

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10188



Figure 1: The Piper PA-28-140 aircraft, registered ZS-FWR (Source: FlightZone Aviation Photography)

Description:

On Monday morning, 11 July 2022, a flight instructor accompanied by a student pilot (who had a Private Pilot Licence) on-board a Piper PA-28-140 aircraft with registration ZS-FWR took off from Wonderboom Aerodrome (FAWB) in Gauteng province, to Witbank Aerodrome (FAWI) in Mpumalanga province. The duo performed several simulated variable omni-range (VOR) approaches at FAWI before they flew back to FAWB. During their return flight, they heard a noise emanating from the engine and, a few minutes later, they saw traces of engine oil on the top part of the engine cowling, after which a severe engine vibration ensued. As a result, they performed a forced landing on an open field.

Occurrence Details

Reference number : CA18/2/3/10188
Name of the operator : Thompson Aviation
Type of operation : Training (Part 141)
Manufacturer : Piper Aircraft Company
Model : PA-28-140
Nationality : South Africa
Registration marking : ZS-FWR
Place : Ezemvelo Nature Reserve, Gauteng Province
Date : 11 July 2022
Time : 1115Z

Purpose of the Investigation

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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 apportion blame or liability**.*

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.

Any person who has information concerning this accident should contact the Accident and Investigations Division (AIID) on AIIDinbox@caa.co.za

Investigation Process

The Accident and Incident Investigations Division (AIID) was informed of the accident via the email address: AIIDinbox@caa.co.za involving a Piper PA-28-140 that occurred at Ezemvelo Nature Reserve. The AIID appointed an investigator-in-charge (IIC) on 15 July 2022 who will lead the investigation and issue the final report.

The information contained in this preliminary report is derived from the factual information gathered during the on-going investigation into the occurrence. Later, an interim report or the final report may contain altered information in case new evidence is found during the on-going investigation that require changes to the information depicted in this report.

The AIID reports are made available to the public at:

<http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx>

Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:
 - Accident – this investigated accident
 - Aircraft – the Piper PA-28-140 involved in this accident
 - Investigation – the investigation into the circumstances of this accident
 - Pilot – the pilot involved in this accident
 - Report – this accident report

2. Photos and figures used in this report were obtained from different sources and may be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or the addition of text boxes, arrows or lines.

Disclaimer

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Abbreviations	Description
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMSL	Above Mean Sea Level
ATO	Approved Training Organisation
°C	Degrees Celsius
CAR	Civil Aviation Regulations
CAVOK	Cloud and Visibility OK
CFI	Chief Flight Instructor
CVR	Cockpit Voice Recorder
FAWB	Wonderboom Aerodrome (ICAO code)
FAWI	Witbank Aerodrome (ICAO code)
FDR	Flight Data Recorder
ft	feet
GFA	General Flying Area
GPS	Global Positioning System
hPa	Hectopascal
ICAO	International Civil Aviation Organisation
IIC	Investigator-in-charge
m	Metre
METAR	Meteorological Aerodrome Report
MHz	Megahertz
MPI	Mandatory Periodic Inspection
MTOW	Maximum Take-off Weight
nm	Nautical Miles
PIC	Pilot-in-command
POH	Pilot's Operating Handbook
QNH	Barometric Pressure Adjusted to Sea Level
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	Co-ordinated Universal Time
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	Variable Omni-range
Z	Zulu (Term for Universal Coordinated Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 On Monday morning, 11 July 2022, a Piper PA-28-140 aircraft with registration ZS-FWR was subjected to a systems check flight as the mandatory periodic inspection (MPI) had just been completed. The flight was conducted by a flight instructor from the approved training organisation (ATO) which owns the aircraft. No anomalies were noted during the flight, which lasted approximately 25 minutes.
- 1.1.2 Later the same morning, the aircraft was refuelled with 76 litres of Avgas at Wonderboom Aerodrome (FAWB). Shortly thereafter, the flight instructor, accompanied by a student pilot (with a Private Pilot Licence and who was training towards his Commercial Pilot Licence) boarded the aircraft and flew to Witbank Aerodrome (FAWI). The training flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011.
- 1.1.3 Upon reaching FAWI, the pair flew several simulated variable omni-range (VOR) approaches utilising the Whiskey India Victor (WIV) beacon, which included five holds and two full approaches and, thereafter, returned to FAWB. According to the crew, approximately 10 nautical miles (nm) west of FAWI they heard an unfamiliar noise emanating from the engine. They then removed their headsets to better assess the noise.
- 1.1.4 About 10 minutes later, the flight instructor stated that the engine started to vibrate. The crew then saw engine oil on the top part of the engine cowling. The flight instructor tried to call FAWB tower but could not get through as they were out of range. He then broadcasted on the very high frequency (VHF) 125.40-Megahertz (MHz) that they would be performing a forced landing on an open field due to engine trouble. The flight instructor took control of the aircraft and landed on an open field. During the landing roll, the left main wheel impacted an anthill and the entire wheel strut assembly (under the wing) broke off. No person was injured during the accident sequence.
- 1.1.5 The accident occurred during daylight on an open field at Ezemvelo Nature Reserve at Global Positioning System (GPS) co-ordinates determined to be: 25°42'16.31" South 028°55'41.65" East at an elevation of 4 641 feet (ft).

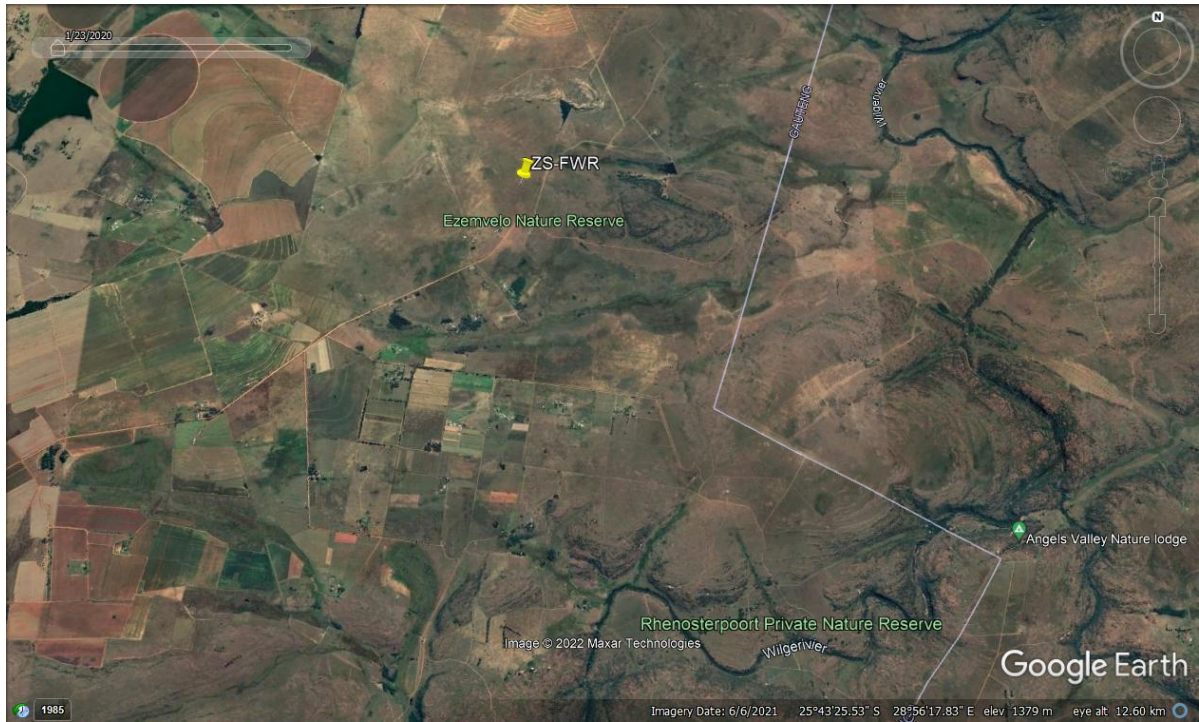


Figure 2: The accident site is indicated by the yellow pin ZS-FWR. (Source: Google Earth)

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	1	1	-	2	-
Total	1	1	-	2	-

1.3 Damage to Aircraft

- 1.3.1 Apart from the uncontained engine failure, the only other damage was caused to the left wing and the left main gear that broke off during impact with the anthill.



Figure 3: Damage to the engine crankcase.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC)

Nationality	Nigerian	Gender	Male	Age	27
Licence Type	Commercial Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Instructor Grade II				
Medical Expiry Date	31 July 2023 (Class 1)				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	1 560.0
Total Past 90 Days	170.0
Total on Type Past 90 Days	150.0
Total on Type	1 312.7

1.5.2 Private (Student) Pilot

Nationality	Zimbabwean	Gender	Male	Age	23
Licence Type	Private Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night				
Medical Expiry Date	31 May 2023 (Class 2)				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	208.0
Total Past 90 Days	35.8
Total on Type Past 90 Days	10.7
Total on Type	51.0

1.6 Aircraft Information

1.6.1 Aircraft description

The Piper PA-28-140 is a four-seat light aircraft built by Piper Aircraft and designed for flight training, air taxi and personal use. The PA-28 family of aircraft comprises all-metal, unpressurised, single-engine piston-powered with low-mounted wings and fixed tricycle landing gear. They have a single door on the right side; and one gains access into the aircraft by stepping onto the wing.

Airframe:

Manufacturer	Piper Aircraft Corporation	
Model	PA-28-140	
Serial Number	28-25326	
Year of Manufacture	1969	
Total Airframe Hours (at time of the accident)	12 538.0	
Last Maintenance Inspection (hours & date)	12 536.0	9 July 2022
Hours Since Last Inspection	2.0	
C of A (issue date)	13 June 1969	
C of A (expiry date)	30 June 2023	
C of R (issue date) (Present Owner)	30 October 1997	
MTOW	2 150 lbs (975kg)	
Type of fuel used	Avgas	
Operating Category	Standard Normal Aeroplane	

Engine:

Type	Lycoming O-320-D2A
Serial Number	L-10411-39A
Hours Since New	8 061.9
Hours Since Overhaul	1 413.7

Propeller:

Type	Sensenich 74DM6-0-58
Serial Number	A62378
Hours Since New	Not available
Hours Since Overhaul	814.9

1.7 Meteorological Information

1.7.1 The weather information entered in the table below was obtained from the pilot questionnaire.

Wind Direction	120°	Wind Speed	10-15kts	Visibility	9999m
Temperature	18°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	0°C	QNH	1024hPa		

1.7.2 The meteorological aerodrome report (METAR) for FAWB at 1100Z on 11 July 2022 indicated the following weather conditions:

FAWB 111100Z AUTO 25002KT //// // ///// 19/01 Q1024=

Wind Direction	250°	Wind Speed	2kts	Visibility	9999m
Temperature	19°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	1°C	QNH	1024hPa		

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records that indicated the navigational system was unserviceable prior to the flight.

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment as approved by the Regulator.

1.9.2 The pilot broadcasted his intentions on VHF 125.40MHz, stating that he will be performing a forced landing on an open field.

1.10 Aerodrome Information

1.10.1 The accident did not occur at or close to an aerodrome.

1.11 Flight Recorders

1.11.1 This aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required in accordance with the regulations.

1.12 Wreckage and Impact Information

1.12.1 The crew had identified an open field on which they elected to execute a forced landing. The touch down and initial ground roll went without difficulty, but later, the left main landing gear impacted an anthill and broke off, causing substantial damage to the left wing. The engine was also extensively damaged.



Figure 4: The aircraft as it came to rest. (Source: Pilot)



Figure 5: Damage to the left wing caused by the main gear strut that broke off. (Source: Pilot)



Figure 6: A view of the lower surface of the left wing post-recovery.



Figure 7: A closer view of the damaged crankcase.

1.13 Medical and Pathological Information

1.13.1 Not applicable.

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 survivable as the crew was properly restrained. Also, the cabin was not damaged.

1.16 Tests and Research

1.16.1 An engine teardown inspection is set to be conducted and the findings, thereof, would be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 This was a training flight conducted under the provisions of Part 141 of the CAR 2011. The ATO was issued an ATO certificate with an effective date of 1 December 2017 and an expiry date of 30 November 2022.

1.17.2 The last maintenance inspection that was carried out on this aircraft prior to the accident flight was certified on 8 July 2022 at 12 536.0 airframe hours by an approved aircraft maintenance organisation (AMO). A further 2.0 hours were flown using the aircraft since the said inspection.

1.17.3 The aircraft was maintained by the SACAA-approved AMO. The AMO-approval certificate was issued by the Regulator on 26 August 2021 with an expiry date of 31 August 2022.

1.18 Additional Information

1.18.1 To be discussed in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed in the final report.

2. Findings

2.1 General

From the evidence available, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings** — are statements of all significant conditions, events or circumstances in this accident. The findings are significant steps in this incident sequence, but they are not always causal or indicate deficiencies.

2.2 Findings

Although the investigation is on-going, the following provisional findings were made:

The crew

- 2.2.1 The flight instructor was in possession of a Commercial Pilot Licence (CPL). According to his logbook, he had flown a total of 1 560.0 hours, of which 1 312.7 hours were on the aircraft type.
- 2.2.2 The flight instructor was issued a Class 1 aviation medical certificate on 1 July 2022 with an expiry date of 31 July 2023.
- 2.2.3 The student pilot was in possession of a Private Pilot Licence (PPL). According to his logbook, he had flown a total of 208.0 hours, of which 51.0 hours were on the aircraft type.
- 2.2.4 The student pilot was issued a Class 2 aviation medical certificate on 14 May 2018 with an expiry date of 31 May 2023.

The aircraft

- 2.2.5 The aircraft was issued a Certificate of Airworthiness on 13 June 1969 with an expiry date of 30 June 2023.
- 2.2.6 The aircraft was issued a Certificate of Registration on 30 October 1997.
- 2.2.7 The last maintenance inspection carried out on the aircraft prior to the accident flight was certified on 8 July 2022 at 12 536.0 airframe hours. The aircraft had accumulated a further 2.0 airframe hours since the said inspection.
- 2.2.8 A Certificate of Release to Service was issued on 8 July 2022 with an expiry date of 8 July 2023 or at a total of 12 636.0 hours of flight time, whichever occurs first.
- 2.2.9 The engine suffered a catastrophic (uncontained) engine failure during the flight.

Approved Training Organisation (ATO)

- 2.2.10 The ATO was in possession of a valid certificate that was issued by the Regulator on 1 December 2017 with an expiry date of 30 November 2022.
- 2.2.11 The flight was accordingly authorised in the flight authorisation sheet.

Environment

- 2.2.12 Fine weather conditions prevailed at the time of the flight; the weather had no bearing on this accident.

3. On-going Investigation

- 3.1 The AIID investigation is on-going and will include all other aspects of this accident, which may or may not have safety implications.

4. Safety Recommendations

- 4.1 None.

5. Appendices

5.1 None.

**This report is issued by:
Accident and Incident Investigation Division
South African Civil Aviation Authority
Republic of South Africa**