



# AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/8691	
<b>Aircraft Registration</b>	<b>ZS-AKS</b>	<b>Date of Accident</b>	6 September 2009		<b>Time of Accident</b>	1330Z
<b>Type of Aircraft</b>	Piper Cherokee PA28-140		<b>Type of Operation</b>		Private	
<b>Pilot-in-command Licence Type</b>		Private	<b>Age</b>	29	<b>Licence Valid</b>	Yes
<b>Pilot-in-command Flying Experience</b>		Total Flying Hours	89.8		Hours on Type	44.5
<b>Last point of departure</b>		Rand Aerodrome (FAGM) (Gauteng province)				
<b>Next point of intended landing</b>		Rand Aerodrome (FAGM) (Gauteng province)				
<b>Location of the accident site with reference to easily defined geographical points (GPS readings if possible)</b>						
Vanderbijlpark. GPS position: S 26°34.26' E 027° 41.12' Elevation: 4 570 ft AMSL						
<b>Meteorological Information</b>		Temperature: 20°C; Cloud cover: Clear skies; Visibility: 10 km				
<b>Number of people on board</b>	1 + 1	<b>No. of people injured</b>	2	<b>No. of people killed</b>	0	
<b>Synopsis</b>						
<p>The pilot, accompanied by a passenger, took off from Rand airport on a private flight. Whilst orbiting at Vanderbijlpark (FAGM general flying area) at approximately 7 000 feet AMSL, the pilot reported that the engine had suddenly lost power and the aircraft could not maintain height.</p> <p>The passenger was immediately informed of the situation and the pilot identified a ploughed field for an emergency landing. The aeroplane landed hard on its right main gear, then on the left gear and nose gear simultaneously. The nose gear strut broke and the aircraft nosed over. The pilot and the passenger immediately unbuckled themselves and climbed out.</p> <p>The pilot and passenger both suffered minor injuries, and the aeroplane was substantially damaged.</p>						
<b>Probable Cause</b>						
Engine failure due to lack of maintenance resulting in unsuccessful forced landing						
IARC Date				Release Date		



## AIRCRAFT ACCIDENT REPORT

**Name of Owner/Operator** : Aero Precision CC  
**Manufacturer** : Piper Aircraft Corporation  
**Model** : Piper PA28-140  
**Nationality** : South African  
**Registration Marks** : ZS-AKS  
**Place** : Vanderbijlpark, Gauteng  
**Date** : 6 September 2009  
**Time** : 1330Z

*All times given in this report is 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 The pilot, accompanied by a passenger, took off at 1245Z from Rand aerodrome on a private flight with the intention of returning to the same aerodrome. Takeoff was uneventful. After about 40 minutes, whilst orbiting above Vanderbilpark in the FAGM General Flying Area at 7 000 ft AMSL the pilot reported that she had experienced a loss in engine power and could not maintain height.
- 1.1.2 The passenger was immediately informed of the situation. The pilot broadcast a Mayday call to Rand control tower and elected to execute an emergency landing on a gravel road. The aircraft was losing height at the time. As they approached the road, the pilot saw electric poles and a fence and she immediately turned slowly to the right towards a ploughed field. The aircraft landed hard on its right main gear, then on the left main gear and nose gear simultaneously. The field had just been ploughed, and the nose gear dug into the ground, the strut broke and the aeroplane nosed over.
- 1.1.3 The pilot and passenger immediately unbuckled themselves and climbed out. They both suffered minor injuries. The aircraft's nose strut broke, and wings, the engine cowling, the propeller blades and the tail section were substantially damaged. The pilot phoned the operator, who informed the police and paramedics. They were quickly on the scene to render assistance and secure the area. The pilot and passenger were taken to Union Hospital for treatment.

- 1.1.4 The accident occurred during daylight at the GPS coordinates South 26° 34.26' East 027°41.12', and at an elevation of 4 570 ft A MSL.

## 1.2 Injuries to Persons

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

## 1.3 Damage to Aircraft

- 1.3.1 The aircraft was substantially damaged.



Figure 1. The aircraft after nosing over in the ploughed field.

## 1.4 Other Damage

- 1.4 None.

## 1.5 Personnel Information

Nationality	Mauritian	Gender	Female	Age	29
Licence Number	*****	Licence Type	Private		
Licence valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 November 2009				
Restrictions	Nil				
Previous Accidents	None				

**Note:** The pilot was issued with a student pilot's licence on 28 November 2007 and a pilot private's licence on 7 May 2008.

#### Flying Experience

Total Hours	89.8
Total Past 90 Days	1.4
Total on Type Past 90 Days	1.4
Total on Type	44.5

### 1.6 Aircraft Information

Type	Piper Cherokee PA28-140	
Serial Number	28-23253	
Manufacturer	Piper Aircraft Corporation	
Date of Manufacture	1970	
Total Airframe Hours (At time of Accident)	9 204.3	
Last MPI (Date & Hours)	23 January 2009	9 135.1
Hours since Last MPI	69.2	
C of A (Issue Date)	4 January 1974	
C of A (Expiry Date)	3 January 2010	
C of R (Issue Date) (Present Owner)	26 August 2004	
Operating Categories	Standard	

- 1.6.1** This aircraft was owned by TAS Flight School CC whose Aviation Training Organisation (ATO) certificate and Aircraft Maintenance Organisation (AMO) approval were revoked by the SACAA. The aircraft was then leased to Aero Precision who applied for the inclusion of the aircraft on their operating certificate on 26 August 2009. The request was approved by SACAA. Aero Precision started operating the aircraft on 28 August 2009. The last MPI carried out on the aircraft prior the accident was certified on 23 January 2009 by the AMO whose approval was revoked by the SACAA. The last aircraft maintenance work pack could not be found during the investigation. The aircraft ownership has not been transferred to Aero Precision.

#### Engine

Type	Lycoming
Serial Number	L-28026-27A
Hours since New	Not known
Hours since Overhaul	Not known

#### Propeller

Type	Sensenich
Serial Number	A60953
Hours since New	Not known
Hours since Overhaul	Not known

## 1.7 Meteorological Information

Wind direction	South	Wind speed	10 knots	Visibility	10 km
Temperature	20°C	Cloud cover	Clear	Cloud base	None
Dew point	14°C				

## 1.8 Aids to Navigation

- 1.8.1 The aircraft was fitted with standard navigation equipment for this aircraft type as approved at the time of certification.

## 1.9 Communications

- 1.9.1 No difficulties with communication were reported prior to, or during, the accident flight.
- 1.9.2 The pilot broadcast an emergency call to FAGM control tower on 118.7 MHz.

## 1.10 Aerodrome Information

- 1.10.1 The accident occurred on a ploughed field at GPS coordinates South 26° 34.26' East 027° 41.12' at an elevation of 4 570 ft AMSL.

## 1.11 Flight Recorders

- 1.11.1 The aircraft was not fitted with a flight data recorder (FDR) or a cockpit voice recorder (CVR). Neither was required in terms of South African Civil Aviation regulations.

## 1.12 Wreckage and Impact Information

- 1.12.1 The accident occurred on a maize field. The wings, engine cowling, cabin roof and tail section were extensively damaged and the nose strut broke off.
- 1.12.2 The propeller showed signs of the engine operating at a low power setting at the time of impact. Both tanks were still intact and had enough fuel. Both flaps were extended.



**Figure 2.** First point of impact and the final position of the wreckage.

### **1.13 Medical and Pathological Information**

1.13.1 The pilot and the passenger sustained minor injuries.

1.13.2 The pilot was a holder of a valid aviation medical certificate without any restrictions.

### **1.14 Fire**

1.14.1 There was no evidence of a pre- or post-impact fire.

### **1.15 Survival Aspects**

1.15.1 The accident was considered survivable as there was no damage to the cockpit, and the pilot and passenger were properly restrained.

### **1.16 Tests and Research**

1.16.1 During the onsite investigation, fuel (AVGAS LL 100 for reciprocating engines) was found in both tanks. Fuel samples were taken from both tanks and analysed, and no abnormalities were found. The propeller hub was still intact and damage was limited to the blades. The aircraft was recovered to a CAA-approved AMO at Wonderboom aerodrome for further investigations under CAA supervision. The engine was removed from the airframe because the engine mountings were damaged during the accident sequence. The engine was transported to another CAA-approved AMO facility for analysis on a test bench under CAA supervision.

- 1.16.2 Before testing, the damaged propeller was replaced with a serviceable one. The engine was then replenished with oil and fuel, and started. It ran extremely roughly and could achieve only 1 000 RPM, and it was discovered that the engine was running on number 3 cylinder only.
- 1.16.3 Number 4 cylinder induction gasket was found to be missing and a new one was installed.
- 1.16.4 A thorough inspection was carried out on all the spark plugs. Those on number 3 cylinder were removed, inspected and found to be in a good condition. They were then reinstalled.
- 1.16.5 Six other spark plugs from the faulty cylinders – numbers 1, 2 and 4 – were removed. These were inspected and their insulator noses found to be covered with a thick brown/yellowish glazing. This glazing results from high engine loading after extended operation, becomes conductive and causes misfiring. The exterior of several of the plugs was also rusted.



**Figure 3.** The six spark plugs from cylinders 1, 2 and 4.

- 1.16.6 The spark plugs were cleaned, tested and found to be unserviceable. New spark plugs were then fitted. The engine was started and all parameters were met. The engine operated normally and power was increased in stages until it was evident that it was capable of operating at full power.

## **1.17 Organisational and Management Information**

- 1.17.1 This was a private flight.
- 1.17.2 The last Mandatory Periodic Inspection (MPI) carried out on the aircraft prior to the accident was certified on 23 January 2009 by a CAA approved AMO.
- 1.17.3 The application for inclusion of the aircraft on the ATO list was approved on 26 August 2009.

## **1.18 Additional Information**

- 1.18.1 This was a hire-and-fly (private) flight. The pilot hired the aircraft with the intention of building up her hours. The aircraft had done four flights of 1.5 hours each on the same day by different pilots before the accident flight. No abnormalities were experienced or reported during these first four flights.

## **1.19 Useful or Effective Investigation Techniques**

- 1.19.1 None

## **2. ANALYSIS**

- 2.1 The pilot, accompanied by a passenger, took off from Rand aerodrome on a private flight. Available information indicates that fine weather prevailed in the area at the time of the accident. The prevailing weather conditions were therefore not considered to have had any bearing on the accident.
- 2.2 The pilot was properly licensed and had flown a total of 44.5 hours on the aircraft type and a grand total of 89.8 hours.
- 2.3 While the aircraft was flying in the Rand General Flying Area, the pilot suddenly realised that the engine was losing power and the aircraft could not maintain height. The passenger was immediately informed of the situation and the pilot executed an emergency landing on a ploughed field. Because the field had just been ploughed, however, the nose landing gear dug into the ground and the aeroplane nosed over.
- 2.4 After the recovery of the aircraft, the aircraft log books were inspected and it was noted that the aircraft had been subjected to an MPI on 23 January 2009. This had been performed by a CAA-approved AMO, but the AMO had subsequently been closed by the CAA, and the last maintenance work pack could not be found during the investigation.
- 2.5 The aircraft was recovered to Wonderboom aerodrome for analysis under the CAA investigator's supervision. The engine was removed from the airframe, the damaged propeller replaced with a serviceable one and the engine run on a test bench.
- 2.6 It was discovered that the engine was operating on only one cylinder; the other three cylinders were not functioning due to faulty spark plugs, which caused abnormal combustion and subsequent loss of engine power. New spark plugs were fitted and the engine restarted. It then met all the parameters and power was increased in stages until it was evident that the engine was capable of operating at full power.
- 2.7 Although spark plugs and other ignition components sometimes fail before their scheduled service time, it is highly unlikely that these six spark plugs became unserviceable simultaneously. Of particular concern here is when last these spark plugs were replaced.

- 2.8 According to the manufacturer, spark plugs should be inspected and tested during every MPI, and if they are in good condition and still serviceable, they can continue to be used. From the condition of the sparkplugs in question, it appears that they were not replaced during the MPI on 23 January 2009 and therefore might have been in service for a considerable period. In conclusion, the engine failure was due to collective complacency by the AMO and the operator.

### **3. CONCLUSION**

#### **3.1 Findings**

- 3.1.1 The pilot was a holder of a valid private pilot's licence with the aircraft type endorsed in her logbook.
- 3.1.2 The pilot's medical was valid until 30 November 2009.
- 3.1.3 The pilot was involved in a private flight.
- 3.1.4 The pilot had no ratings at the time of the accident.
- 3.1.5 The aircraft was maintained in accordance with the approved maintenance schedule with the last MPI prior to the accident being certified on 23 January 2009 by a SACAA-approved AMO.
- 3.1.6 The AMO was last audited by the SACAA on 30 January 2009.
- 3.1.7 The AMO approval certificate expired on 1 August 2009.
- 3.1.8 The AMO approval was revoked by the SACAA.
- 3.1.9 The application for inclusion of the aircraft on the ATO list was approved on 26 August 2009.
- 3.1.10 The current ATO began operating this aircraft on 28 August 2009.
- 3.1.11 The flight was conducted in good weather conditions.

#### **3.2 Probable Cause/s**

- 3.2.1 Engine failure due to lack of maintenance resulting in unsuccessful forced landing.

### **4. SAFETY RECOMMENDATIONS**

- 4.1 It is recommended that the SACAA must verify the airworthiness status of all aircraft maintained over the past twelve months by the Aircraft Maintenance Organisation (AMO) whose approval was revoked.

## **5. APPENDICES**

5.1 None.

Report reviewed and amended by the Advisory Safety Panel on 19 January 2010  
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