PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10550

Figure 1: File picture of the Piper PA28-180 Cherokee ZS-MKY. (Source: www.jetphotos.com)

Description:

On Tuesday afternoon, 4 February 2025, a flight instructor and a pilot (with a Private Pilot Licence) on-board a Piper PA28A-180 aircraft with registration ZS-MKY took off on a navigational training flight from Wonderboom Aerodrome (FAWB) in Gauteng province with the intention to fly to Brits Aerodrome (FABS) and Pilanesberg Aerodrome (FAPN), both located in the North West province, before returning to FAWB.

The crew switched on the engine at 1230Z and spent 15 to 20 minutes conducting run-up checks. Thereafter, they took off at 1258Z from Runway 29 and headed west towards FABS. The crew completed their after-take-off checks after climbing to 300 feet (ft). At approximately 500 feet, the engine suddenly lost power, which caused the revolutions per minute (rpm) to drop to idle (from 2700 rpm to 1000 rpm). The flight instructor took control of the aircraft and attempted to troubleshoot the anomaly using different power settings. The engine surged briefly before it lost power again. The aircraft lost height and the instructor decided to land ahead of their path in Onderstepoort, Pretoria. The aircraft sustained damage to the left wing and the propeller blade. The crew was not injured.

Occurrence Details

Reference Number	**:** CA18/2/3/10550
Occurrence Category	**:** Category 2 (Accident)
Type of Operation	**:** Training (Part 141)
Name of Operator	**:** Thompson Aviation
Aircraft Registration	**:** ZS-MKY
Aircraft Make and Model	**:** Piper Aircraft Corp; PA28-180 Cherokee
Nationality	**:** South African
Place	**:** Onderstepoort, Pretoria
Date and Time	**:** 4 February 2025 at 1300Z
Injuries	**:** None
Damage	**:** Minor

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.

Investigation Process

The Accident and Incident Investigations Division (AIID) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence involving a Piper PA28-180 Cherokee which occurred in Onderstepoort, Pretoria, in Gauteng province, on 4 February 2024 at 1300Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions.

The AIID has appointed an investigator-in-charge to conduct a full investigation. The investigator did not dispatch to the accident site. Notifications was sent to the State of Registry, Operator, Design and Manufacturer in accordance with the CAR 2011 Part 12 and the ICAO Annex 13 Chapter 4. The States did not appoint an accredited representative and advisor. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and the ICAO Annex 13.

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

The AIID reports are made available to the public at:
https://www.caa.co.za/industry-information/accidents-and-incidents/

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Aircraft — the Piper PA28-180 Cherokee 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 taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

Table of Contents

Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
AMM	Aircraft Maintenance Manual
AMO	Aircraft Maintenance Organisation
CAR	Civil Aviation Regulation
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
E	East
FABS	Brits Aerodrome
FAPN	Pilanesberg Aerodrome
FAWB	Wonderboom Aerodrome
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
KM	Kliometre/s
kt	Knots
m	Metre/s
METAR	Meteorological Aerodrome Report
MHz	Megahertz
POH	Pilot's Operating Handbook
PPL	Private Pilot Licence
QNH	Query: Nautical Height
RPM	Revolutions per Minute
RWY	Runway
S	South
SACAR	South African Civil Aviation Regulations
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
SP	Student Pilot
VMC	Visual Meteorological Condition
UTC	Co-ordinated Universal Time
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Tuesday afternoon, 4 February 2025, a flight instructor and a pilot with a Private Pilot Licence (PPL) on-board a Piper PA28A-180 aircraft registered ZS-MKY took off on a navigational training flight from Wonderboom Aerodrome (FAWB) in Gauteng province with the intention to fly to Brits Aerodrome (FABS) and Pilanesberg Aerodrome (FAPN), both located in North West province, before returning to FAWB. The training flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2. The flight instructor reported that the aircraft was started at 1230Z, and that they spent 15 to 20 minutes performing the run-up checks. Thereafter, they took off at 1258Z from Runway 29 and headed west toward FABS. They completed the after-take-off checks after reaching an altitude of 300 feet (ft). At 500 feet, the engine lost power and the revolutions per minute (rpm) dropped to idle (from 2700 to 1000 rpm). The instructor took control of the aircraft and attempted to troubleshoot the anomaly by selecting different power settings, but there was no improvement to the engine performance. The engine surged for a short period and then lost power again. The aircraft began to descend and the instructor opted to land straight ahead of their path on a bushy terrain (densely vegetated) in Onderstepoort, Pretoria.

1.1.3. The pilot stated that the take-off and climb phases to 300 ft were uneventful. However, upon reaching 500 ft, he noticed the fluctuating rpm. Shortly after, the engine lost power. The pilot attempted to turn on the electrical fuel pump, but it had no effect to the engine's rpm. Thus, the flight instructor took control of the aircraft and conducted a forced landing.

1.1.4. The aircraft sustained damage to the left wing and the propeller blade. The crew was not injured.

1.1.5. The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 25°38'51.99" S 28°10'17.78" E, at an elevation of 3 999ft.

Figure 2: The aerial view of the accident site and the aerodrome. (Source: Google Earth Map)

1.2. Injuries to Persons

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

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. The left wing and the propeller blade sustained damage.

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

Flight Instructor

Nationality	South African	Gender	Male	Age	24
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instruments and Instructors Grade III				
Medical Expiry Date	31 May 2025				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	490.9
Total Past 24 Hours	0
Total Past 7 Days	4
Total Past 90 Days	73.5
Total on Type Past 90 Days	65.4
Total on Type	469.6

1.5.1. The flight instructor was initially issued a Commercial Pilot Licence (CPL) on 30 June 2023 under the provisions of Part 61 of the CAR 2011. The CPL was revalidated on 20 January 2025 with an expiry date of 31 January 2026.

1.5.2. The flight instructor was issued a Class 1 medical certificate on 30 May 2024 with an expiry date of 31 May 2025.

Pilot

Nationality	Nigerian	Gender	Male	Age	25
Licence Type	Private Pilot Licence (PPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	30 September 2029				
Restrictions	None				
Previous Accidents	None.				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	75.6
Total Past 24 Hours	0
Total Past 7 Days	0
Total Past 90 Days	11.3
Total on Type Past 90 Days	11.3
Total on Type	11.3

1.5.3. The pilot had a Private Pilot Licence (PPL) that was issued on 22 February 2022 with an expiry date of 28 February 2023. His Class 1 medical certificate was issued on 17 July 2021 with an expiry date of 31 July 2022 with no waivers.

1.6. Aircraft Information

(Source: Pilot's Operating Handbook)

1.6.1. *The Piper PA-28-180 Cherokee is a family of two-seat or four-seat light aircraft built by Piper Aircraft and designed for flight training, air taxi and personal use. The PA-28-180*

family of aircraft comprises all-metal, unpressurised, single piston-engine airplanes with low-mounted wings and tricycle fixed landing gear.

Airframe:

Manufacturer/Model	Piper PA-28-180	
Serial Number	28-1171	
Year of Manufacture	1964	
Total Airframe Hours (At Time of Accident)	3914.99	
Last Inspection (Date & Hours)	3 December 2024	3905.67
Hours Since Last Inspection	9.32	
CRS Issue Date	3 December 2024	
C of A (Issue Date & Expiry Date)	6 August 2024.	31 August 2025
C of R (Issue Date) (Present Owner)	30 October 2023	
Type of Fuel Used	Avgas 100LL	
Operating Category	Training (Part141)	
Previous Accidents	To be discussed in the final report	

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

The information below is an extract from the Pilot's Operating Handbook (POH)

Engine Power Loss:

The most common of engine power loss is mismanagement of the fuel. Therefore, the first step to take after engine power loss is to move the fuel selector valve to the tank not being used. This will often keep the engine running even if there is no apparent reason for the engine to stop on the tank being used. If changing to another tank does not restore the engine:

1. Check fuel pressure and turn on electrical fuel pump if OFF.

2. Push mixture control to full "RICH".

3. Check ignition switch. Turn to best operating magnetos left, right or both.

ENGINE POWER LOSS DURING TAKE-OFF

The proper action to be taken if loss of power occurs during take-off will depend on circumstances.

1. If sufficient runway remains for a normal landing, land straight ahead.

2. If insufficient runway remains, maintain a same airspeed and make only a shallow turn to avoid obstructions. Use of flaps depends on circumstances. Normally, flaps should be fully extended for touchdown.

3. If you have gained sufficient altitude to attempt a restart, proceed as follows:

a. MAINTAIN SAFE AIRSPEED

b. FUEL SELECTOR - SWITCH TO ANOTHER TANK CONTAINING FUEL

c. ELECTRIC FUEL PUMP - CHECK ON

d. MIXTURE - CHECK RICH

e. CARBURETOR HEAT – ON

Engine:

Manufacturer/Model	Lycoming/0-360-A3A
Serial Number	L-5785-36
Hours Since New	TBA
Hours Since Overhaul	TBA

1.6.2. According to the Aircraft Maintenance Manual (AMM), the engine time between overhaul (TBO) is 2000 hours.

1.6.3. The information below is an extract from the POH:

Lycoming carburetted engines rely on a carburettor to mix fuel and air, with a venturi creating a pressure drop to atomise fuel before it enters the cylinders. These engines are typically four-stroke, horizontally opposed, air-cooled, and naturally aspirated, offering a compact design that enhances aerodynamics. These engines use a dual magneto ignition system for redundancy and reliability, along with manual mixture control to optimise fuel burn at varying altitudes. However, carburettor icing can be an issue due to fuel vaporisation cooling the carburettor throat, necessitating a carb heat system to prevent ice formation. Most models rely on ambient air for cooling, minimising weight and complexity, though some versions feature turbocharging for better high-altitude performance.

Figure 3: The Lycoming engine.

Propeller:

Manufacturer/Model	Sensenich/76EM
Serial Number	102068K855-0-60
Hours Since New	TBA
Hours Since Overhaul	TBA

1.6.4. According to the manufacturer's guidelines, the time between overhaul for the propeller (TBO) is 2000 hours.

1.7. Meteorological Information

1.7.1. The weather information below was obtained from the Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS), recorded at FAWB on 4 February 2024 at 1300Z. FAWB is located 7 kilometres from the accident site.

Wind Direction	270°	Wind Speed	05kt	Visibility	9999m
Temperature	32°C	Cloud Cover	SCT	Cloud Base	2400
Dew Point	18°C	QNH	1018hPa		

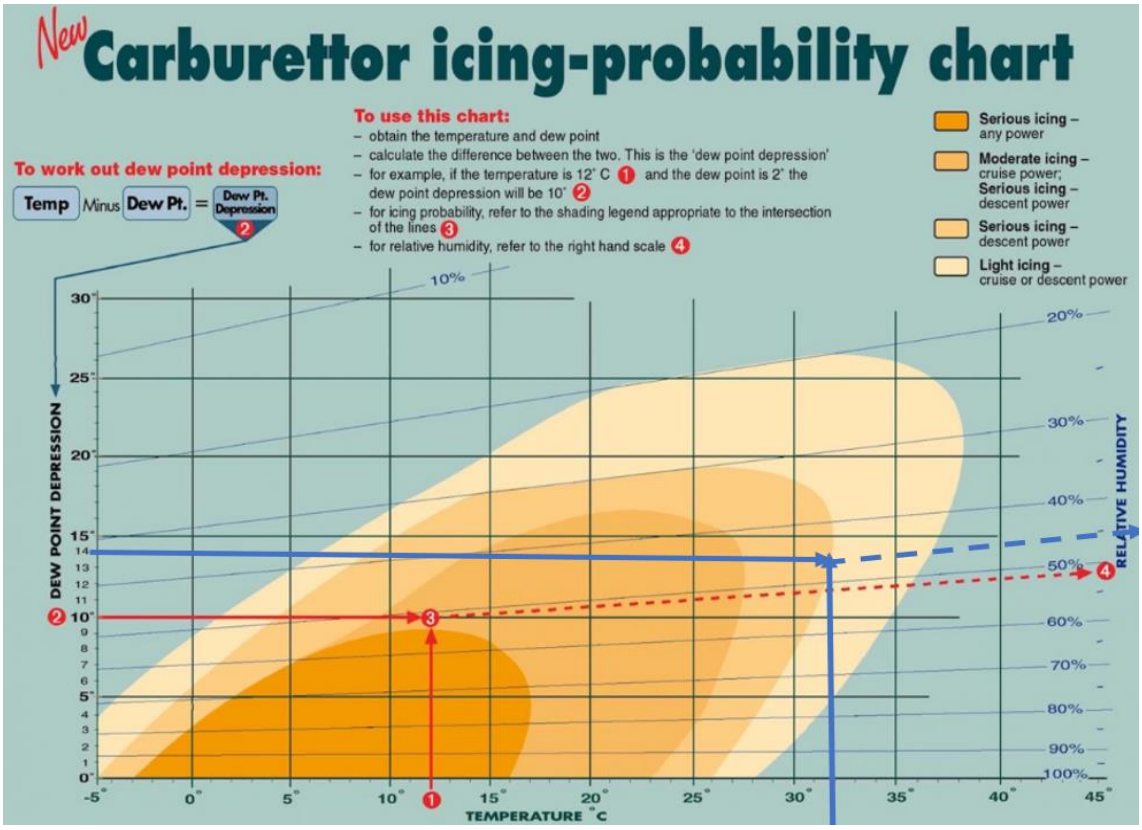


Figure 4 - Icing-probability Chart.

1.7.2. The carburettor icing probability chart on the day of the flight indicated a dew point depression of 14°C with an air temperature of 32°C and a dew point of 18°C at a relative humidity of 45%. The aircraft was in the climb phase at these icing-probability chart calculations.

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 indicating that the navigational equipment was unserviceable prior to the flight.

1.9. Communication

1.9.1. The aircraft was equipped with a standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the flight.

1.10. Aerodrome Information

1.10.1. The crew took off from FAWB with the intention to land at the same aerodrome after routing to FABS and FAPN.

Aerodrome Name	Wonderboom Aerodrome
Aerodrome Location	Wonderboom, Pretoria
Aerodrome Status	Licensed
Aerodrome GPS co-ordinates	25°38'51.99" S 28°10'17.78" E
Aerodrome Elevation	4070 ft
Runway Headings	273.2°/93.2°
Dimensions of Runway Used	1 828m x 30m
Heading of Runway Used	273.2°
Surface of Runway Used	Asphalt
Approach Facilities	VOR/DME NDB approaches, RNAV/GNSS approaches and a VOR/DME
Radio Frequency	257.5MHz

1.11. Flight Recorders

1.11.1. The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the aircraft type.

1.12. Wreckage and Impact Information

1.12.1. The flight instructor executed a forced landing in Onderstepoort, Pretoria, approximately 7 kilometres west of Runway 29. The aircraft landed in a densely vegetated area.

Figure 5: The aircraft at the accident side. (Source: Operator)

1.12.2. The left wing and the propeller were damaged during the forced landing. The aircraft was retrieved in its entirety without being disassembled. It remained structurally intact as it was found, ensuring that all components were preserved in their original condition for further examination.

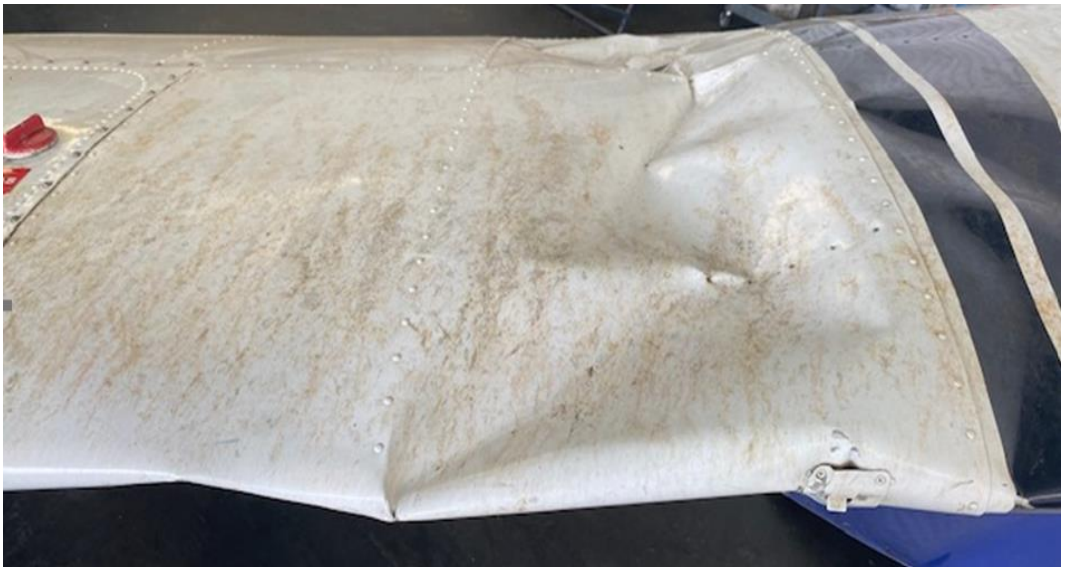


Figure 6: The damaged left wing.

Figure 7: The bent propeller blade.

1.13. Medical and Pathological Information

1.13.1. None.

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 there was no damage to the cockpit and cabin areas that would have caused serious injury to the crew. The crew had their safety harnesses on during the flight, and they did not fail during the accident sequence.

Figure 8: A view of the cockpit after the accident. (Source: Operator)

1.16. Tests and Research

1.16.1. To be discussed in the final report.

1.17. Organisational and Management Information

1.17.1. This was a training flight operated under the provisions of Part 141 of the CAR 2011 as amended.

1.17.2. The Approved Training Organisation (ATO) was issued an Approved Training Organisation Certificate on 28 September 2022 with an expiry date of 30 November 2027. The training operation (Part 141) and the aircraft type were endorsed on the certificate.

1.17.3. The aircraft was maintained by an approved aircraft maintenance organisation (AMO). The AMO was issued an AMO Certificate on 14 August 2024 with an expiry date of 31 August 2025.

1.18. **Additional Information**

1.18.1. To be discussed in the final report.

1.19. **Useful or Effective Investigation Techniques**

1.19.1. None.

2. FINDINGS

2.1. **General**

From the available evidence, the following preliminary findings were made with respect to this accident. These shall not be read as apportioning blame or liability to any 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 accident sequence, but they are not always causal or indicate deficiencies.

2.2. **Findings**

Pilots

2.2.1. The flight instructor had a Commercial Pilot Licence (CPL) that was issued on 30 June 2023 under the provisions of Part 61 of the CAR 2011. The licence was revalidated on 20 January 2025 with an expiry date of 31 January 2026.

2.2.2. The flight instructor had a Class 1 medical certificate that was issued on 30 May 2024 with an expiry date of 31 May 2025. The flight instructor was properly certified and medically fit to undertake the flight.

2.2.3. The pilot on training had a Private Pilot Licence (PPL) that was issued on 22 February 2022 with an expiry date of 28 February 2023. His Class 1 medical certificate was issued on 17 July 2021 with an expiry date of 31 July 2022 with no waivers.

Aircraft

2.2.4. The flight was conducted in accordance with the provisions of Part 141 of the South African Civil Aviation Regulations 2011 as amended.

2.2.5. The aircraft was issued a Certificate of Registration (C of R) on 30 October 2023.

2.2.6. The aircraft was maintained by an approved aircraft maintenance organisation (AMO). The AMO had an AMO Certificate that was issued on 14 August 2024 with an expiry date of 31 August 2025.

2.2.7. The aircraft had a Certificate of Airworthiness (C of A) that was issued on 6 August 2024. The latest C of A had an expiry date of 31 August 2025.

2.2.8. The last annual inspection of the aircraft was conducted and certified on 3 December 2024 at 3905.67 airframe hours. The accident occurred at 3914.99 total airframe hours, which meant that the aircraft had accrued 9.32 airframe hours since the last annual inspection.

2.2.9. The aircraft had a Certificate of Release to Service (CRS) that was issued on 21 June 2024 at 44 465.44 airframe hours with an expiry date of 12 January 2025 or at 44 960.10 airframe hours, whichever occurs first. No defects were recorded in the flight folio at the time of the flight. The aircraft was airworthy when it was dispatched for the flight.

2.2.10. The ATO had an Approved Training Organisation Certificate that was issued on 13 November 2024 with an expiry date of 30 November 2027. The training operations (Part 141) and the aircraft type were endorsed on the ATO's operations specifications.

2.2.11. During the climb phase, the aircraft lost engine power and the flight instructor took control of the aircraft and conducted the fault-finding procedures in accordance with the POH, but with no success. He executed a forced landing in Onderstepoort and landed in a densely vegetated area.

2.2.12. The engine is scheduled to undergo tests and inspections.

Environment

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

Aerodrome

2.2.14. FAWB is a licensed aerodrome with two runways. The pilot used Runway 29 for take-off, which is 1 828m long and 30m wide. The crew had planned to land back at the same aerodrome.

3. ON-GOING INVESTIGATION

3.1. The AIID investigation is on-going and the investigator will look into other aspects of this occurrence which may or may not have safety implications.

4. SAFETY RECOMMENDATIONS

4.1. **General**

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2. **Safety Recommendation/s**

4.2.1. To be discussed in the final report.

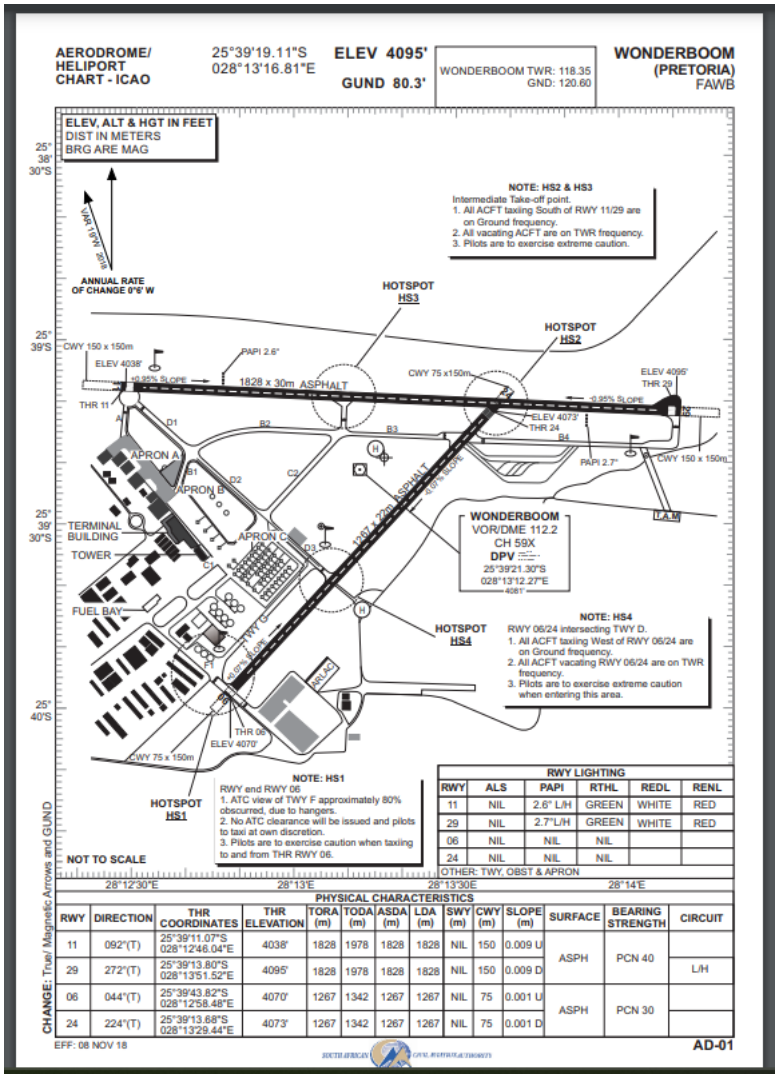
5. APPENDICES

5.1. Appendix A: FAWB layout chart

This report is issued by:

Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa

Appendix A


AERODROME/ HELIPORT CHART - ICAO
25°39'19.11"S 028°13'16.81"E
ELEV 4095'
GUND 80.3'
WONDERBOOM TWR: 118.35 GND: 120.60
WONDERBOOM (PRETORIA) FAWB
ELEV, ALT & HGT IN FEET
DIST IN METERS
BRG ARE MAG
ANNUAL RATE OF CHANGE 0°6' W
NOTE: HS2 & HS3
Intermediate Take-off point.
1. All ACFT taxiing South of RWY 11/29 are on Ground frequency.
2. All vacating ACFT are on TWR frequency.
3. Pilots are to exercise extreme caution.
HOTSPOT HS3
HOTSPOT HS2
CWY 150 x 150m
ELEV 4038'
PAPI 2.6°
+0.95% SLOPE
1828 x 30m ASPHALT
CWY 75 x150m
ELEV 4095'
THR 29
-0.95% SLOPE
THR 11
ELEV 4073'
THR 24
PAPI 2.7°
CWY 150 x 150m
APRON A
APRON B
APRON C
TERMINAL BUILDING
TOWER
FUEL BAY
WONDERBOOM
VOR/DME 112.2
CH 59X
DPV
25°39'21.30"S
028°13'12.27"E
408°
NOTE: HS4
RWY 06/24 intersecting TWY D.
1. All ACFT taxiing West of RWY 06/24 are on Ground frequency.
2. All ACFT vacating RWY 06/24 are on TWR frequency.
3. Pilots are to exercise extreme caution when entering this area.
HOTSPOT HS4
THR 06
ELEV 4070'
CWY 75 x 150m
HOTSPOT HS1
NOTE: HS1
RWY end RWY 06
1. ATC view of TWY F approximately 80% obscurred, due to hangers.
2. No ATC clearance will be issued and pilots to taxi at own discretion.
3. Pilots are to exercise caution when taxiing to and from THR RWY 06.
NOT TO SCALE
RWY LIGHTING
RWY ALS PAPI RTHL REDL RENL
11 NIL 2.6° L/H GREEN WHITE RED
29 NIL 2.7°L/H GREEN WHITE RED
06 NIL NIL NIL
24 NIL NIL NIL
OTHER: TWY, OBST & APRON
28°12'30"E 28°13'E 28°13'30"E 28°14'E
PHYSICAL CHARACTERISTICS
RWY DIRECTION THR COORDINATES THR ELEVATION TORA (m) TODA (m) ASDA (m) LDA (m) SWY (m) CWY (m) SLOPE (m) SURFACE BEARING STRENGTH CIRCUIT
11 092°(T) 25°39'11.07"S 028°12'46.04"E 4038' 1828 1978 1828 1828 NIL 150 0.009 U ASPH PCN 40
29 272°(T) 25°39'13.80"S 028°13'51.52"E 4095' 1828 1978 1828 1828 NIL 150 0.009 D L/H
06 044°(T) 25°39'43.82"S 028°12'58.48"E 4070' 1267 1342 1267 1267 NIL 75 0.001 U ASPH PCN 30
24 224°(T) 25°39'13.68"S 028°13'29.44"E 4073' 1267 1342 1267 1267 NIL 75 0.001 D
CHANGE: True/ Magnetic Arrows and GUND
EFF: 08 NOV 18
AD-01