from the left tank, but only 1 litre of fuel from the right hand fuel tank.

3. CONCLUSION

3.1 Findings

- 3.1.1 According to SACAA records, the aircraft had a valid certificate of registration and a valid certificate of airworthiness.
- 3.1.2 The aircraft was maintained in accordance with approved regulations and procedures.
- 3.1.3 The pilot was correctly licensed and qualified for the flight and in possession of a valid medical certificate at the time of the accident.
- 3.1.4 The weather conditions were reported to be fine at the time of the accident.
- 3.1.5 The engine was inspected and functionally tested by an AMO and found to be operating satisfactorily in all respects.
- 3.1.6 The pilot selected the right hand tank for takeoff which was coincidentally the tank that contained the least amount of fuel, causing the engine to stop due to fuel starvation.

3.2 Probable Cause/s

- 3.2.1 The engine failure was caused by fuel starvation due to fuel mismanagement.

4. SAFETY RECOMMENDATIONS

4.1 None.

5. APPENDICES

5.1 None.

Report reviewed and amended by the Advisory Safety Panel on 20 April 2010.

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