SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – DRAFT

Reference Number	CA18/3/2/1475						
Classification	Serious Incident	**Date**	27 April 2025		**Time**	0558Z	
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Cape Winelands Aerodrome (FAWN), Western Cape Province	Place of Intended Landing	Cape Winelands Aerodrome (FAWN), Western Cape Province				
Place of Occurrence	On a farmland, approximately 3 nautical miles (nm) north-east of Cape Winelands Aerodrome						
GPS Co-ordinates	Latitude	33° 45' 34.05" S	Longitude	018° 44' 49.07" E	Elevation	308.4ft	
Aircraft Information							
Registration	ZS-FWR						
Make; Model; S/N	Piper; PA-28-140 Cherokee (Serial Number: 28-25326)						
Damage to Aircraft	None	Total Aircraft Hours	12 730.63				
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL)	Gender	Male	Age	28		
Licence Valid	Yes	Total Hours	513.7	Total Hours on Type	420.3		
Total Hours 30 Days	57.7	Total Flying on Type Past 90 Days	82.7				
People On-board	2+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Sunday morning, 27 April 2025, a flight instructor (FI) and a student pilot (SP) on-board a Piper PA-28-140 aircraft with registration ZS-FWR were conducting a training flight from Cape Winelands Aerodrome (FAWN) in Western Cape province with the intention to land back at the same aerodrome. The flight was conducted under visual meteorological conditions (VMC) and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot's pre-flight checks confirmed that the aircraft had about 140 litres (L) of Avgas. The dipstick oil indication amount was at level six, which was within the normal operational range.

The FI stated that the aircraft took off from Runway 05 at approximately 0550Z. The engine was operated at 2 500 revolutions per minute (RPM), and the aircraft maintained an airspeed of approximately 65 knots (kts). The initial phase of the flight proceeded normally.

The crew conducted a standard circuit as part of the routine training, followed by a successful touch-and-go landing exercise on Runway 05. After the second take-off, the aircraft flew another circuit and, on final approach, the FI initiated a simulated engine failure exercise. *This involved reducing*

the engine power to simulate an engine failure as well as referencing the emergency procedures before increasing power to recover the aircraft. However, when the crew increased power to exit the simulation, the engine power could not be restored and the engine misfired, ran rough and lost power.

The FI declared a "PAN-PAN" call to FAWN air traffic control (ATC) on frequency 131.10-Megahertz (MHz). *The PAN PAN indicates an urgent situation that requires assistance*. He then diverted the aircraft towards FAWN whilst completing the fault-finding checks but was unable to restore the engine power. Therefore, he executed a forced landing on an identified suitable open area on a farmland that was within the aircraft's gliding range after he had notified the ATC personnel of his intention. The forced landing was executed safely without incident. Neither the FI nor the SP sustained injuries during the forced landing. After the crew had secured the aircraft, they safely disembarked from it.

A post-landing inspection did not reveal damage to the aircraft. Furthermore, the fuel level was checked and approximately 128L remained in the tanks.

The serious incident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 33° 45' 34.05" South 018° 44' 49.07" East, at an elevation of 308.4 feet (ft).

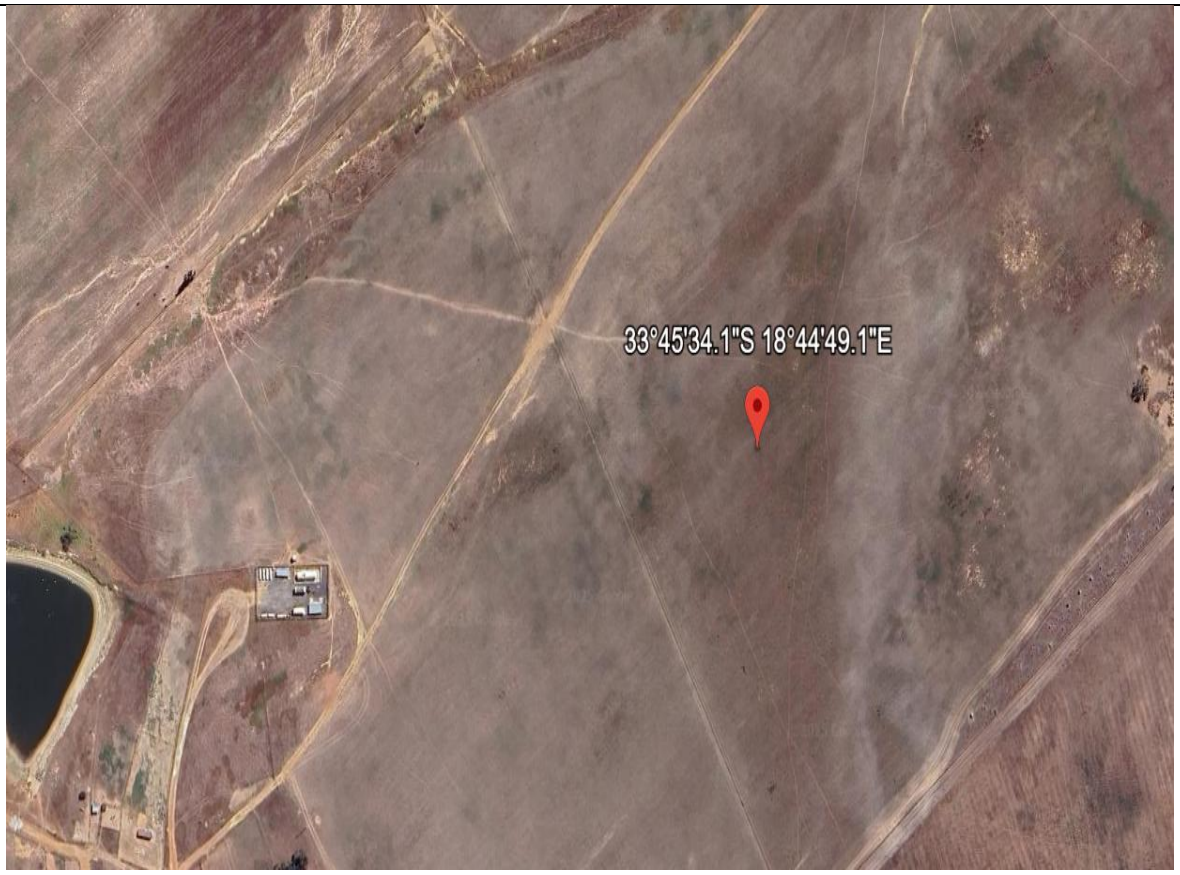

Figure 1: Aerial view of the approximate serious incident site. (Source: Google Earth)

Figure 2: The aircraft came to rest on the farmland. (Source: ATO)

Figure 3: The track marks that were made by the aircraft before it stopped. (Source: ATO)

Post-serious Incident Investigation

An engineer who inspected the aircraft's engine to determine the cause of power loss discovered that the right magneto had failed. This, therefore, corresponded with the indicators that were reported by the FI (engine running rough, misfiring and power loss).

A serviceable replacement magneto was installed on-site. After the installation, the engine was ground-run and it performed satisfactorily with no further anomalies noted. The engine parameters were within the normal operating limits during the test.

During the inspection, a scat hose which routes air from the engine cowl to the carburettor intake, was found detached. The investigation concluded that this detachment was a result of the engine backfiring due to the magneto failure, rather than it being the initial cause of the engine power loss. The hose and the associated fittings were checked and re-secured as part of the rectification process.

The aircraft was recovered by road to FAWN for further inspection.

An aircraft maintenance organisation (AMO) that was approved by the South African Civil Aviation Authority (SACAA) inspected the failed right-side magneto. The AMO determined that a broken distributor gear within the magneto (Figure 4) was the root cause of the failure. This internal mechanical failure rendered the magneto inoperative and was the direct cause of the engine malfunction during the flight.

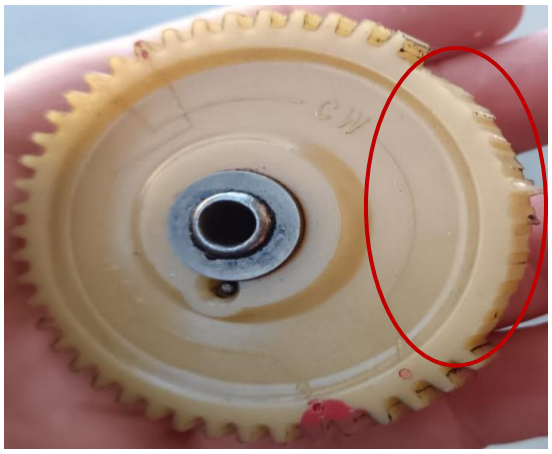

Figure 4: The magneto distributor gear. The red oval shows the broken distributor gear. (Source: AMO)

As part of the rectification process, the AMO performed a 500-hour/4-year inspection on both magnetos in line with the applicable maintenance schedules and airworthiness requirements (Figures 5 and 6). The magnetos were deemed serviceable, and a Certificate of Release to Service for both magnetos was issued on 30 April 2025.

6.Item:	7.Description:	8.Part Number:	9.Eligibility:	10.Quantity:	11. Serial/Batch Number:	12.Status/Work:
1	500hr /4yr Inspection on Magneto	10-163045-3	N/A	1	42329	Service

13.Remarks:

Stripped and inspected. Cleaned all hardware. Tested coil and condenser. Found distributor gear broken. Replaced parts. Set E-Gap and Internal timing. Re-greased and oiled bushes. Re-assembled and bench tested. Unit found serviceable.

Figure 5: Magneto release certificate. (Source: AMO)

6.Item:	7.Description:	8.Part Number:	9.Eligibility:	10.Quantity:	11. Serial/Batch Number:	12.Status/Work:
1	500hr /4yr Inspection on Magneto	10-51360-45	N/A	1	991440	Service

13.Remarks:

Stripped and inspected. Cleaned all hardware. Tested coil and condenser. Replaced parts. Set E-Gap and Internal timing. Re-greased and oiled bushes. Re-assembled and bench tested. Unit found serviceable.

Figure 6: Magneto release certificate. (Source: AMO)

The forced landing was attributed to the failure of one of the magnetos which caused the engine to run rough and lose power. The subsequent backfiring caused the detachment of the scat hose, which was a secondary effect rather than the primary cause of the serious incident.

Findings

1. Personnel Information

1.1. The FI had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator (SACAA) on 20 January 2023. The licence was reissued on 22 February 2025 with an expiry date of 28 February 2026. The FI had flown a total of 513.7 hours of which 420.3 hours were on the aircraft type. The aircraft type was endorsed on the FI's licence.

1.2. The FI had a Class 1 aviation medical certificate that was issued on 22 January 2025 with an expiry date of 31 January 2026 with no medical restrictions.

1.3. The FI obtained the Grade 3 Instructor Rating on 22 February 2025 with an expiry date of 31 March 2026.

1.4. The SP had a Student Pilot Licence (SPL) that was issued by the Regulator on 5 February 2025 with an expiry date of 4 February 2026. The SP had flown a total of 15.7 hours of which 7.4 hours were on the aircraft type.

1.5. The SP had a Class 2 aviation medical certificate that was issued on 28 January 2025 with an expiry date of 31 January 2030 with no medical restrictions.

2. Aircraft information

2.1. The AMO that maintained the aircraft was approved by the SACAA. The aircraft's latest maintenance inspection was certified on 20 March 2025 at 12 638.36 total airframe hours. The aircraft was flown a further 92.27 hours since the last maintenance inspection.

2.2. The aircraft was issued a Certificate of Release to Service (CRS) on 20 March 2025 with an expiry date of 19 March 2026 or at 12 738.36 airframe hours, whichever occurs first.

2.3. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 13 June 1969. The latest C of A had an expiry date of 4 December 2025.

2.4. The aircraft's Certificate of Registration (C of R) was issued to the present owner on 22 January 2025.

2.5. The aircraft's engine ran rough and lost power in-flight during training. A failed magneto was identified as the cause and was replaced with a serviceable unit. The engine ran normally during ground testing.

2.6. A scat hose was found detached, and it was determined that it had dislodged when the engine backfired due to the failed magneto.

2.7. A detailed examination by the AMO identified a broken distributor gear in the magneto as the cause of the failure.

2.8. The CRS for both magnetos was issued on 30 April 2025.

3. Environmental Information

3.1. The weather conditions did not contribute to this serious incident.

Probable Cause(s)

The mechanical failure of the right magneto due to the breakdown of the distributor gear caused the engine to misfire and lose power.

Contributing Factor(s)

1. Detachment of the scat hose.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

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
In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, 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.
Disclaimer
This report is produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

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