PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10152

Figure 1: Piper PA-25-235, ZS-AWX. (Source: Operator)

Description:

On 3 May 2022 at 0647Z, a Piper PA-25-235 aircraft with registration ZS-AWX was involved in an accident during a crop-spraying operation at Albert Falls in KwaZulu-Natal province. The pilot stated that after completing a spray line, he initiated a climbing left turn and the engine started to run rough followed by an abnormal vibration as the engine began losing power. The pilot successfully forced-landed the aircraft, but during the ground roll, the aircraft collided with and flattened a perimeter fence, ground looped while making an approximate 90° turn, and impacted some bushes before it came to a halt.

The pilot was not injured during the accident sequence; however, the aircraft was substantially damaged. Visual meteorological conditions (VMC) by day prevailed at the time of the accident.

Occurrence Details

Reference Number	**:** CA18/2/3/10152
Occurrence Category	**:** Category 1
Type of Operation	**:** Aerial Work Operations (Part 137)
Name of Operator	**:** Natal Aerial Spray (PTY) LTD
Aircraft Make and Model	**:** Piper PA-25-235
Nationality	**:** South African
Registration Mark	**:** ZS-AWX
Place	**:** Albert Falls
Date and Time	**:** 3 May 2022, 0647Z
Injuries	**:** None
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 PA-25-235, which occurred at Albert Falls, KwaZulu-Natal Province, on 3 May 2022 at 0647Z. 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. The investigator dispatched to the accident site on 5 May 2022. Notifications were sent to the State of Registry, Operator and Manufacturer in accordance with CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The State of manufacturer appointed an accredited representative and advisor. 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:
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-25-235 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

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AOC	Air Operator Certificate
CAR	Civil Aviation Regulations
CAVOK	Cloud and Visibility OK
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
DME	Distance Measuring Equipment
FAPM	Pietermaritzburg Airport
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
ICAO	International Civil Aviation Organisation
LTD	Limited
m	Metre
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
PAPI	Precision Approach Path Indicator
PTY	Proprietary
QNH	Barometric Pressure Adjusted to Sea Level (Query Nautical Height)
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	Co-ordinated Universal Time
VHF	Very High Frequency
VMC	Visual Meteorological Conditions
VOR	VHF Omnidirectional Radio Range
Z	Zulu (Term for Universal Coordinated Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On 3 May 2022, a pilot on-board a Piper PA-25-235 aircraft with registration mark ZS-AWX took off on a crop-spraying flight from Clan Airfield in KwaZulu-Natal province to a private farm in Albert Falls, also in KwaZulu-Natal. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2 The pilot stated that after completing five swath lines and was on the climb to line up for the sixth swath line of spraying the crops at the farm, he made a left turn to line up the aircraft at approximately 100 feet (ft) above ground level (AGL). At this time, the engine started to run rough whilst the aircraft experienced abnormal vibrations. The pilot also noted that the aircraft's engine had lost power. He then turned right towards an open field in the vicinity to perform a forced landing. During the (right) turn, he heard loud noises which sounded like spluttering emanating from the engine compartment. The pilot stated that he leaned the mixture and turned on the carburettor heat to remedy the situation, but this was in vain. However, he successfully forced-landed the aircraft on the open field and continued to roll on the ground for approximately 60 metres (m) before the propeller blades impacted a perimeter fence and flattened it. The aircraft continued to roll to the other side of the fence, ground-looped and impacted some bushes before coming to a stop.

1.1.3 The pilot was not injured during the accident sequence; however, the aircraft was substantially damaged.

1.1.4 The accident occurred during day light at Global Positioning System (GPS) co-ordinates determined to be 29°26'13.39" South, 030°27'17.41" East, at an elevation of 2 105ft.

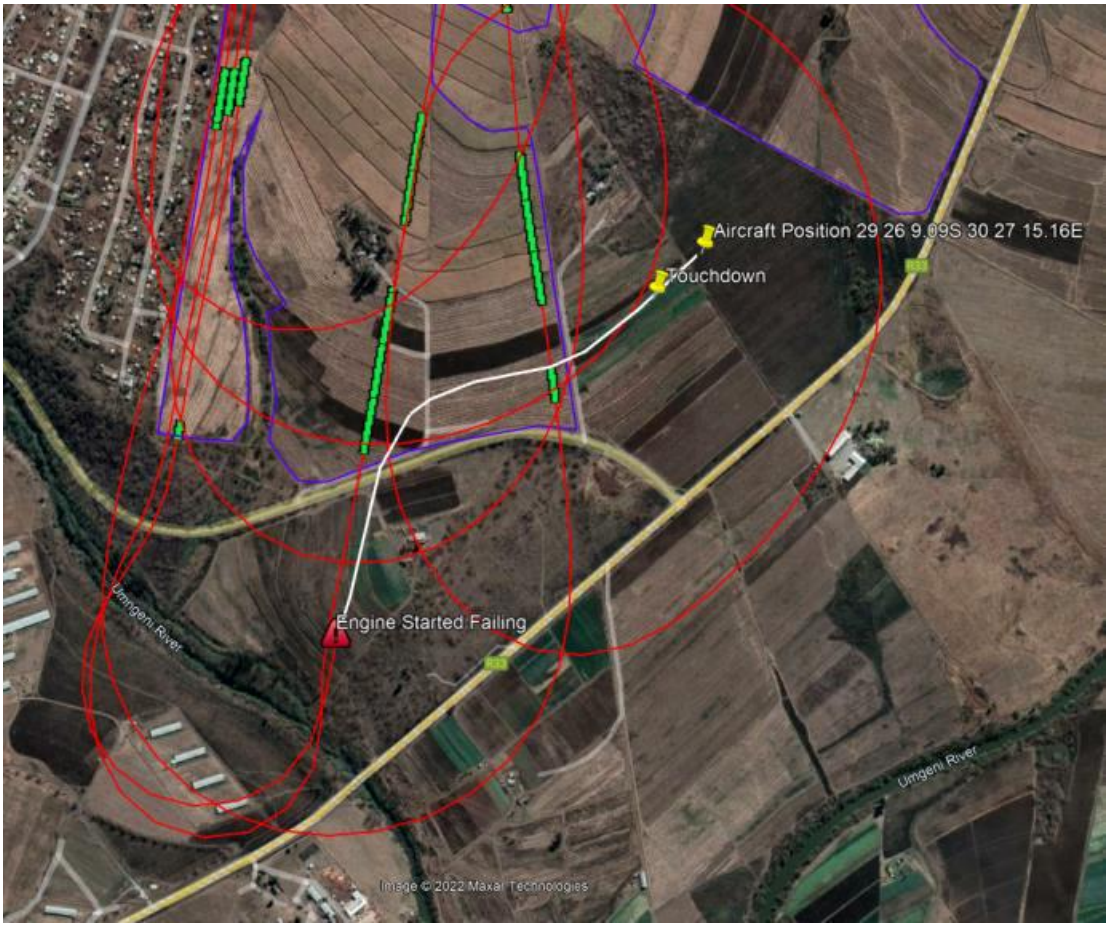

Figure 2: The white line shows the flight path of the aircraft from the point the engine started running rough to where it came to a stop. (Source: Pilot)

1.2. Injuries to Persons

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

Note: Other means people on ground.

1.3. Damage to Aircraft

1.3.1. The aircraft sustained damage to the propeller, undercarriage, both wings' leading edges, left elevator, spinner and the spray system equipment.

Figure 3: The aircraft on site post-accident.

1.4. **Other Damage**

1.4.1. The aircraft impacted a perimeter fence and flattened it.

Figure 4: The perimeter fence (red line) constructed from wood poles and barb wire.

1.5. **Personnel Information**

Nationality	South African	Gender	Male	Age	25
Licence Type	Commercial Pilot Licence (CPL) Aeroplane				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, Instrument, Tug and Agricultural Pilot				
Medical Expiry Date	31 March 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	1232.9
Total Past 24 Hours	0.6
Total Past 7 Days	8.3
Total Past 90 Days	127.0
Total on Type Past 90 Days	127.0
Total on Type	288.0

1.5.1. The pilot was issued a Commercial Pilot Licence (CPL) on 13 March 2022 with an expiry date of 31 March 2023. The pilot's hours in the above table are as per the hours submitted by the pilot through the pilot questionnaire and his logbook.

1.5.2. The pilot was issued a Class 1 medical certificate on 2 March 2022 with an expiry date of 31 March 2023 with no restrictions.

1.5.3. The pilot was issued a Piper PA-25-235 aircraft rating on 14 October 2021 to act as a pilot-in-command.

1.6. **Aircraft Information**

1.6.1. *The Piper PA-25 Pawnee was manufactured by Piper Aircraft as an agricultural aircraft and introduced in August 1959. The Pawnee was produced from 1959 to 1981 and continues to serve its purpose in agricultural spraying. It was also utilised as a tow plane, or tug, used for launching gliders or for towing banners.*

In the same year, two pre-production models were built and in May 1959, aircraft production began. The initial production version was designated as PA-25-150 Pawnee. In 1962, the PA-25-235 Pawnee B was built. It was powered by a Lycoming O-540-B2B5 engine rated at 235 horsepower and showcased a larger hopper, enhanced dispersal gear, and increased payload of 540 kg. In 1967, the PA-25-235 and PA-25-260 Pawnee C were introduced. It was an enhanced variant of the previous Pawnee B fitted with a 235 horsepower or 260 horsepower high-compression type of the Lycoming O-540 engine. It also featured a fixed-pitch or a constant-speed propeller. The PA-25-235 and PA-25-260 Pawnee D with fuel tanks located in the outer wings were also built.
(Source: Piper Aircraft Corp)

Airframe:

Manufacturer/Model	Piper Aircraft Corporation, PA-25-235	
Serial Number	25-2528	
Year of Manufacture	1959	
Total Airframe Hours (At Time of Accident)	3252.2	
Last Inspection (Date & Hours)	2 March 2022	3187.7
Hours Since Last Inspection	64.5	
CRS Issue Date	4 March 2022	
C of A (Issue Date & Expiry Date)	24 November 2018	30 November 2022
C of R (Issue Date) Present Owner	28 November 2017	
Type of Fuel Used	AVGAS 100LL	
Operating Category	Part 137	
Previous Accidents	None	

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

1.6.2 According to available information, the aircraft was first registered under the present owner on 28 November 2017. The aircraft was reissued a Certificate of Release to Service (CRS) on 4 March 2022.

1.6.3 Based on the aircraft flight folio, the last mandatory periodic inspection (MPI) was carried out on 2 March 2022 at 3187.7 airframe hours. The aircraft had accumulated an additional 64.5 airframe hours in operation since the last inspection, and no major defects were recorded.

Engine:

Manufacturer/Model	Lycoming/ O-540-B2B5
Serial Number	L-6538-40
Hours Since New	8034.9
Hours Since Overhaul	921.1

Propeller:

Manufacturer/Model	McCauley/ 2A200-FA8452
Serial Number	103337
Hours Since New	3252.2
Hours Since Overhaul	563.3

1.7. **Meteorological Information**

1.7.1. The weather information below was obtained from the Meteorological Routine Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS) recorded on 3 May 2022 at 0700Z at Pietermaritzburg Airport (FAPM), which is located 10 nautical miles (nm) from the accident site.

FAPM 030700Z AUTO 00000KT CAVOK 14/14 Q1023=

Wind Direction	360°	Wind Speed	Nil	Visibility	9999m
Temperature	14°C	Cloud Cover	CAVOK	Cloud Base	CAVOK
Dew Point	14°C	QNH	1027hPa		

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 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 closest aerodrome to the accident site was Pietermaritzburg Airport (FAPM).

Aerodrome Location	Pietermaritzburg, KwaZulu-Natal
Aerodrome Status	Licensed
Aerodrome GPS coordinates	29°39’0.47” South, 30°23’58.78” East
Aerodrome Elevation	2423 ft
Runway Headings	16/34
Dimensions of Runway	30m x 1537m
Surface of Runway	Asphalt
Approach Facilities	VOR, DME, PAPI
Radio Frequency	122.0 MHz

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 successfully touched down after the forced landing and rolled on an uneven terrain for 60m before the propeller blades impacted a perimeter fence, flattening it. The aircraft continued to roll to the other side of the fence, ground-looped whilst making an approximate 90° turn. It then impacted some bushes before it came to a stop with the nose facing south-east.

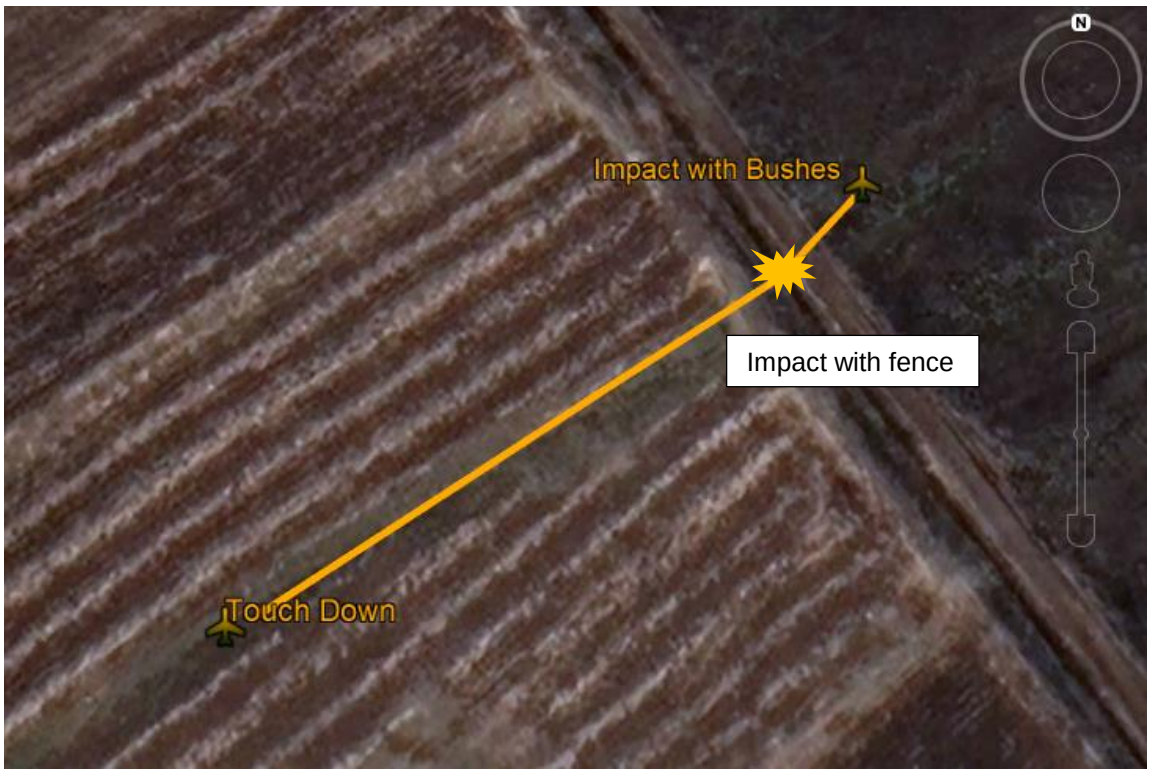

Figure 5: The path of the aircraft after touchdown. (Source: Google Earth)

1.12.2. The fuselage:

The fuselage was fairly intact with signs of damage on both wings' leading edges after impacting the perimeter fence. The left elevator and left-wing leading edge sustained greater impact damage as the aircraft's left-side impacted the bushes and the spray system equipment.

Figure 6 and 7: Damage to the left elevator (left); and left-side wing embedded in the bushes (right).

1.12.3. The engine and propeller:

The engine was intact and was found still attached to the cradle with no sign of oil or fuel spillage. Both propeller blades were still attached to the hub with no signs of rotational signatures. One blade was found lodged firmly into the ground.

Figure 8: The condition of the engine compartment as it was found at the accident site.

Figure 9: The final position of the propeller.

1.13. **Medical and Pathological Information**

1.13.1. Not applicable.

1.14. **Fire**

1.14.1. There was no pre- or post-impact fire that erupted during the accident sequence.

1.15. **Survival Aspects**

1.15.1. The accident was considered survivable as the cabin structure was still intact and the pilot was safely harnessed during the flight. Also, the aircraft rolled on the ground and bled off some speed before impacting the perimeter fence.

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 under the provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.17.2. The operator was issued an Air Operating Certificate (AOC) number CAA/G529D Part 135 with an endorsement of Part 137 by the Regulator (SACAA) on 5 October 2021. The operator had a Class G certificate in accordance with the Civil Aviation Regulations.

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**

2.2.1. The pilot was issued a CPL on 13 March 2022 with an expiry date of 31 March 2023. The pilot's Class 1 medical certificate was issued on 2 March 2022 with an expiry date of 31 March 2023 with no restrictions.

2.2.2. The pilot had the agricultural rating and the aircraft type endorsed on his licence.

2.2.3. The flight was conducted under the provisions of Part 137 of the CAR 2011 as amended and under VMC by day. Fine weather conditions prevailed at the time of the flight.

2.2.4. The aircraft was originally issued a Certificate of Airworthiness on 24 November 2018 with an expiry date of 30 November 2022.

2.2.5. The Certificate of Registration was issued to the present owner on 28 November 2017.

2.2.6. The last MPI was carried out on 2 March 2022 at 3 187.7 airframe hours. The aircraft had accumulated an additional 64.5 airframe hours in operation since the last inspection and no major defects were recorded. The aircraft was issued a Certificate of Release to Service (CRS) on 4 March 2022 with an expiry date of 3 March 2023 or at 3 287.7 hours, whichever occurs first unless the aircraft is involved in an accident.

2.2.7. The aircraft's engine lost power during a climbing left turn.

3. ON-GOING INVESTIGATION

3.1. The AIID investigation is on-going and the investigator 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