PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10248

Figure 1: The file picture of the ZS-EAW aircraft. (Source: www.flightzone.co.za)

Description:

On Sunday morning, 15 January 2023 at approximately 0515Z, a flight instructor and a pilot on-board a Piper PA-30-160 aircraft with registration ZS-EAW were engaged in a multi-engine aircraft conversion training at Grand Central Aerodrome (FAGC) in Gauteng province. A flight plan was filed for this flight, which was conducted under visual flight rules (VFR) and in visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot, with a Private Pilot Licence (PPL) and the instructor, with a Grade II rating conducted their training at FAGC circuit for approximately 33 minutes before they requested permission from the air traffic control (ATC) to route to Johannesburg General Flying Area (GFA). Later, eyewitnesses observed the aircraft flying at a reduced speed, approximately 600 feet (ft) above ground level (AGL) before it suddenly pitched up and then spiralled towards the ground in a nose-down attitude. It impacted the dump site at Crown Mines near the National Recreation Centre (NASREC) in the south of Johannesburg. The aircraft was destroyed on impact, and both occupants were fatally injured.

Occurrence Details

Reference Number	**:** CA18/2/3/10248
Occurrence Category	**:** Accident (Category 1)
Type of Operation	**:** Training (Part 141)
Name of Operator	**:** Flight Training Services (FTS)
Aircraft Registration	**:** ZS-EAW
Aircraft Make and Model	**:** Piper PA-30-160 Twin Comanche
Nationality	**:** South African
Place	**:** Crown Mines dumping site near NASREC, Gauteng Province
Date and Time	**:** 15 January 2023 at 0605Z
Injuries	**:** Two fatalities
Damage	**:** Destroyed

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 promoting aviation safety and reducing aviation accidents or incidents' risk and not apportioning 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 PA-30-160 Twin Comanche aircraft which occurred on 15 January 2023 at 0605Z at Crown Mines in Gauteng province. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions.

The AIID has appointed an investigator-in-charge to conduct a full investigation. An investigating team was dispatched to the accident site. Notifications were sent to the State of Design and Manufacturer in accordance with CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The State of Design and Manufacturer did not appoint an accredited representative. The AIID will lead the investigation and issue the final report of this accident in accordance with CAR 2011 Part 12 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:
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 of accident
   Aircraft — the Piper PA-30-160 involved in this accident
   Investigation — the investigation into the circumstances of this accident
   Pilots — the pilots 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
°C	Degree Celsius
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
ARFF	Aircraft Rescue and Firefighting
ATC	Air Traffic Control
ATO	Approved Training Organisation
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CAR	Civil Aviation Regulations
CAVOK	Ceiling and Visibility OK
CBD	Central Business District
CCTV	Close Circuit Television
CPL	Commercial Pilot Licence
CVR	Cockpit Voice Recorder
E	East
EMS	Emergency Medical Services
FAGC	Grand Central Aerodrome
FDR	Flight Data Recorder
ft	Feet
GFA	General Flying Area
GPS	Global Positioning System
hPa	Hectopascal
IIC	Investigator-in-charge
kts	Knot(s)
m	Metre
METAR	Meteorological Aerodrome Report
MHz	Megahertz
MPI	Mandatory Periodic Inspection
N/A	Not Applicable
NASREC	National Recreation Centre
nm	Nautical Mile
POH	Pilot’s Operating Handbook
QNH	Query: Nautical Height
S	South
SACAA	South African Civil Aviation Authority
SAPS	South African Police Service
SAWS	South African Weather Service
TBA	To Be Announce
TL	Technical Logbook
UTC	Co-ordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Sunday morning, 15 January 2023 at approximately 0515Z, an instructor and a pilot on-board a Piper PA-30-160 aircraft with registration ZS-EAW took off on a multi-engine conversion training flight from Grand Central Aerodrome (FAGC) in Gauteng province, with the intention to land back at the same aerodrome. The pilot had a Private Pilot Licence (PPL), and the instructor had a Grade II rating. Clear weather conditions prevailed at the time of the flight. A flight plan was filed for this training flight, which was conducted under visual flight rules (VFR) and in 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 A closed circuit television (CCTV) footage captured at FAGC showed *the pilot walking to the aircraft and conducting what appeared to be a pre-flight inspection. He then boarded the aircraft. Moments later, the flight instructor is seen walking to the aircraft to join the pilot who was already in the cockpit.*

A voice recording was obtained from FAGC Aircraft Rescue and Firefighting (ARFF) official. The recording from ARFF revealed that at approximately 0515Z, the crew requested take-off clearance from the air traffic control (ATC) to conduct three touch-and-go landings at FAGC, which was granted. ***Note:*** *FAGC ATC tower does not have the recording software.*

1.1.3 Two touch-and-go landings were performed. During the third circuit at about 0548Z, the instructor and the pilot requested clearance from ATC to fly to the Johannesburg General Flying Area (GFA). The three circuits lasted approximately 33 minutes.

1.1.4 According to their flight path (Figure 2), the crew was supposed to fly east from FAGC as indicated by the red line, however after two circuits (and during the third circuit) they requested to route to Johannesburg South (GFA).

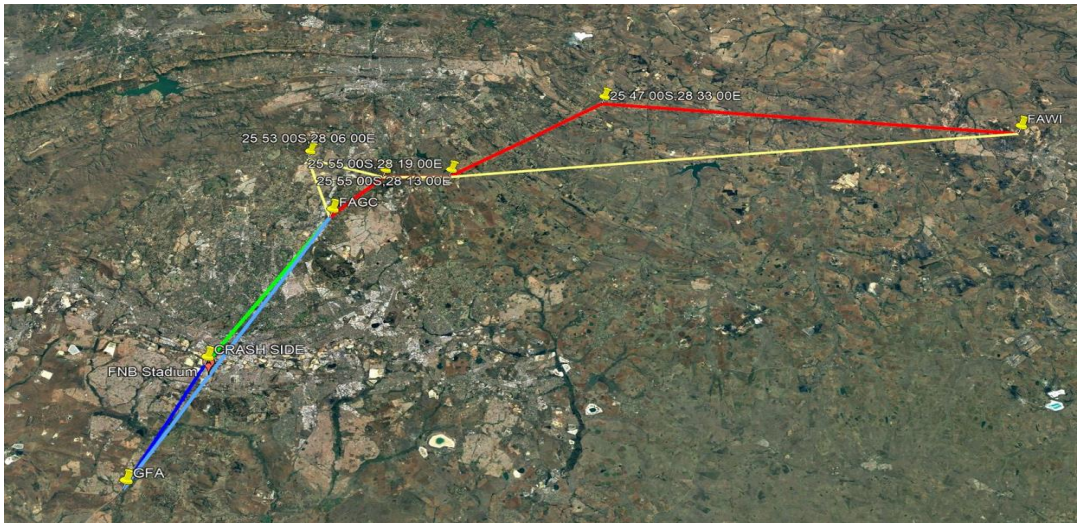

Figure 2: The planned flight path. The red line indicates the filed flight path (departure path), the yellow line indicates the filed planned return path, the green line indicates the path they took, the light blue line indicates the route from FAGC to GFA, and the dark blue line indicates the route from Johannesburg GFA to the crash site. (Source: Google Earth)

1.1.5 The first eyewitness who was travelling on one of the roads in the vicinity of the accident site stated: *"It was approximately 0600Z when I saw a white aircraft flying slow at a low altitude; the aircraft flew straight up as if it is doing aerobatics, then suddenly stalled and went down, spiralling with the nose pointing down [sic]".*

A written statement from a second eyewitness who was at her dwelling, approximately 3 kilometres north-east of the accident site stated: "*At approximately 0605Z my attention was attracted by the idling/running rough [sound] of the engine of the aircraft which went on and off, and suddenly stopped. I observed the plane flying low and the engine stopped and finally when I stood up on my toes, I saw it going down with the nose down and disappeared in the bush [sic]".*

1.1.6 The third witness who was approximately 500 metres from the crash site immediately notified the South African Police Service (SAPS) after witnessing the crash. The SAPS notified the Emergency Medical Services (EMS), the ARFF officials and the South African Search and Rescue (SASAR) personnel. The SASAR then notified the Accident and Incident Investigations Division (AIID), and investigators were dispatched to the accident site.

1.1.7 The wreckage was located at Crown Mines dump site near the National Recreation Centre (NASREC). Both occupants were fatally injured during the accident sequence, and the aircraft was destroyed.

1.1.8 The accident occurred during daylight at the base of Crown Mine dump site at Global Positioning System (GPS) co-ordinates determined to be 26°14'05.5'' South and 027°58'24.0'' East, at an elevation of 5600 feet (ft).

Figure 3: The yellow line shows the flight path, and the red star indicates the crash site. (Source: Google Earth)

1.2 Injuries to Persons

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

Note: Other means people on the ground.

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during the accident sequence.

Figure 4: The ZS-EAW aircraft post-accident.

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Flight Instructor

Flight Instructor Nationality	Iranian	Gender	Male	Age	28
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instructor Grade II and Instruments				
Medical Expiry Date	31 July 2023				
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	539.4
Total Past 24 Hours	0.8
Total Past 7 Days	13.7
Total Past 90 Days	84
Total on Type Past 90 Days	8.4
Total on Type	55

1.5.1 The Grade II instructor was initially issued a Commercial Pilot Licence (CPL) on 20 August 2020. His last validation was conducted on 10 July 2022, on which the licence was issued with an expiry date of 31 July 2023. The Piper PA-30 aircraft was endorsed on his licence.

1.5.2 The instructor was issued a Class 1 aviation medical certificate on 25 July 2022 with an expiry date of 31 July 2023.

1.5.3 **Pilot**

Nationality	Nepalese	Gender	Male	Age	19
Licence Type	Private Pilot Licence (PPL)				
Licence Valid	Yes	Type Endorsed	No		
Ratings	Night rating				
Medical Expiry Date	31 May 2023				
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	172
Total Past 24 Hours	0.8
Total Past 7 Days	5.1
Total Past 90 Days	20.5
Total on Type Past 90 Days	5.1
Total on Type	5.1

1.5.4 The pilot was initially issued a Private Pilot Licence (PPL) on 1 May 2022 with an expiry date of 31 May 2023. The Piper PA-30 aircraft was not endorsed on his licence.

1.5.5 The pilot was issued a Class 2 aviation medical certificate on 1 May 2022 with an expiry date of 31 May 2023.

1.6 Aircraft Information

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

The Piper PA-30 Twin Comanche was designed and manufactured by Piper Aircraft as a twin-engine cabin monoplane. The Piper PA-30 Twin Comanche can accommodate four to six people in flight. It has an exterior length of 7.67 metres, an exterior height of 1.6 metres, and a fuselage diameter of 1.2 metres. The tail height is 2.51 metres. The low-wing cantilever monoplane has a wingspan of 11.21 metres including tip tanks and a wing area of 16.54 square metres. The retractable landing gear has a wheelbase of 2.3 metres. The aircraft has an empty weight of 1030 kg and a maximum take-off weight of 1690 kg. It has a maximum payload of 310 kg and a fuel tank capacity of 120 US gallons with tip tanks. The PA-30 is powered by a twin Lycoming IO-320-B1A naturally aspirated, air-cooled, four-cylinder, direct-drive engine piston engine. It has an injector offset toward the engine's fore and aft centreline. Each engine produces a maximum take-off thrust of 160 horsepower and drives a two-bladed Hartzell HC-E2YL-27663-4 counter-rotating propeller. The aircraft has a maximum speed of 178 knots, a long-range cruise speed of 155 knots, a stall speed of 61 knots with flaps down and power off, and a never to exceed speed of 236 knots. The standard travel range is 1000 nautical miles. The PA-30 can fly up to 20000 feet and can climb at a rate of 1460 feet per minute. The take-off run to 50 feet is 470 metres while the landing run is 570 metres.

Airframe:

Manufacturer/Model	Piper Aircraft Corporation/PA-30-160 Twin Comanche	
Serial Number	30-0663	
Year of Manufacture	1965	
Total Airframe Hours (At Time of Accident)	10 390.07	
Last Inspection (Date & Hours)	20 October 2022	10 373.15
Hours Since Last Inspection	16.92	
CRS Issue Date	26 August 2022	
C of A (Issue Date & Expiry Date)	21 March 2007	31 March 2023
C of R (Issue Date) (Present Owner)	8 March 2007	
Type of Fuel Used	Avgas 100LL	
Operating Category	Training (Part 141)	
Previous Accidents	None	

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

1.6.2 The aircraft was registered to the current owner on 8 March 2007. According to the technical logbook (TL 36), at the time of the fatal accident the aircraft had accrued approximately 10 390.07 total airframe hours.

The last 50-hour mandatory periodic inspection (MPI) was conducted on 20 October 2022 at 10 373.15 airframe hours. The aircraft was flown a total of 16.92 airframe hours since the last MPI.

The aircraft was reissued a Certificate of Release to Service (CRS) on 26 August 2022 with an expiry date of 25 August 2023 or at 10 395.84 airframe hours, whichever occurs first.

Engine 1:

Manufacturer/Model	Lycoming IO-320-B1A
Serial Number	L-1488-55A
Part Number	10-51360-37
Hours Since New	10373.15
Hours Since Overhaul	1071.95

Propeller 1:

Manufacturer/Model	Hartzell/ HC-EZYL-2BSF
Serial Number	BG4467
Part Number	F7663-4
Hours Since New	6116.8
Hours Since Overhaul	1120.30

Engine 2:

Manufacturer/Model	Lycoming IO-320-B1A
Serial Number	L-3516-55A
Part Number	10-51360-37
Hours Since New	10373.15
Hours Since Overhaul	1319.90

Propeller 2:

Manufacturer/Model	Hartzell/ HC-EZYL-2BSF
Serial Number	BG4478
Part Number	F7663-4
Hours Since New	6262.17
Hours Since Overhaul	1120.34

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) and recorded at the Johannesburg Botanical Gardens (FAJB) on 15 January 2023 at 0600Z. The FAJB is located 10 kilometres from the accident site.

Wind Direction	030°	Wind Speed	02kt	Visibility	9999m
Temperature	20°C	Cloud Cover	CAVOK	Cloud Base	NIL
Dew Point	0°C	QNH	1025 hPa		

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 recorded defects with the navigational equipment 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 did not occur at or near an aerodrome. The accident occurred during daylight at Crown Mines dump site at GPS position determined to be 26°14’05.5’’ South and 027°58’24.0’’ East, at an elevation of 5600 feet (ft).

1.11 Flight Recorders

1.11.1 The aircraft was not 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 aircraft struck the ground at a high speed at Crown Mines dump site, located south-west of Johannesburg central business district (CBD). The aircraft first impacted the ground with its left-side and bounced approximately 4 metres, it then hit the ground the second time, and bounced again approximately 6 metres. It finally impacted a hillock and flipped over. Fragments of the left engine were found scattered on the hillock. A piece of the left wing tip was found approximately 4 metres on the left-side of the main wreckage.

1.12.2 The pilot’s body was found approximately 2 metres from the wreckage, whilst the flight instructor’s body was found under the wreckage. The aircraft was crushed from the mid-section to the nose section.

1.12.3 The left main gear and the nose gear were found in an extended position, whilst the right main gear was in a retracted position. The landing gears were found selected in the “Down” position. The rudder and the right elevator were still intact whilst the left elevator was bent towards the tip. The flight controls (rudder and the elevator) were checked for movement, which was confirmed. Also, the cables were checked for continuity, and they were found to be intact.

Figure 5: The after it flipped over.

1.12.4 During the on-site inspection of the instrument panels, both the left-side engine magneto switches were in the ‘off’ position and the instrument indications were damaged by impact forces.

Figure 6: The cockpit instrument with the left-side magneto switch in the ‘off’ position.

Figure 7: The damaged instruments.

1.12.5 Following the accident, the aircraft console's:

- Left- and right-side engine power levers were towards the "closed" position.
- Left- and right-side propeller levers were feathered.
- Left- and right-side mixture control levers were at full rich.
- Levers were bent and hard to move (forward or backward).

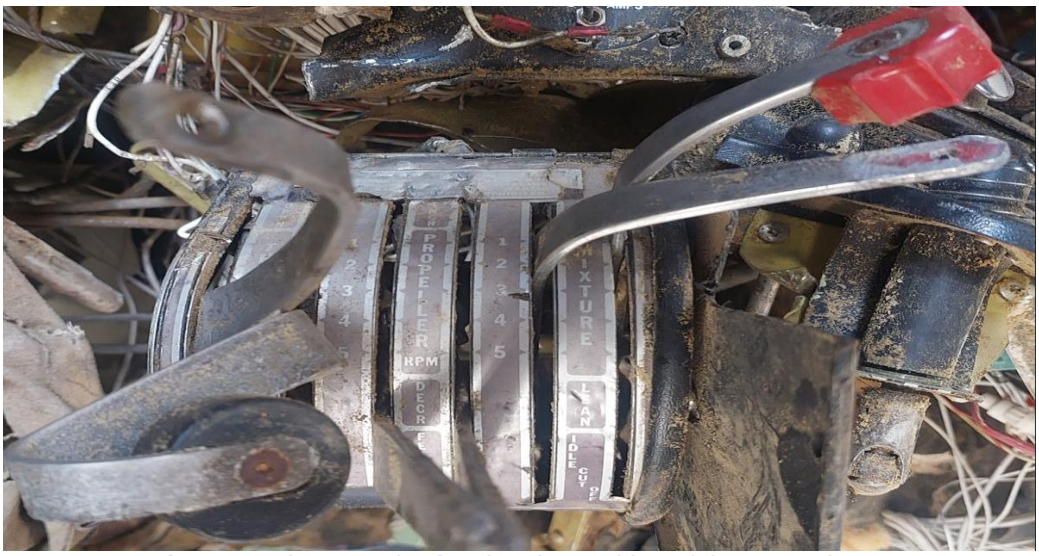

Figure 8: The console showing the position of the power levers.

1.12.6 During the on-site examination of the engines, the right-side engine was still intact with no impact damage, whilst the left-side engine was damaged on impact with the ground. Both engines' crankshafts were rotated by hand, and they turned freely with evidence of compression. There was an oil leak from both engines.

1.12.7 The inspection of the airframe, engine and propeller indicated that there was no pre-impact failures, and all damage was attributed to the impact forces. Both engines will be subjected to a teardown inspection.

Figure 9: The bent propellers.

1.12.8 The right tank switch was in the “auxiliary” (Aux) position whilst the left tank switch was in the “off” position. The aircraft’s main and auxiliary fuel bladder tanks had raptured, and the fuel leaked to the ground.

Figure 10: The raptured fuel bladder tanks.

1.12.9 There was fuel contained in the gascolator. The fuel was free from contaminants, and the fuel lines to the gascolator were still intact.

1.13 Medical and Pathological Information

1.13.1 To be discussed in the final report.

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 not survivable due to the damage sustained in the cockpit when the aircraft impacted the ground. The instructor and the pilot were fatally injured.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 The flight was conducted in accordance with the provisions of Part 141 of the CAR 2011 as amended.

1.17.2 The ATO had an approved ATO operation certificate that was issued on 1 November 2021 with an expiry date of 31 October 2026. The ATO certificate was issued in terms of Part 141 of the Civil Aviation Regulations 2011 as amended. The ATO also had an approved operations manual.

1.17.3 The aircraft was maintained by an approved aircraft maintenance organisation (AMO). The AMO's certificate was issued on 12 July 2022 with an expiry date of 31 July 2023.

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 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 instructor was issued a Commercial Pilot Licence (CPL) on 20 August 2020. His last licence validation was on 10 July 2022 with an expiry date of 31 July 2023.

2.2.2 The instructor was issued a Class 1 aviation medical certificate on 25 July 2022 with an expiry date of 31 July 2023.

2.2.3 The pilot was issued a Private Pilot Licence (PPL) on 1 May 2022 with an expiry date of 31 May 2023.

2.2.4 The pilot was issued a Class 2 aviation medical certificate on 1 May 2022 with an expiry date of 31 May 2023.

Approved Training Organisation (ATO)

2.2.5 The ATO had an approved ATO certificate that was issued on 1 November 2021 with an expiry date of 31 October 2026.

2.2.6 The flight was conducted under visual flight rules (VFR) and in visual meteorological conditions (VMC) by day. The aircraft was operated under the provisions of Part 141 of the CAR 2011 as amended.

The Aircraft

2.2.7 The aircraft was first registered to the current owner on 8 March 2007. According to the technical logbook (TL 36), at the time of the fatal accident, the aircraft had accrued approximately 10 390.07 total airframe hours.

The last 50-hour mandatory periodic inspection (MPI) was conducted on 20 October 2022 at 10 373.15 airframe hours. The aircraft was flown a total of 16.92 airframe hours since the last MPI.

The aircraft was reissued a Certificate of Release to Service (CRS) on 26 August 2022 with an expiry date of 25 August 2023 or at 10 395.84 airframe hours, whichever occurs first.

2.2.8 The aircraft was maintained by an approved AMO. The AMO's certificate was issued by the Regulator on 12 July 2022 with an expiry date of 31 July 2023.

2.2.9 The on-site inspection of the instrument panel indicated that both the left-side engine magneto switches were in the 'off' position and the instrument indications were damaged by impact forces.

2.2.10 Following the accident, the aircraft console's:

- Left- and right-side engine power levers were towards the "closed" position.
- Left- and right-side propeller levers were feathered.
- Left- and right-side mixture control levers were at full rich.
- Levers were bent and hard to move (forward or backward).

2.2.11 On-site examination of the engines found that the right-side engine was still intact with no impact damage, whilst the left-side engine was damaged on impact with the ground. Both engines' crankshafts were rotated by hand, and they turned freely with evidence of compression. There was an oil leak from both engines.

2.2.12 The inspection of the airframe, engine and propeller indicated that there was no pre-impact failures, and all damage was attributed to the impact forces. Both engines will be subjected to a teardown inspection.

2.2.13 The right tank switch was in the "auxiliary" (Aux) position whilst the left tank switch was in the "off" position. The aircraft's main and auxiliary fuel bladder tanks were found raptured, and the fuel leaked to the ground.

2.2.14 There was fuel contained in the gascolator. The fuel was free from contaminants, and the fuel lines to the gascolator were still intact.

Environment

2.2.15 Fine weather conditions prevailed at the time of the accident, which is consistent with the official weather report that was received from the SAWS.

2.2.16 The aircraft was observed climbing at a high pitch, followed by a stall and descent to the ground. The aircraft struck the ground at a high speed in a steep nose-down attitude at Crown Mines dump site, south-west of Johannesburg CBD.

3. On-going Investigation

3.1 The AIID investigation is on-going and the investigator will be looking into other aspects of this accident, 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