



AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8874	
Aircraft Registration	ZS-LLA	Date of Accident	30 November 2010		Time of Accident	1330Z
Type of Aircraft	PA 46-310P (Piper Malibu)		Type of Operation		Private	
Pilot-in-command Licence Type		Commercial Pilot	Age	46	Licence Valid	Yes
Pilot-in-command Flying Experience		Total Flying Hours	1 153		Hours on Type	560
Last point of departure		Wonderboom aerodrome (FAWB), Gauteng				
Next point of intended landing		Wonderboom aerodrome (FAWB), Gauteng				
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)						
Open area of veld on the extended centreline of runway 29 at Wonderboom aerodrome (GPS position S25°39'8" E28°12'16")						
Meteorological Information		Wind: westerly at 8 kt; Temperature: 26°C; Dew point: unknown; Visibility: > 10 km; Clouds: scattered at 8 000 ft.				
Number of people on board	1 + 0	No. of people injured	0	No. of people killed	0	
Synopsis						
<p>The pilot took off from runway 29 at Wonderboom aerodrome on an acceptance flight following maintenance on the aircraft.</p> <p>Shortly after rotation, he experienced an engine failure and conducted a forced landing on an open area of veld on the extended centre line of runway 29. After touching down at speed, he realised that he was heading for trees, a concrete structure and telephone wires at the far edge of the open area. Unable to stop in time, he pulled up the nose of the aircraft and managed to clear the obstacles. He then struck the ground heavily. The nose wheel collapsed and the aircraft swung 90° before coming to a standstill.</p> <p>Damage was caused to the propeller, nose wheel and wings. The pilot did not sustain any injuries.</p>						
Probable Cause						
<p>Unsuccessful forced landing following an engine failure shortly after rotation.</p>						
IARC Date				Release Date		



AIRCRAFT ACCIDENT REPORT

Name of Owner/Operator : Leading Prospect Trading 38 (Pty) Ltd
Manufacturer : Piper Aircraft Corporation
Model : PA-46-310P
Nationality : South African
Registration Marks : ZS-LLA
Place : Open area of veld near Wonderboom aerodrome
Date : 30 November 2010
Time : 1330Z

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 two 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

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1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 The pilot, who was also the owner of the aircraft, took off from runway 29 at Wonderboom aerodrome on a private acceptance flight following maintenance on the aeroplane. The flight was conducted under visual meteorological conditions (VMC).
- 1.1.2 He stated that before takeoff he had completed all his engine and pre-flight checks, and had selected the right-hand fuel tank. The engine had performed normally during the checks.
- 1.1.3 On rotation, the engine failed. The pilot changed the fuel tank selector to the left tank but this made no difference. He selected a 40° flap setting and carried out a forced landing on an open area of veld on the extended centreline of runway 29.
- 1.1.4 After touching down at speed, he realised that he was heading for trees, a concrete structure and telephone wires at the far edge of the open area. Unable to stop in time, he pulled up the nose of the aircraft and managed to clear the obstacles. He then struck the ground heavily. The nose wheel collapsed and the aircraft swung 90° before coming to a standstill.
- 1.1.5 Damage was caused to the propeller, nose wheel and wings. The pilot did not sustain any injuries.



Figure 1. Accident path after the engine failure.

1.2 Injuries to Persons

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

1.3 Damage to Aircraft

1.3.1 Substantial damage was caused to the propeller, nose wheel and wings.



Figure 2. The aircraft after the accident.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Nationality	South African	Gender	Male	Age	46
Licence Number	0270470479	Licence Type	Commercial Pilot		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	Test pilot Class II; Night rating; Instrument rating.				
Medical Expiry Date	30 November 2011				
Restrictions	None				
Previous Accidents	None				

Flying Experience

Total Hours	1 153
Total Past 90 Days	25
Total on Type Past 90 Days	23
Total on Type	560

1.6 Aircraft Information

Airframe

Type	PA-46-310P	
Serial Number	46-8408006	
Manufacturer	Piper Aircraft Corporation	
Year of Manufacture	1983	
Total Airframe Hours (at time of accident)	1 985,6	
Last MPI (Date & Hours)	25 November 2010	1 985,5
Hours since last MPI	0,1	
C of A (Issue Date)	12 March 1984	
C of R (Issue Date) (Present Owner)	11 December 2002	
Operating Categories	Standard	

Engine

Type	Continental TSIO-520BE
Serial Number	528007
Hours since New	1 985,6
Hours since Overhaul	553,8

Propeller

Type	Hartzell BHC-C2YF-IBF
Serial Number	AM 2506
Hours since New	1 985,6
Hours since Overhaul	392,2

1.7 Meteorological Information

1.7.1 The following weather conditions at the time and place of the accident were obtained from the pilot's questionnaire.

Wind direction	Westerly	Wind speed	8 kt	Visibility	> 10 km
Temperature	26°C	Cloud cover	Scattered	Cloud base	8 000 ft
Dew point	Unknown				

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as per the minimum equipment list approved by the regulator. No defects to the equipment were recorded prior to the flight.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as per the minimum equipment list approved by the regulator. No defects to the equipment were recorded before the flight. The pilot transmitted a mayday call to Wonderboom tower on frequency 120,6 MHz.

1.10 Aerodrome Information

Aerodrome Location	Six Nm north of Pretoria	
Aerodrome Co-ordinates	S 25°39'19" E28°13'17"	
Aerodrome Elevation	4 095 ft	
Runway Designations	11/29	06/24
Runway Dimensions	1 828 m x 22 m	1 280 m x 22 m
Runway Used	29	
Runway Surface	Asphalt	
Approach Facilities	Runway light, PAPI, NDB	

1.11 Flight Recorders

1.11.1 The aircraft was not fitted with a cockpit voice recorder or flight data recorder. Neither was required by regulations to be fitted to this type of aircraft.

1.12 Wreckage and Impact Information

1.12.1 The accident sequence occurred along the extended centre line of runway 29. The first contact point with the ground was 450m beyond the end of runway 29 and the final impact point was 740m beyond the end of the runway. The aircraft came to rest on its nose after the nose wheel collapsed.

1.12.7 At the time of impact, the landing gear had been lowered and the flaps selected at 40°.

1.13 Medical and Pathological Information

1.12.1 The pilot did not sustain any injuries during the accident.

1.14 Fire

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

1.15 Survival Aspects

1.15 The accident was considered survivable due to the low kinetic energy of the impact and the fact that the pilot had been wearing the aircraft-equipped safety harness.

1.16 Tests and Research

1.16.1 A test run conducted on the engine after the accident revealed no abnormalities.

1.17 Organisational and Management Information

1.17 The last mandatory periodic inspection of the aircraft before the accident was certified on 25 November 2010 at 1 985,5 hours by a CAA-approved aircraft

maintenance organisation in possession of a valid AMO approval certificate.

1.18 Additional Information

1.18.1 Directly after the accident, while the aircraft was in a nose-down attitude, the fuel gauge indicated that the left tank held six gallons and the right was empty.

1.18.2 Once the aircraft was recovered and placed in a level attitude, the same gauge showed that the left tank held nine gallons and the right, eight.



Figure 3. Readings in a nose-down attitude.



Figure 4. Readings in a level attitude.

1.18.3 The airframe and engine fuel systems were inspected. No components were damaged and no abnormalities were found. No parts were replaced before the next phase – the engine test runs.

1.18.4 The aircraft was secured in a level attitude. The engine was started and then operated at all power settings. No difficulties or abnormalities were recorded.

1.18.5 The aeroplane was secured in the takeoff attitude and the engine tested again. No abnormalities were recorded.

1.18.6 During both ground runs, the fuel tank selector was switched from the left to the right tank without the engine misfiring or quitting. Only when OFF was selected did the engine stop.

1.18.7 The remaining fuel – approximately 27 l in each tank – was drained after the engine run. According to the pilot's operating handbook, one US gallon (about 3,8 l) of fuel in each tank is defined as unusable.

1.18.8 The pilot stated that he had taken off with the right-hand fuel tank selected, and when the engine failure occurred, had selected the left-hand tank. However, during the investigation immediately after the accident, the right-hand tank was found to be selected. The left-hand tank was selected for the engine test after the accident.



Figure 6. Position of the fuel tank selector immediately after the accident.

1.18.9 During the interview with the pilot on the day after the accident, the position of the fuel tank selector valve was discussed. The pilot then became unsure if the original selection had been the left or right tank. He said that he had been trying to rectify the engine problem and fly the aircraft simultaneously and could not recall his actions precisely.

He added that he had had no time to switch the electrical fuel pump to HIGH.

1.18.10 Fuel is stored in two main integral wing tanks, each holding 60 usable gallons and one unusable gallon. The fuel is gravity-fed to a collector tank located at the root of each wing. Reverse fuel flow from the collector tank to the main tank is prevented by two flapper check valves in each collector tank.

1.18.11 Each collector tank has a submerged, electric centrifugal pump for vapour suppression at altitude. It may be used during normal engine operation both on the ground and in the air when selected in the LOW position. An engine-driven fuel pump caters for normal fuel supply. When failure of the engine or engine-driven fuel pump is expected, the electric pump is used in the HIGH position to supply adequate fuel pressure.

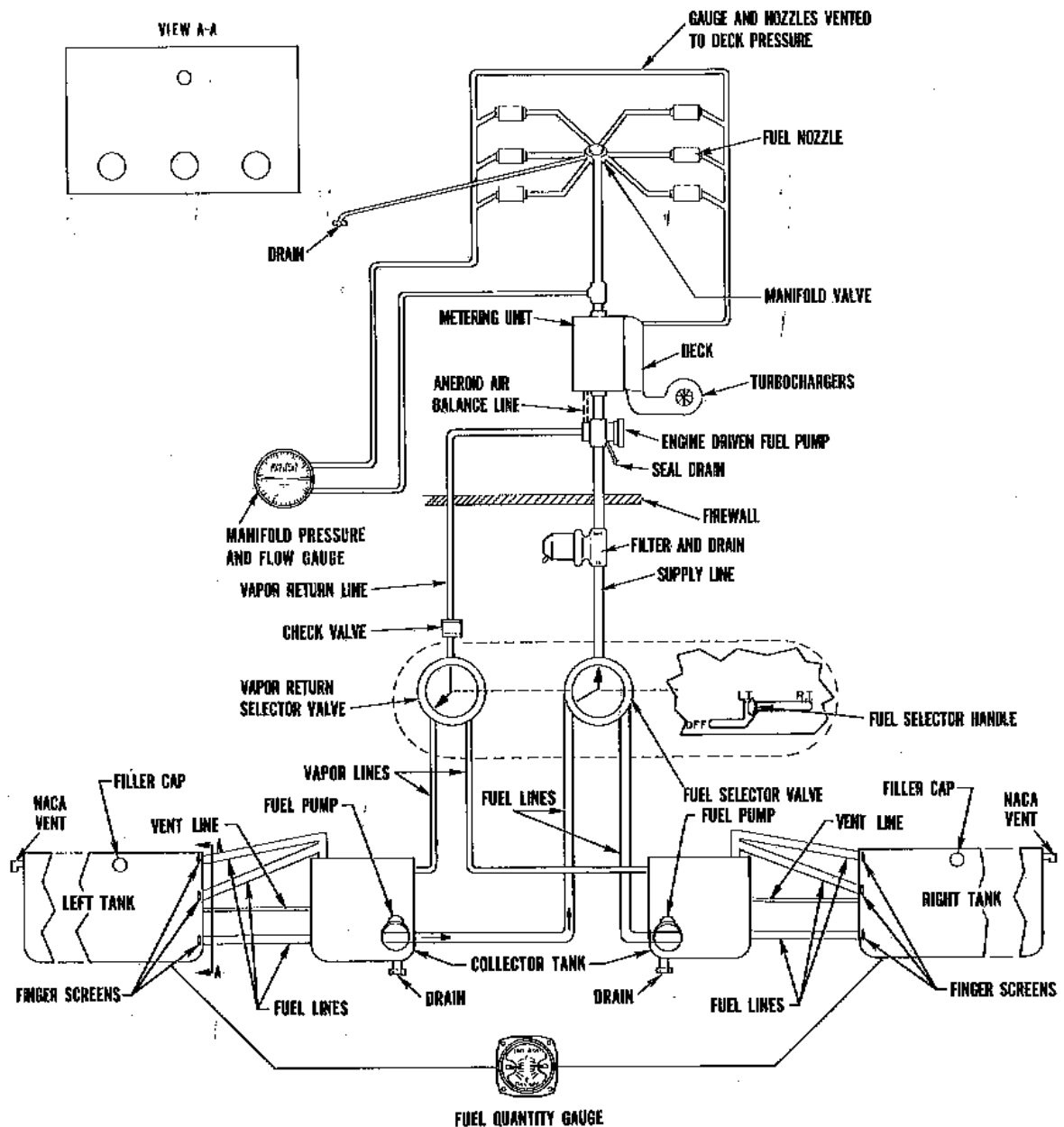


Figure 7. Diagram of Piper Malibu fuel system.

1.19 Useful or Effective Investigation Techniques

1.19.1 None

2. ANALYSIS

2.1 The pilot was the holder of a commercial pilot's licence that was valid at the time of the accident. He was also in possession of a valid medical certificate without any medical restrictions.

2.2 The pilot could not provide an accurate account of his actions while changing the

fuel selector valve after experiencing a problem with the engine.

- 2.3 Maintenance documents revealed that the last mandatory periodic inspection (MPI) on the aircraft was certified on 25 November 2010 at 1 985,5 airframe hours by an SACAA-approved aircraft maintenance organisation in possession of an approved AMO certificate.
- 2.4 After the accident, the engine was subjected to a test-run, during which it was operated at various power settings without abnormalities. The fuel selector valve (located on the instrument panel) was shifted from the left to the right tank without interfering with engine operation. Engine operation was interrupted only when the selector valve was moved to the OFF position; this caused the engine to stop.
- 2.5 Fine weather conditions prevailed at the time of the accident.

3. CONCLUSION

3.1 Findings

- 3.1 The pilot was properly certified and qualified to conduct the flight.
- 3.2 The aircraft was properly certified, equipped and maintained in accordance with current regulations.
- 3.3 Although the cause of the engine failure could not be determined, fuel mismanagement (moving the fuel selector to the OFF position) at the moment the emergency occurred, could not be ruled out.
- 3.4 The weather did not contribute to the accident.

3.2 Probable Cause/s

- 3.2.1 Unsuccessful forced landing following an engine failure shortly after rotation.

4. SAFETY RECOMMENDATIONS

- 4.1 None

5. APPENDICES

- 5.1 None

Compiled by

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Date:

For: Director of Civil Aviation

Investigator-in-charge:

Date:

Co-investigator:

Date: