PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10165

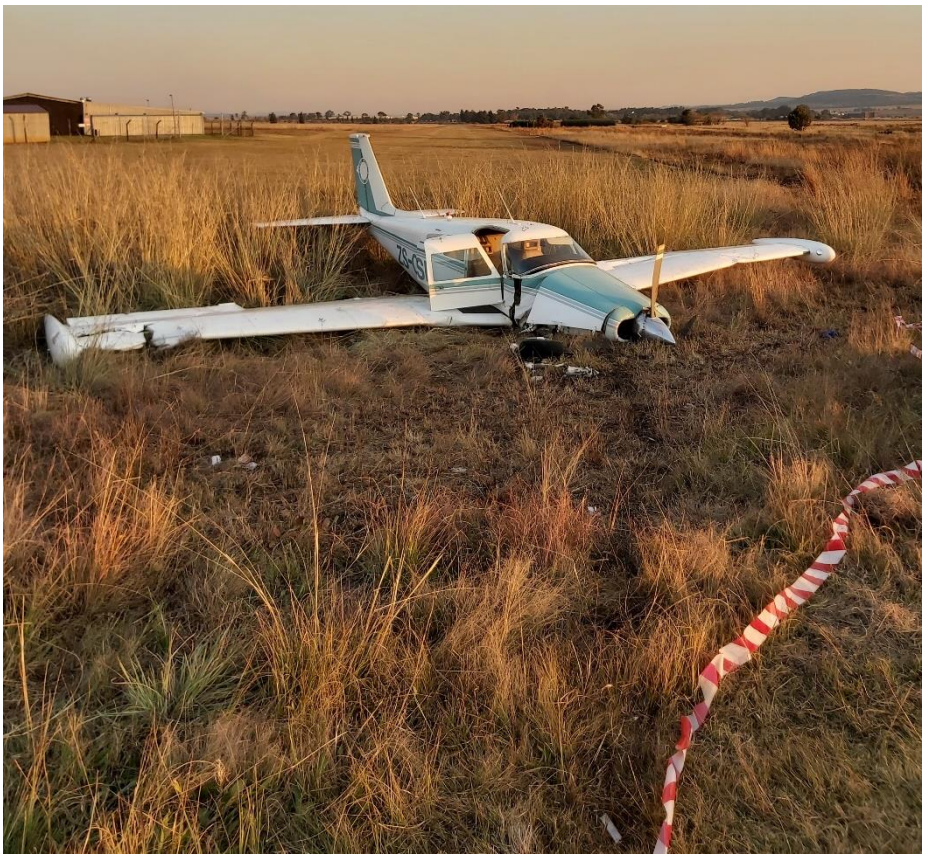

Figure 1: The aircraft after the accident.

Description:

On Thursday, 26 May 2022, a pilot accompanied by two passengers on-board a Piper Comanche PA-24-250 aircraft with registration ZS-CSL took off on a private flight from Newcastle Aerodrome (FANC) in KwaZulu-Natal province, to Krugersdorp Aerodrome (FAKR) in Gauteng province. The pilot stated that whilst overhead the general flying area (GFA) in Johannesburg South, the aircraft's engine ran rough. He then broadcasted blindly on frequency 125.6-Megahertz (MHz) that the engine was running rough. Thereafter, he followed the troubleshooting procedure to resolve the problem, but without success. He decided to execute a forced landing at Panorama Airfield as it was the closest aerodrome from his position. When

he was overhead Panorama Airfield, he noticed traffic on Runway 20 and decided to carry out the joining procedure for Runway 20 instead of Runway 02 as he had initially intended. When the pilot was established on final approach, he extended the landing gear as he was certain that he was going to make it to Runway 20, but the engine stopped, and the aircraft lost height rapidly. When he was approximately 50 metres away from the runway, the main undercarriage got hooked on the barbed wire fence before impacting the road embankment. The aircraft bounced over the road and spun 180 degrees before coming to rest, approximately 42 metres (m) from the first point of impact, facing the opposite direction from which it had approached. The pilot and the passengers sustained serious injuries, and the aircraft was substantially damaged during the accident sequence.

Occurrence Details

Reference Number	**:** CA18/2/3/10165
Occurrence Category	**:** Category 2
Type of Operation	**:** Private (Part 91)
Name of Operator	**:** Private
Aircraft Registration	**:** ZS-CSL
Aircraft Make and Model	**:** Piper PA-24-250
Nationality	**:** South African
Registration Marks	**:** ZS-CSL
Place	**:** Panorama Airfield
Date and Time	**:** 26 May 2022 at 1520Z
Injuries	**:** Serious
Damage	**:** Substantial

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 Comanche PA-24-250, which occurred on 26 May 2022 at 1510Z at Panorama Airfield in Gauteng province. The occurrence was classified as an accident according to the Part 12 of the CAR 2011 and ICAO STD Annex 13 definitions.

The AIID has appointed an investigator-in-charge and a co-investigator who dispatched to the accident site to conduct a full investigation. Notifications were sent to the State of Registry/Operator/Design/ Manufacturer in accordance with Part 12 of the CAR 2011 and ICAO Annex 13 Chapter 4. None of the states appointed an accredited representative and/or advisor. The AIID will lead the investigation and issue the final report of this accident in accordance with Part 12 of the CAR 2011 and 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:
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 Comanche PA-24-250 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
ACCID	Accident
AIID	Accident and Incident Investigations Division
AME	Aircraft Maintenance Engineer
AMO	Aircraft Maintenance Organisation
CAA	Civil Aviation Authority
CoA	Certificate of Airworthiness
CAVOK	Cloud and Visibility OK
CAR	Civil Aviation Regulations
CoR	Certificate of Registration
CVR	Cockpit Voice Recorder
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
FDR	Flight Data Recorder
FAGM	Rand Aerodrome
FAKR	Krugersdorp Aerodrome
FANC	Newcastle Aerodrome
Ft	Feet
GPS	Global Position System
GFA	General Flying Area
kt	Knots
M	Metres
METAR	Meteorological Aerodrome Report
POH	Pilot's Operating Handbook
QNH	Altitude Above Mean Sea Level
RWY	Runway
SACAA	South African Civil Aviation Authority
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
SAWS	South African Weather Service
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On Monday, 14 March 2022, the operator refuelled a Piper PA-24-250 aircraft with registration ZS-CSL as he intended to fly, but later cancelled the flight. The aircraft was taxied to the hangar. Later the same day, the operator noticed fuel leaking slightly from the aircraft. He then decided to taxi the aircraft from the hangar to the main apron twice as he wanted to recharge the aircraft's battery. However, the operator noticed that the fuel was still leaking. He then decided to drain approximately 40 litres of fuel from the auxiliary fuel tanks, leaving about 10 litres (in the tanks). The aircraft was then parked in the hangar.

1.1.2 On Thursday, 26 May 2022, a pilot taxied the aircraft from the operator's hangar to the operator's bulk fuel storage where he topped up the main tanks with a total of 36 litres of fuel — the right-side main tank was topped up with 20 litres, and the left-side main tank was topped up with 16 litres, bringing the grand total in the main tanks to 204 litres (full capacity).

1.1.3 The pilot, in the company of two passengers on-board, took off on a private flight from Krugersdorp Aerodrome (FAKR) in Gauteng province to Newcastle Aerodrome (FANC) in KwaZulu-Natal province, with the intention to return to FAKR. The purpose of the flight was to accompany the two friends to a meeting in Newcastle. The flight was conducted under visual meteorological conditions (VMC) by day and the under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended

1.1.4 The flight from FAKR to FANC was uneventful. The pilot stated that once at FANC, he visually inspected the main fuel tanks and confirmed that there was no need to refuel because he still had enough fuel for the flight back to FAKR.

1.1.5 Later that day, the pilot and the two passengers took off from FANC back to FAKR. Whilst overhead the general flying area (GFA) in Johannesburg South, the aircraft's engine started to run rough. Thereafter, the pilot broadcasted blindly on frequency 125.6-Megahertz (MHz) that his aircraft's engine was running rough. He then followed the troubleshooting procedure to resolve the problem by switching between the main left and right fuel tanks, but there was no change in the engine's performance. He then switched fuel to the auxiliary tanks, and the engine operated normally but only for a short while. At this point, the pilot had visual of Panorama Airfield. Due to the traffic that was taking off from Runway 02, he opted to execute the normal joining procedure by flying overhead the airfield at 2000 feet to reposition for landing on Runway 20. During the final approach

and when he was certain that he was going to make it for Runway 20, he extended the landing gear.

1.1.6 The aircraft descended fast and the main undercarriage got caught in the barbed wire fence. The aircraft impacted the road embankment and bounced over the road, landing on the other side and facing the opposite direction from which it had approached. The nose landing gear compressed into the engine compartment and the main landing gear broke off due to impact. The occupants sustained serious injuries and were transported to the hospital. The aircraft sustained substantial damages to the right wing, left wing, propeller blades, underbelly, landing gear and the cockpit. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.7 The accident occurred in daylight near Panorama Airfield's perimeter fence at Global Positioning System (GPS) co-ordinates determined to be: S26°19'31.06" E028°4'1.90", at an elevation of 5020 feet (ft).

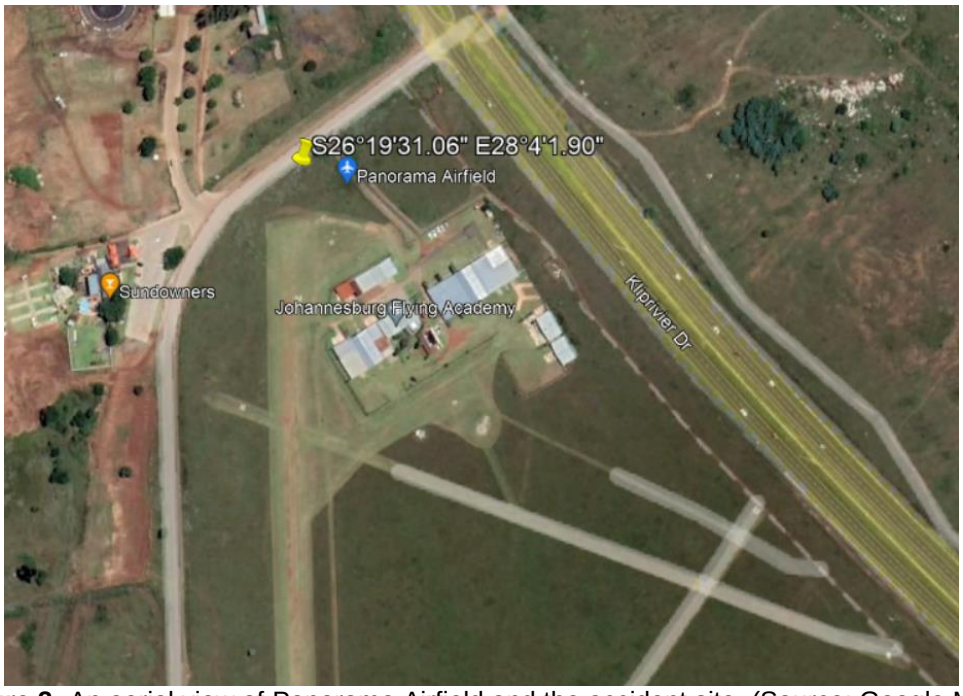

Figure 2: An aerial view of Panorama Airfield and the accident site. (Source: Google Map)

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	1	-	2	3	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	1	-	2	3	-

Note: Other means people on the ground.

1.2.1. The pilot and the passengers sustained serious injuries and were taken to the hospital where they were admitted.

1.3. Damage to Aircraft

1.3.1. The aircraft sustained substantial damage to the propeller blades, both wings, underbelly, landing gear and the cockpit.

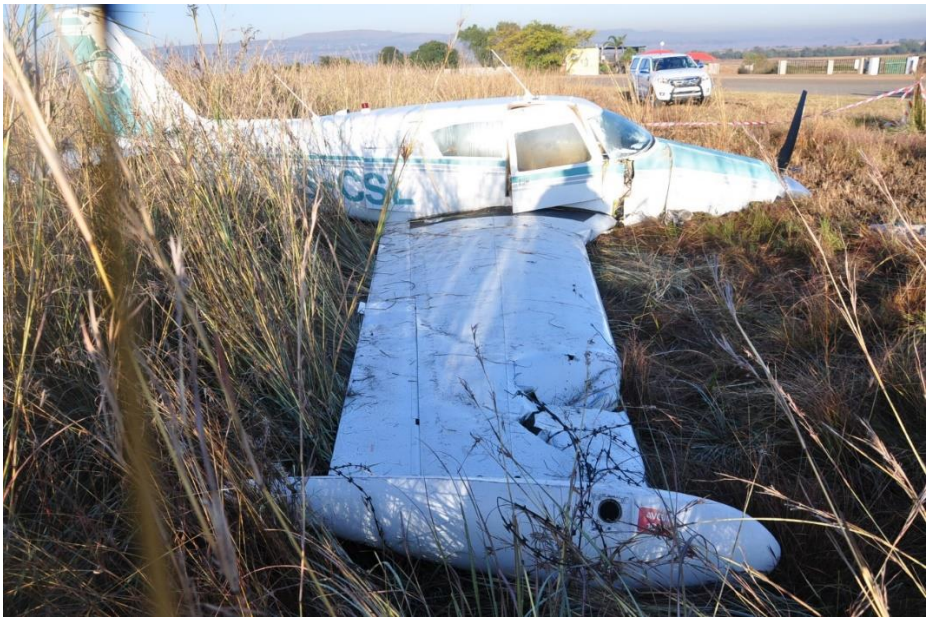

Figure 3: The aircraft at the scene post-accident.

1.4. Other Damage

1.4.1. The perimeter fence opposite the FAKR was damaged.

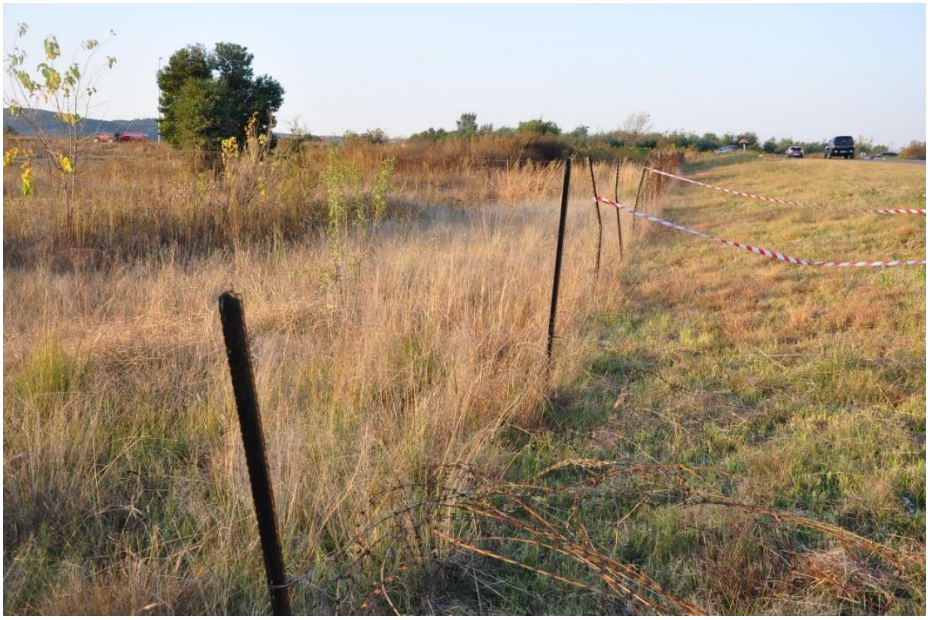

Figure 4: The perimeter fence that the main undercarriage got caught on.

1.5. Personnel Information

Nationality	South African	Gender	Male	Age	34
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, Instructor				
Medical Expiry Date	30 June 2022				
Restrictions	Corrective lens				
Previous Accidents	None				

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

Flying Experience:

Total Hours	1466.9
Total Past 24 Hours	0
Total Past 7 Days	0
Total Past 90 Days	7.2
Total on Type Past 90 Days	3.9
Total on Type	3.9

1.5.1. The pilot was initially issued a Commercial Pilot Licence (CPL) on 3 August 2009.

1.5.2. The pilot was reissued a CPL on 27 June 2021 with an expiry date of 30 June 2022.

1.5.3. The pilot converted to the Piper PA-24-250 aircraft type on 25 February 2022.

1.5.4. The pilot had flown a total of 1466.9 hours of which 3.9 were on the aircraft type.

1.5.5. The pilot was issued a Class 1 aviation medical certificate on 17 June 2021 with an expiry date of 30 June 2022.

1.6. **Aircraft Information**

1.6.1 Source: Piper Comanche PA-24-250 Pilot's Operating Handbook (POH)

The Comanche Model 180 is equipped with a Lycoming 0-360-A series engine rated at 180 HP at 2700 RPM. The engine in the 250 is a Lycoming 0-540-A series, developing 250 HP at 2575 RPM. The engine has compression ratio of 8.5 to 1 and require 91/96 octane minimum fuel. They are furnished with a geared starter, 50 ampere 12-volt generator, voltage regulator, shielding, fuel pump, propeller governor, vacuum pump drive, and carburettor air box and filter. The exhaust system on the 180 and 250 is a stainless-steel cross over type. A large muffler and oversize heater shroud are provided on both the 180 and 250 installations, to supply heat for cabin and carburettor heater systems. Engine cooling is accomplished without the complication of cowl flaps or exhaust augmenters, and without drag producing fixed cowl flanges.

1.6.2 *Description of the fuel system:*

Two rubber like fuel cells in the inboard leading-edge sections of the wings provide fuel capacity. Available as optional equipment on the PA-24-250 only are two auxiliary fuel cells located outboard of the main fuel cells. Auxiliary fuel cells have 15-gallon capacity. The cells should be kept full of fuel during storage of the airplane to prevent accumulation of moisture and deterioration of the cells. For long term storage without fuel, the cells should be coated with light engine oil to keep rubber from drying out. The main fuel cells hold a maximum of 30 gallons. On the 180, to obtain the standard fuel quantity of 50 gallons total, or 25 gallons per tank, the cells are filled only to the bottom of the filler neck, which extends into the fuel cell about one inch. To obtain the standard plus reserve quantity, the cells are filled to the top of the filler necks. This system provides a reserve fuel capacity for the 180 without the necessity for extra tanks. On the 250 Comanche, 60 gallons is the standard fuel capacity, however if auxiliary fuel cells are installed the fuel capacity is increased to 90 gallons. An electric auxiliary fuel pump is provided for use in the event (two electric auxiliary fuel pumps on PA-24-250) of failure of the standard engine driven pump. The electric pump is normally turned on for landings and take-offs.

Airframe:

Manufacturer/Model	Piper Aircraft Corporation / PA-24-250	
Serial Number	24-2253	
Year of Manufacture	1973	
Total Airframe Hours (At Time of Accident)	4892.9	
Last Inspection (Date & Hours)	16 January 2022	4886.7
Hours Since Last Inspection	6.2	
CRS Issue Date	7 February 2022	
C of A (Issue Date & Expiry Date)	7 April 2021	30 April 2022
C of R (Issue Date) (Present Owner)	6 September 2013	
Type of Fuel Used	Avgas 100LL	
Operating Category	Standard Normal Category	
Previous Accidents	Nil	

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

Engine:

Manufacturer/Model	Lycoming
Serial Number	L-3275-40
Part Number	O-540-E4A5
Hours Since New	4886.7
Hours Since Overhaul	TBA not yet reached

Propeller:

Manufacturer/Model	Hartzell / HC-C3YR-1RF/F7590
Serial Number	DY7095B
Part Number	C3R00023
Hours Since New	429.3
Hours Since Overhaul	TBA not yet reached

1.6.3 The last maintenance inspection prior to the accident flight was carried out on 16 January 2022 at 4886.7 hours. The aircraft was issued a Certificate of Release to Service (CRS) on 7 February 2022 with an expiry date of 6 February 2023 or at 4986.7 hours. There were no defects recorded in the flight folio at the time of the accident.

1.6.4 The aircraft was issued a Certificate of Registration on 6 September 2022.

1.6.5 The aircraft's Certificate of Airworthiness was issued on 7 April 2021 with an expiry date of 30 April 2022. There was no updated (renewed) Certificate of Airworthiness in the aircraft's file or in the Regulator's (SACAA's) records.

1.6.6 At the time of the accident, there was no entry of the accident flight in the flight folio.

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 on 26 May 2022 at 1500Z at Rand Aerodrome (FAGM), located 85 metres from the accident site.

Wind Direction	210°	Wind Speed	07kt	Visibility	CAVOK
Temperature	19.2°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	0.8°C	QNH	850hPa		

1.8. **Aids to Navigation**

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Regulator. There were no records indicating that the navigation system was unserviceable prior to the accident.

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 accident.

1.10. **Aerodrome Information**

1.10.1. The accident occurred approximately 45m from the threshold of Runway 20 at Panorama Airfield.

Aerodrome Location	Panorama Airfield, Gauteng Province		
Aerodrome Status	Unlicensed		
Aerodrome GPS coordinates	26°19'34.31" South 028°04'01.70" East		
Aerodrome Elevation	5050 feet		
Runway Headings	02/20	05/23	12/30
Dimensions of Runway Used	974 x 30m	700 x 20m	600 x 20m
Heading of Runway Used	02		
Surface of Runway Used	Grass		
Approach Facilities	None		
Radio Frequency	124.40 MHz		

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. During approach for an emergency landing at Panorama Airfield, the engine stopped after the landing gear was extended; this was followed by a drastic loss of height before the undercarriage got hooked on the barbed wire fence. The propeller also got entangled in the barbed wire fence. The main landing gear broke off after impacting the road embankment; it was found approximately 26m from the first point of impact. The fuselage was located approximately 42m from the first point of impact with the ground; it came to rest facing the opposite direction from which it had approached.

Figure 5: The first impact with the ground just beyond the barbed wire fence.

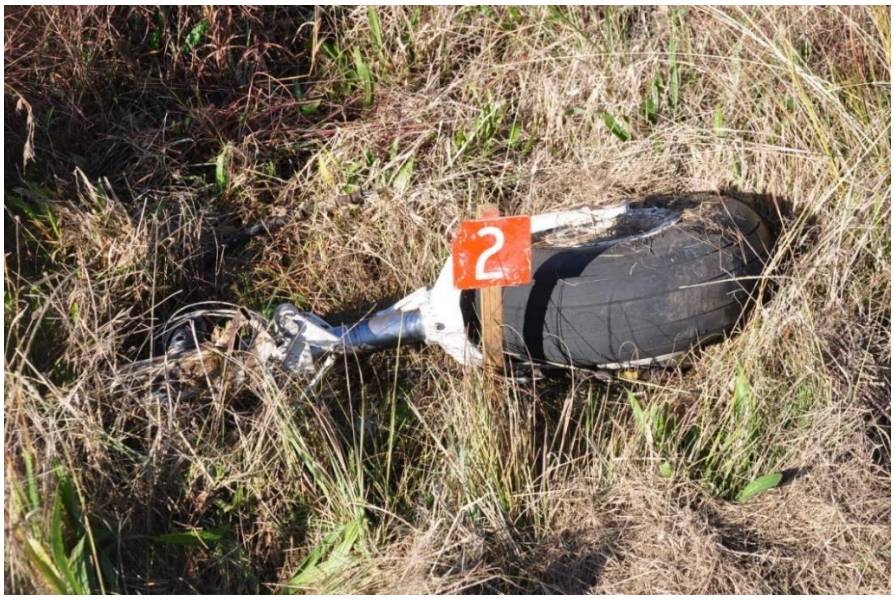

Figure 6: The main undercarriage strut and the wheel that broke off.

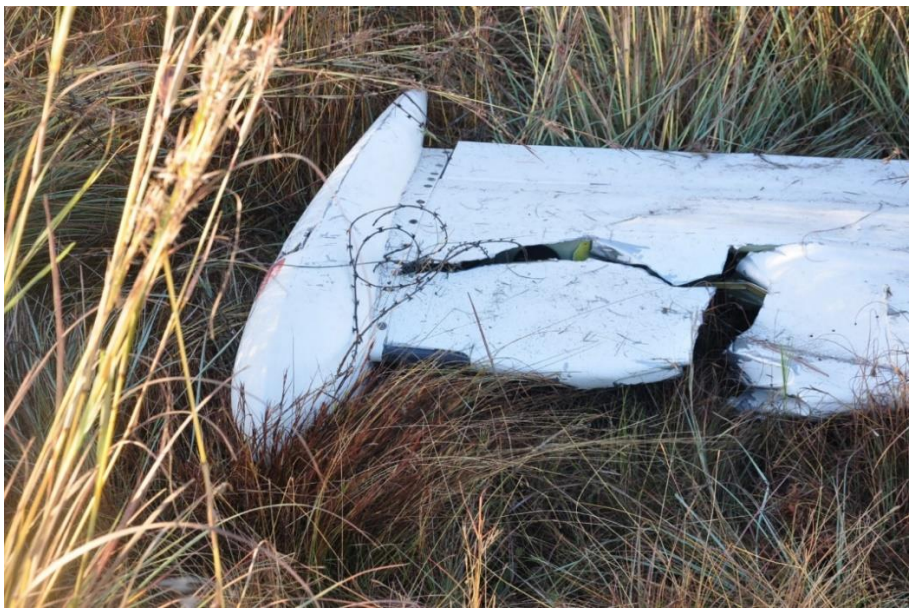

Figure 7: The right wing that hit the fence post.

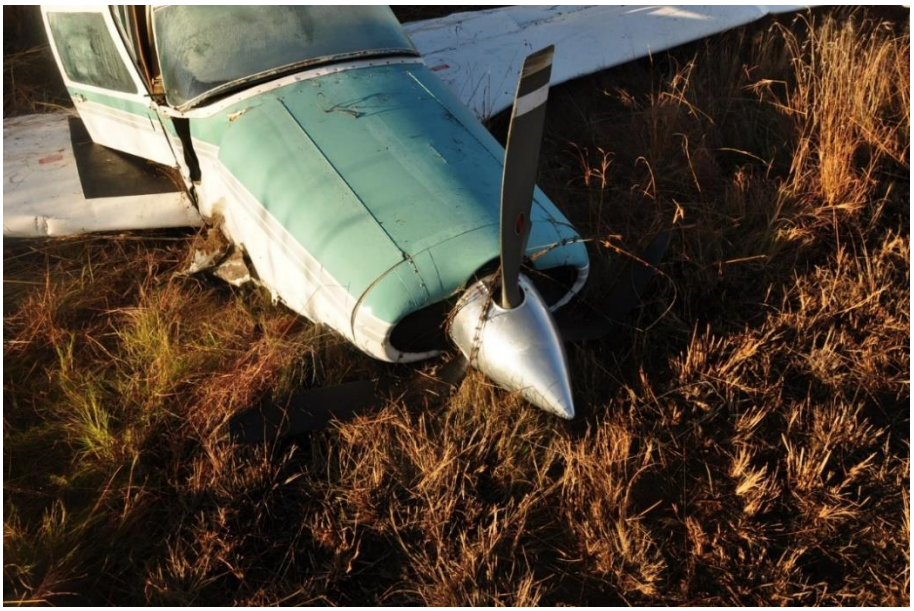

Figure 8: The propeller with the barbed wire fence around it. The propeller blades indicate that the engine was not under power during impact.

1.13. Medical and Pathological Information

1.13.1. The pilot and the two passengers were admitted to the hospital after sustaining serious injuries.

1.14. Fire

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

1.15. **Survival Aspects**

1.15.1. This accident was considered survivable. Although there was damage in the cabin and cockpit areas, they both remained intact. The pilot and the passengers were properly restrained with safety harnesses at the time of the accident.

1.16. **Tests and Research**

1.16.1 When the investigators arrived at the accident site, they did not find any fuel in the main tanks of the aircraft. The fuel that was found in the auxiliary tanks added to approximately 5 litres, both tanks combined.

1.16.2 During the recovery of the aircraft, a leak was found on the right-side wing auxiliary tank. The right-side coupling was loose, it was not properly tightened according to the aircraft maintenance engineer (AME) who was assigned to recover the aircraft.

1.16.3 The aircraft was recovered to an aircraft maintenance organisation (AMO) facility at FAKR. At the AMO facility, the two main bladder tanks were filled with water to check their capacity, and the team filled 102 litres which confirmed that the tanks could carry fuel as prescribed.

1.16.4 With a total of 204 litres of fuel in the main fuel tanks, the aircraft had an endurance of 4 hours. According to the calculations, the trip from FAKR to FANC would have been 3 hours with a fuel consumption of 49 litres per hour. The aircraft should have had 57 litres of fuel remaining in the tanks which was unaccounted for.

1.17. **Organisational and Management Information**

1.17.1. The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.17.2. The AMO which certified the last maintenance inspection (annual inspection) prior to the accident flight was in possession of an AMO-approved certificate that was issued by the Regulator on 31 May 2022 with an expiry date of 31 May 2023.

1.18. **Additional Information**

1.18.1. None.

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**

2.2.1 The pilot was initially issued a Commercial Pilot Licence (CPL) on 3 August 2009.

2.2.2 The pilot was reissued the CPL on 27 June 2021 with an expiry date of 30 June 2022.

2.2.3 The pilot converted to the Piper PA-24-250 aircraft type on 25 February 2022.

2.2.4 The pilot was issued a Class I aviation medical certificate on 17 June 2021 with an expiry date of 30 June 2022.

2.2.5 The aircraft was issued a Certificate of Airworthiness on 7 April 2021 with an expiry date of 30 April 2022.

2.2.6 The aircraft was issued a Certificate of Registration on 6 September 2013.

2.2.7 The AMO which certified the last maintenance inspection (annual inspection) prior to the accident flight was in possession of an AMO-approved certificate that was issued by the Regulator on 31 May 2022 with an expiry date of 31 May 2023.

2.2.8 The last mandatory periodic inspection on the aircraft was carried out on 7 February 2022 at 4886.7 airframe hours. The aircraft had accumulated an additional 6.0 airframe hours in operation since the last inspection.

2.2.9 The flight was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.

2.2.10 The aircraft was issued a Certificate of Airworthiness on 7 April 2021 with an expiry date of 30 April 2022. There was no updated (renewed) Certificate of Airworthiness in the aircraft's file or in the Regulator's records.

2.2.11 There was no entry of the accident flight in the flight folio.

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

2.2.13 According to the fuel calculations (see 1.16.4), 57 litres of fuel was unaccounted for.

2.2.14 The pilot stated that while en route to FAKR and overhead the general flying area in Johannesburg South, the aircraft's engine ran rough. The pilot broadcasted blindly on frequency 125.6 MHz that his aircraft's engine was running rough. He followed the troubleshooting procedure whilst heading for Panorama Airfield to execute an emergency landing. Upon reaching Panorama Airfield, he noticed that there was traffic in the circuit, and he decided to execute the normal joining procedure by flying overhead the airfield at 2000 feet to reposition for landing on Runway 20. While on final approach for Runway 20, he extended the landing gear, thereafter, the engine stopped, and the aircraft lost height rapidly. The undercarriage got hooked on the barbed wire fence and spun 180 degrees before it came to a stop approximately 42m from the barbed wire.

3. ON-GOING INVESTIGATION

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

This report is issued by:

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