AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/2/3/10461	
Aircraft Registration	ZS-URO	**Date of Accident**		11 June 2024		**Time of Accident**	0635Z
Type of Aircraft	Cessna 182T Skylane			**Type of Operation**		Private (Part 91)	
Pilot-in-command Licence Type	Commercial Pilot Licence (CPL)			**Age**	48	Licence Valid	Yes
Pilot-in-command Flying Experience		**Total Flying Hours**		6 279.8		**Hours on Type**	1 202.0
Last Point of Departure	Mooketsi Airstrip near Tzaneen, Limpopo Province						
Next Point of Intended Landing	Esme 4 Farm Airstrip, Limpopo Province						
Damage to the Aircraft	Substantial						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Approximately 19 nautical miles (nm) from Mooketsi Airstrip on public road D3732 near Tzaneen, Limpopo province (GPS position: 23°34'00" South 030°09' 00" East), at an elevation of 2 300 feet (ft)							
Meteorological Information	Temperature: 13.3°C; Dew point: 9.7°C; Cloud: Broken stratocumulus						
Number of People On-board	1 + 3	**Number of People Injured**	1	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On Tuesday morning, 11 June 2024, a pilot and three passengers on-board a Cessna 182T Skylane aircraft with registration ZS-URO took off on a private flight from Mooketsi Airstrip near Tzaneen, Limpopo province, with the intention to land at Esme 4 Farm Airstrip in the same province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011, as amended.

The pilot reported that the aircraft had approximately 3 hours and 20 minutes of endurance during the pre-flight inspection. En route to Esme 4 Farm Airstrip and whilst overhead Giyane residential area, the engine lost power and the pilot elected to execute a forced landing on public road D3732. During the landing roll, the aircraft's left wing struck multiple trees on the side of the road. The accident occurred approximately 8 minutes after take-off. The aircraft sustained substantial damage; one of the passengers sustained minor injuries and the remainder of the occupants were not injured.

Probable Cause/s and/or Contributory Factors

The aircraft experienced serious carburettor icing which led to a loss of engine power and the subsequent unsuccessful forced landing.

SRP Date	9 December 2025	Publication Date	10 December 2025

Occurrence Details

Reference Number	**:** CA18/2/3/10461
Occurrence Category	**:** Accident (Category 1)
Type of Operation	**:** Private (Part 91)
Aircraft Registration	**:** ZS-URO
Aircraft Make and Model	**:** Cessna 182T Skylane
Nationality	**:** South African
Place	**:** Public road at GPS:23°34'00" S 030°09' 00" E
Date and Time	**:** 11 June 2024 at 0635Z
Injuries	**:** One of the passengers sustained minor injuries
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) was notified of the occurrence involving a Cessna 182T Skylane aircraft, which occurred on a gravel public road on 11 June 2024 at 0635Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and International Civil Aviation Organisation (ICAO) STD Annex 13 definitions. The AIID appointed an investigator-in-charge to conduct a desktop investigation. Notification was sent to the State of Design and Manufacturer in accordance with the CAR 2011 Part 12 and the ICAO Annex 13 Chapter 4. The State did not appoint an accredited representative and/or advisor.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Aircraft — the Cessna 182T Skylane *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
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
CAR	Civil Aviation Regulations
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
EGT	Exhaust Gas Temperature
FAWB	Wonderboom Aerodrome
FDR	Flight Data Recorder
ft	Feet
GPS	Global Position System
hPa	Hectopascal
hrs	Hours
kt	Knots
m	Metres
METAR	Meteorological Aerodrome Report
MHz	Megahertz
mins	Minutes
MLU	Midlife Upgrade
MPI	Mandatory Periodic Inspection
nm	Nautical Miles
PIC	Pilot-in-Command
POH	Pilot’s Operating Handbook
QNH	Barometric Pressure Adjusted to Sea Level
RPM	Revolutions per Minute
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
SB	Service Bulletin
SID	Supplementary Inspection Documents
SL	Service Letters
TSI	Technical Service Instructions
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 Tuesday morning, 11 June 2024, a pilot and three passengers on-board a Cessna 182T Skylane aircraft with registration ZS-URO took off on a private flight from Mooketsi Airstrip near Tzaneen, Limpopo province, with the intention to land at Esme 4 Farm Airstrip in the same province. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011, as amended.

1.1.2. The pilot reported that a pre-flight inspection of the aircraft was conducted with no anomalies found. The aircraft had approximately 3 hours (hrs) and 20 minutes (mins) duration of Avgas LL100 in the tanks. The aircraft took off at an airspeed of approximately 60 knots (kts) with the engine power set at 2 500 revolutions per minute (RPM) and manifold air pressure (MAP) indicating 26 inches.

1.1.3. Whilst routing east of the Makhado Terminal Control Area (TMA) and overhead Giyani residential area, the engine began to oscillate whilst making noise that sounded like something was being winded/twisted; this was accompanied by a sharp increase in exhaust gas temperature (EGT) which was nearing its maximum limit. At the time, the aircraft had reached a cruise altitude of 5 500 feet (ft) after climbing through broken clouds. The pilot immediately initiated a descent below the cloud layer and considered returning to Mooketsi Airstrip. However, due to the progressive engine power loss, he elected to conduct a forced landing on a nearby tarred public road (D3732) which, from the air, appeared suitable for landing as there were no power lines near the road.

1.1.4. The aircraft approached public road D3732 at a speed of approximately 80 kts. The narrow width of the road and the surrounding vegetation posed significant challenges during the landing roll. As the aircraft touched down and rolled on the road, the left wing struck multiple trees that were next to the road, as a result, the outboard section of the left wing and the aileron were severed. After impacting the trees, the pilot lost directional control of the aircraft, and it veered off to the left side of the road and into the bush. During this process, the nose gear strut collapsed, which caused the propeller to strike the ground. The aircraft came to rest in an upright position. The flight duration was approximately 8 minutes from take-off.

1.1.5. The aircraft damage was substantial. One of the three passengers sustained minor injuries, whilst the pilot and the other two passengers were not injured.

1.1.6. The accident occurred on public road D3732 at Global Positioning System (GPS) co-ordinates determined to be 23°34'00" South 030°09' 00" East, at an elevation of 2 300 feet (ft).

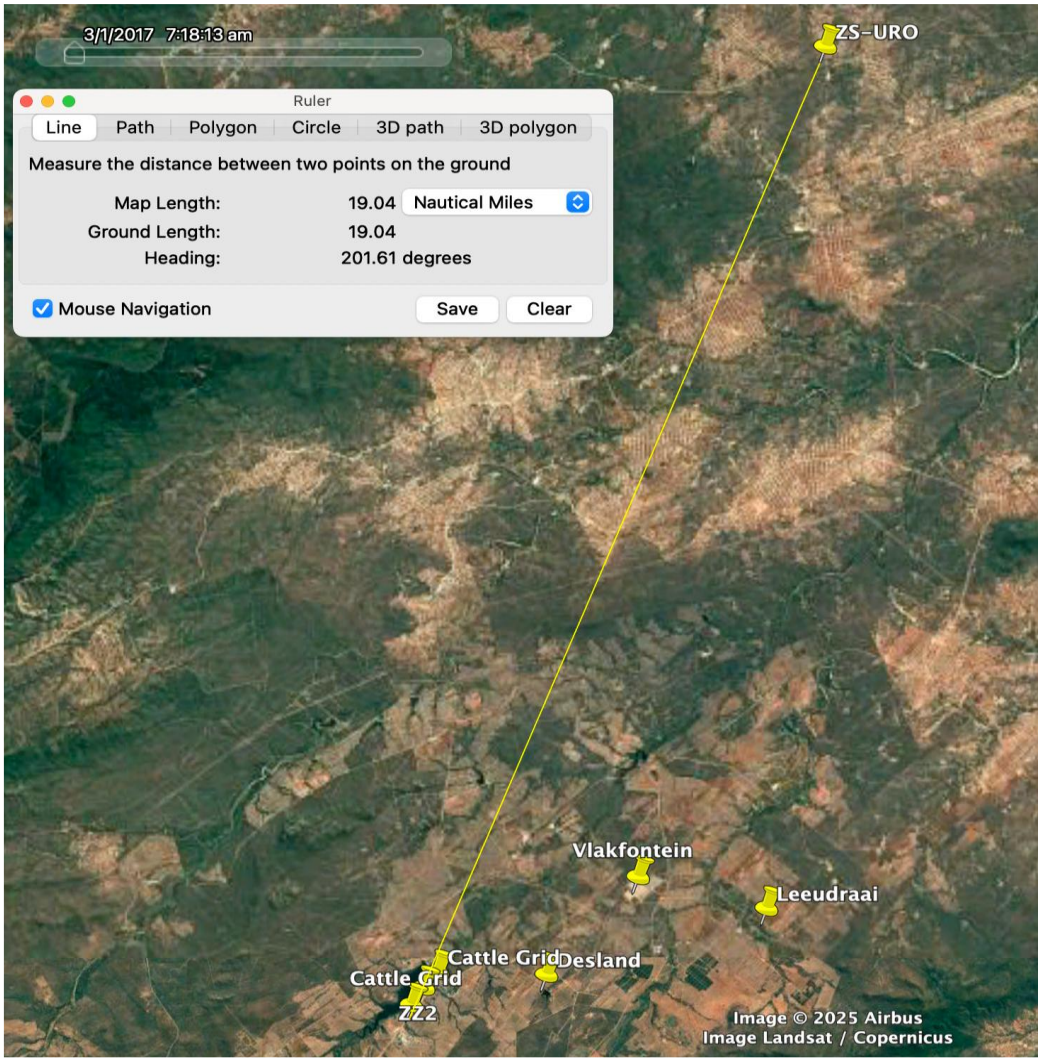

Figure 1: The distance from Mooketsi Airstrip to the accident site. (Source: Google Earth)

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	1	1	-
None	1	-	2	3	-
Total	**1**	**-**	**3**	**4**	**-**

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. The aircraft sustained substantial damage.

Figure 2: The aircraft as it came to rest next to the road. (Source: Pilot)

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

1.5.1 Pilot-in-Command (PIC)

Nationality	South African	Gender	Male	Age	48
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument, Agricultural				
Medical Expiry Date	31 May 2025 (Class 1)				
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	6 279.8
Total Past 24 Hours	3.8
Total Past 7 Days	17.7
Total Past 90 Days	92.0
Total on Type Past 90 Days	27.0
Total on Type	1 202.0

1.5.2. The pilot had a Commercial Pilot Licence (CPL) that was initially issued on 22 November 2017. The licence was renewed on 22 November 2023 with an expiry date of 30 November 2024.

1.5.3. The pilot had a Class 1 aviation medical certificate that was issued on 31 May 2024 with an expiry date of 31 May 2025 with no medical restrictions.

1.6. Aircraft Information

1.6.1. The following information is an extract from https://cessna.txtav.com

The Cessna 182T Skylane is an American four-seat, single engine light airplane built by Cessna of Wichita, Kansas. There is an option to add two child seats in the baggage area. Introduced in 1956, the 182 has been produced in a number of variants, including a version with retractable landing gear, and is the second most popular Cessna model after the 172. The 182T Skylane model is a four-seat light aircraft with fixed landing gear, powered by a fuel injected 230 hp (172 kW) Lycoming IO-540-A1A5 piston engine with a gross weight of 3 100 lb (1 406 kg) for take-off, and 2 950 lb (1 338 kg) for landing. 182T Skylane model was certified on 23 February 2001 and, as of July 2015, it is the only variant in production.

Airframe:

Manufacturer/Model	Cessna Aircraft Company/C182T	
Serial Number	182-81030	
Year of Manufacture	2001	
Total Airframe Hours (At Time of Accident)	3 455.1	
Last Inspection (Date & Hours)	2 April 2024	3 437.9
Hours Since Last Inspection	17.2	
CRS Issue Date	2 April 2024	
C of A (Issue Date & Expiry Date)	31 April 2024	31 March 2025
C of R (Issue Date) (Present Owner)	11 June 2013	

Type of Fuel Used	Avgas 100LL
Operating Category	Private (Part 91)
Previous Accidents	None

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

Engine:

Manufacturer/Model	Lycoming
Serial Number	L-28123-48A
Part Number	IO-540 A1A5
Hours Since New	3 455.1
Hours Since Overhaul	1 455.1

Propeller:

Manufacturer/Model	McCauley
Serial Number	051311
Part Number	B3D36C431-C
Hours Since New	3 475
Date of Midlife Upgrade (MLU)	13 March 2021
Hours Since MLU	603

1.6.2. The aircraft Certificate of Release to Service (CRS) was issued on 2 April 2024 at 3 437.9 hours with an expiry date of 1 April 2025 or at 3 536.7 hours, whichever comes first.

1.6.3. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 6 March 2018. The C of A was renewed on 31 March 2024 with an expiry date of 31 March 2025.

1.6.4. The weight and balance calculation of 3 007.3 pounds (lbs) at take-off was within the maximum allowable take-off weight of 3 100 (lbs), according to the Pilot's Operating Handbook (POH).

Aircraft: C182T
Registration: ZS-URO
Owner: ZZ2-2

Basic Empty Weight 1985.5lbs x 37.80" = 75051.9
Front Seat 1 253.5lbs x 37.00" = 9379.5
Front Seat 2 176.4lbs x 37.00" = 6526.8
Rear Seat 1 176.4lbs x 74.00" = 13053.6
Rear Seat 2 154.3lbs x 74.00" = 11418.2
Baggage A 16.0lbs x 97.00" = 1552.0
Baggage B 4.4lbs x 116.00" = 510.4
Baggage C 0.0lbs x 126.00" = 0.0

Zero Fuel CG 2766.5lbs x 42.47" = 117492.4 OK!
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+ Fuel 240.8lbs x 46.60" = 11221.3

Take Off CG 3007.3lbs x 42.80" = 128713.7 OK!
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- Fuel 60.2lbs x 46.60" = 2805.3

Landing CG 2947.1lbs x 42.72" = 125908.4 OK!
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Figure 3: Weight and balance calculation provided by the pilot. (Source: Pilot)

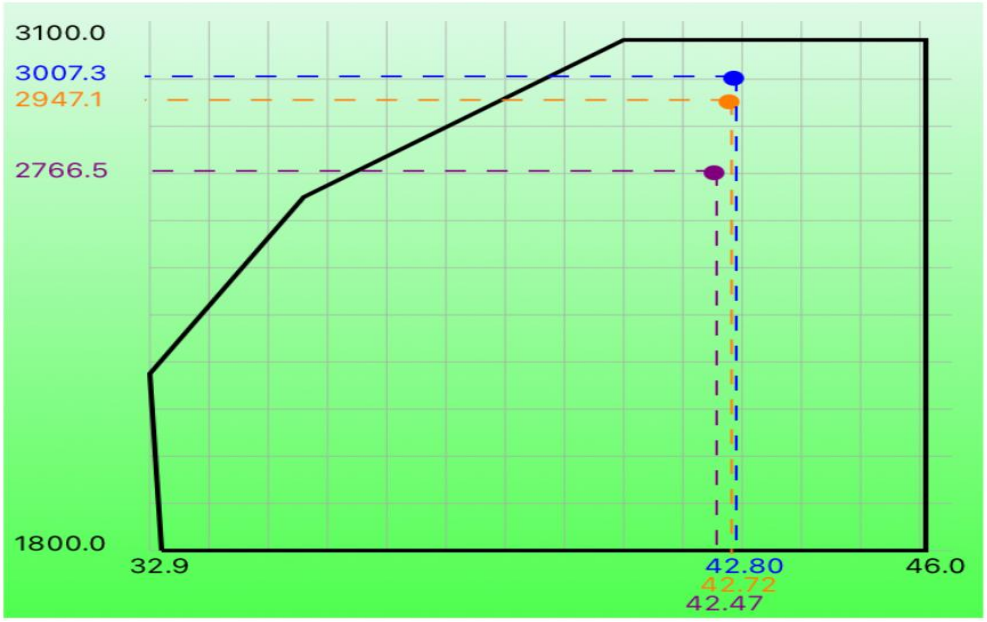

Figure 4: The weight and balance chart calculation based on the numbers in Figure 3. (Source: Pilot)

1.6.5. A review of the aircraft's maintenance documentation, including records for the airframe, engine, propeller, flight folio and mandatory periodic inspection (MPI) reports was conducted. The aircraft was maintained in accordance with the manufacturer's prescribed maintenance procedures. All applicable Service Letters (SL), Service Bulletins (SB), Technical Service Instructions (TSI) and Supplementary Inspection Documents (SID) were complied with during maintenance activities. These procedures were conducted by an approved aircraft maintenance organisation (AMO) and the aircraft owner to ensure continued airworthiness of the aircraft.

1.6.6. According to the pilot, the aircraft departed with a fuel endurance of 3 hours and 20 minutes (three-quarters of Avgas). The flight endured for approximately 8 minutes. Post-accident inspection indicated that there was sufficient fuel on-board and it was not contaminated.

1.7. Meteorological Information

1.7.1. At the time of the accident, broken stratocumulus clouds prevailed (see Figure 5). Given the stated forecast and observations, the significant weather at the time of the accident may have been broken stratocumulus cloud. Moreover, the pilot stated that he flew through broken clouds.

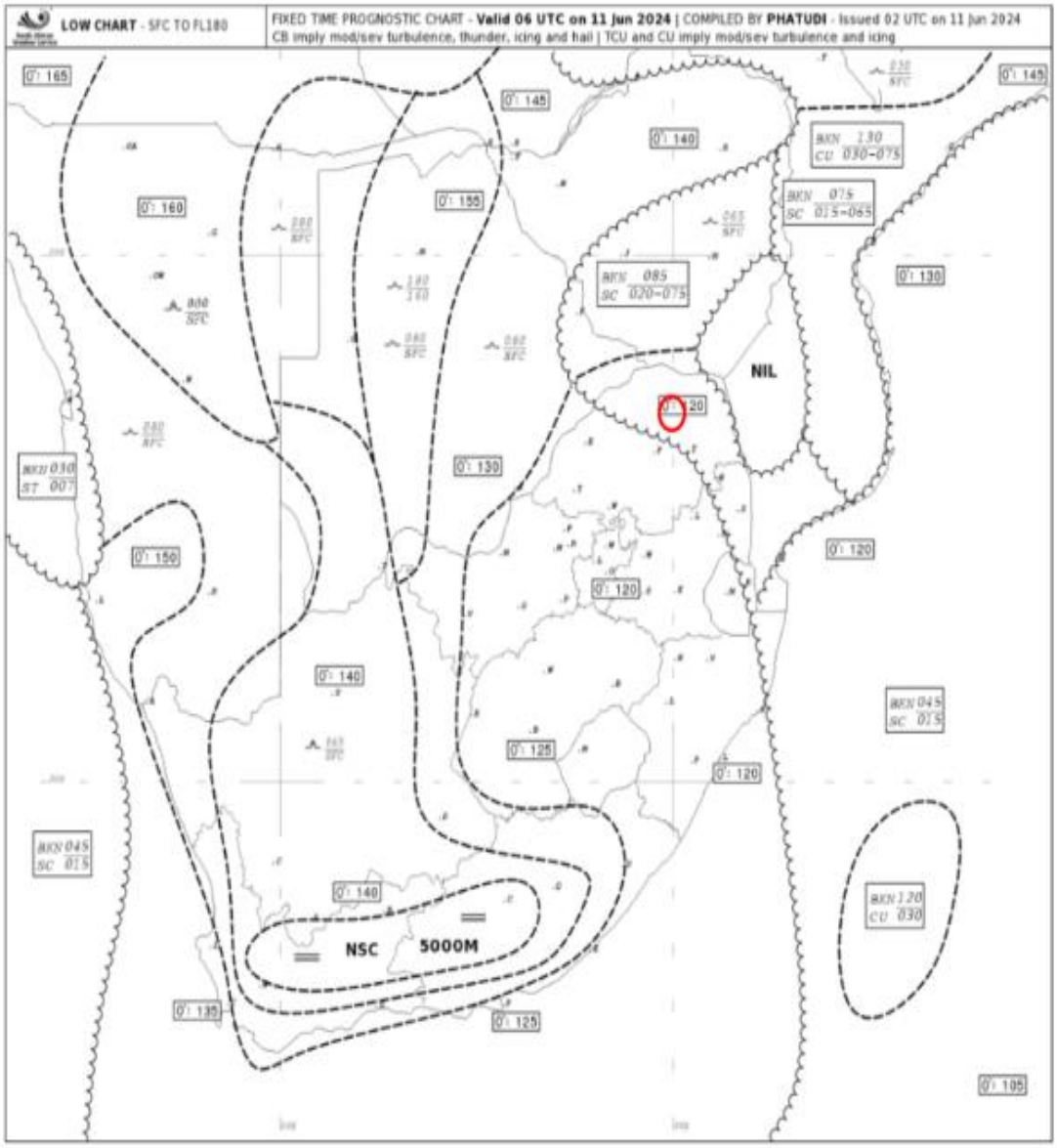

Figure 5: Low-level significant weather chart valid until 0900Z. The accident area is highlighted in red. (Source: South African Weather Service)

Effects of Broken Stratocumulus Clouds on Aircraft (Source: the ICAO Annex 3 – Meteorological Service for International Air Navigation)

1. Turbulence

Stratocumulus clouds, especially in broken form, are associated with stable atmospheric conditions, but they may still produce light to occasional moderate turbulence.

Turbulence is more likely when:

There is wind shear in the cloud layer.

The aircraft is flying near the cloud tops, where convective activity may be slightly stronger.

The ICAO documents caution that turbulence within cloud can reduce passenger comfort and aircraft performance depending on severity.

1.7.2. The approximate relative humidity in Tzaneen, Limpopo, on 11June 2024 was 79% based on the following:

Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS) recorded at Tzaneen Airfield (FATZ) on 11 June 2024 at 0635Z (refer to Appendix A). The accident site was 37.1 kilometres (km) from FATZ.

Based on the above approximate relative humidity (79%), the dew point was calculated as follows:

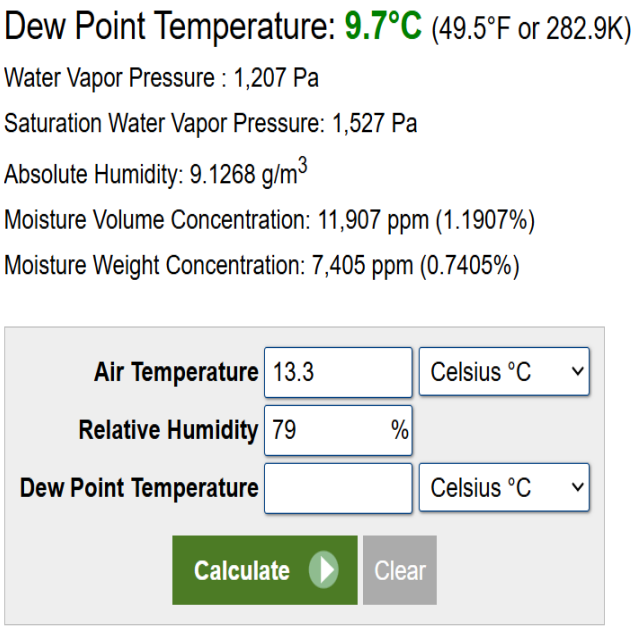

Figure 6: Dew point calculation. (Source: https://www.calculator.net/dew-point-calculator.html)

1.7.3. According to the information derived from 1.7.2, the approximate dew point temperature was 9.7°C. The calculated dew point depression (3.6°C) suggested that the weather conditions

at the time of the accident were conducive for the formation of serious carburettor icing at any power setting. Therefore, these conditions increased the likelihood of carburettor icing (as indicated by the black solid line, along with the black dot, in Figure 7).

Temperature	13.3 °C
Dewpoint	9.7°C
Dewpoint depression	3.6°C
Relative humidity	79%

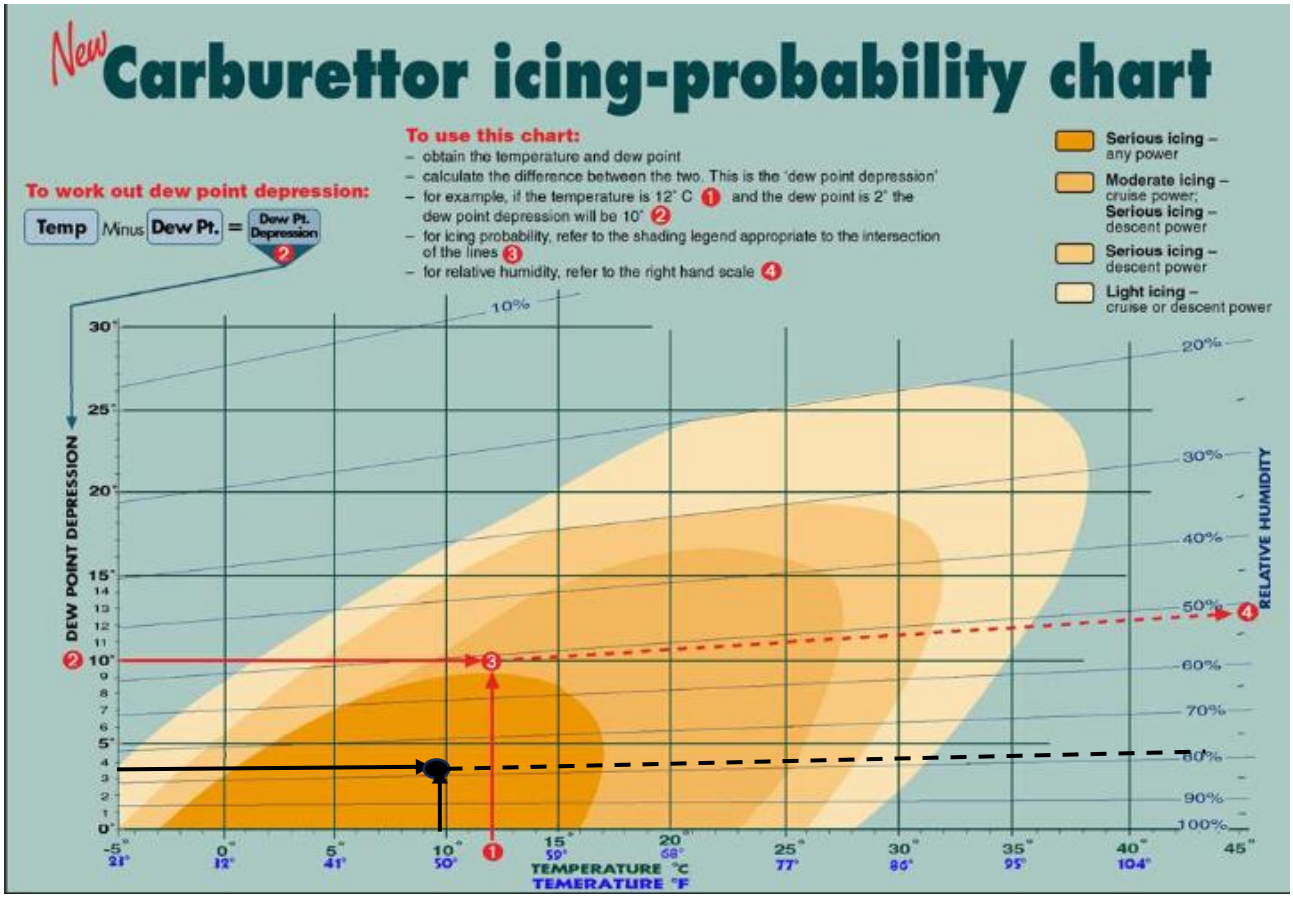

Figure 7: Carburettor icing probability chart.

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 accident did not occur at or in the vicinity of an aerodrome; it occurred on public road D3732 in Tzaneen, Limpopo province.

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 pilot executed a forced landing on a tarred public road. During the landing roll, the left wing struck multiple trees on the side of the road which resulted in complete separation of the outboard section of the left wing, including the attached aileron.

Figure 8: The left wing severed several tree branches during the landing roll. (Source: Pilot).

1.12.2. The detached outboard section of the left wing was located approximately 10 metres (m) from the final resting position of the aircraft, and the separated aileron was found about 9m away.

Figure 9: The final position of the aircraft with the left-wing outboard section and aileron that were severed by the trees. (Source: Pilot)

1.12.3. The nose landing gear strut collapsed during the accident sequence. The propeller exhibited bending and rotational scoring. The aircraft was substantially damaged.

1.13. Medical and Pathological Information

1.13.1. None.

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 survivable as the pilot and the passengers were properly restrained with the safety belts, and the cabin structure was not damaged during the accident sequence.

1.16. Tests and Research

1.16.1. Engine Examination and Post-accident Testing

After the accident, the aircraft's engine was recovered and transported to an AMO facility at Wonderboom Aerodrome (FAWB) for a detailed inspection and functional testing. As part of the post-accident investigation process, a comprehensive examination of the engine was conducted to determine if any mechanical anomalies or malfunctions had contributed to the in-flight engine power loss.

1.16.2. The engine was subjected to a ground run test under controlled conditions. During this test, the engine operated within normal parameters throughout all phases of operation, including idle-, partial- and full-power settings. No irregularities were observed in terms of engine performance, response or stability. Engine ignition systems were also assessed during the ground run, and no issues such as misfiring, rough running or ignition delays were detected.

1.16.3. In addition, a post-accident inspection of the aircraft's fuel system revealed that there was sufficient fuel on-board at the time of the accident. The fuel samples taken from the tanks and lines showed no evidence of contamination, such as water or debris.

1.17. Organisational and Management Information

1.17.1. This was a private flight conducted under the provisions of Part 91 of the CAR 2011, as amended.

1.17.2. The aircraft was registered to the present owner on 11 June 2013.

1.18. Additional Information

1.18.1. Carburettor Icing (Source: ICAO Annex 3 and Document 9760)

Carburettor icing during descent can significantly affect an aircraft's performance by restricting or blocking airflow to the engine due to ice forming inside the carburettor. This occurs because of the cooling effect caused by fuel vaporisation and pressure drop within

the carburettor, especially when engine power is reduced during descent. The result can be a gradual or sudden loss of engine power, rough running or even engine failure if not promptly addressed. This poses a serious risk during the approach and landing phases where altitude and time to recover are limited. During severe cases of carburettor icing, the throttle valve can become stuck due to ice build-up.

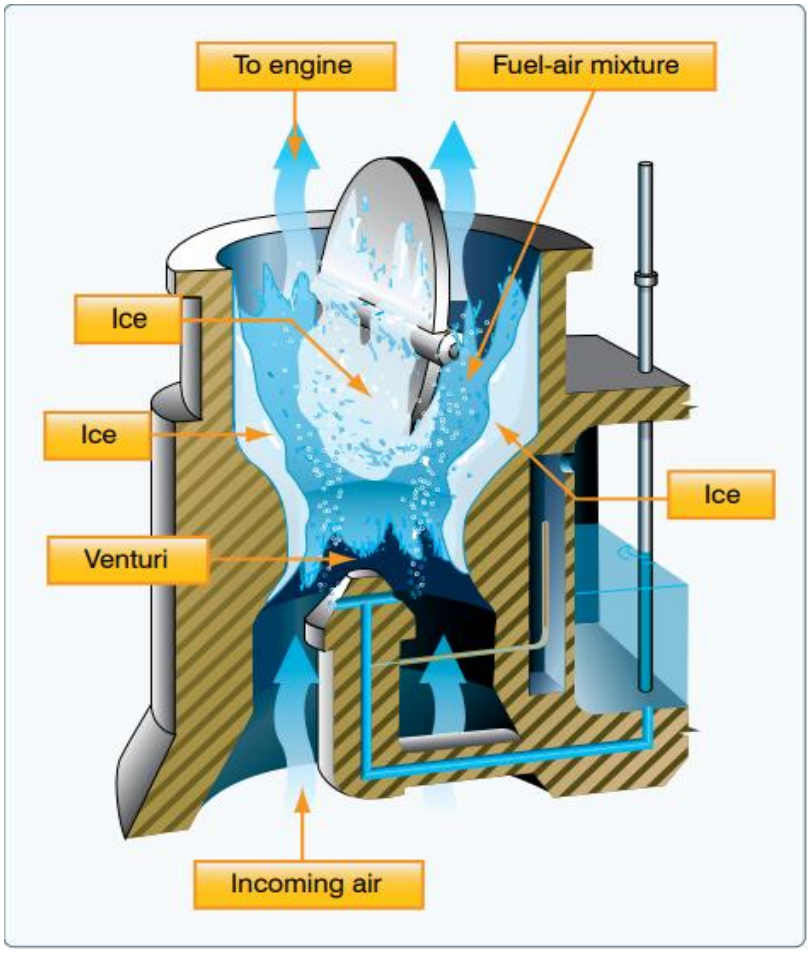

Diagram 1: Typical carburettor ice build-up.

Contributing Factors to Carburettor Icing:

1) *Temperature and Humidity Conditions*
    - *Most likely to occur between -5°C and +20°C.*
    - *High relative humidity increases risk significantly.*
2) *Low Power Settings*
    - *Cruise descent or prolonged idle power, where throttle is nearly closed, increases venturi effect and likelihood of ice.*
    - *Common during approach or training exercises involving power changes.*
3) *Moisture in the Air*
    - *Water vapour in the intake air can freeze as it passes through the carburettor's venturi, where pressure drops and temperature drops rapidly.*

Symptoms of carburettor icing:

1) *Gradual Drop in RPM*
    - *A slow, steady decrease in engine RPM is one of the first signs.*
    - *Often occurs without any immediate engine roughness.*
2) *Engine Roughness or Vibration*
    - *As ice builds up and airflow is disrupted, the engine may run unevenly.*
    - *This is more noticeable if RPM drop is not addressed promptly.*
3) *Poor Engine Response to Throttle Input*
    - *Lagging or weak response when throttle is advanced.*
4) *Temporary RPM Increase After Carb Heat Application*
    - *Applying carb heat causes a further drop in RPM initially (due to hot, less dense air),*
    - *Followed by a gradual increase if ice melts and normal airflow is restored.*

Icing Potential:

1) *Supercooled Water Content*
    - *Stratocumulus clouds can contain supercooled liquid water droplets, particularly when temperatures range between 0°C and -15°C. These droplets freeze on contact with aircraft surfaces.*
2) *Icing Conditions:*
    - *Flying through broken or layered stratocumulus at these temperatures can result in airframe, propeller or carburettor icing.*
3) *ICAO Classification:*
    - *ICAO categorises icing in stratocumulus as generally light, but it may reach moderate intensity in thicker, moisture-rich layers.*
4) *Duration Effect:*
    - *The longer the aircraft remains in cloud, or if it transitions between multiple broken layers, the greater the cumulative ice accretion risk.*
5) *Temperature and Altitude Dependence:*
    - *Icing is most likely to occur between the cloud base and the 0°C isotherm, with risk diminishing rapidly below -20°C, where droplets are mostly frozen.*
6) *Meteorological Indicators:*
    - *Visible moisture, reduced visibility and temperature/dew point spread ≤ 3°C can indicate potential icing conditions.*
7) *Aircraft Performance Effects:*
    - *Ice accumulation can cause increased drag, decreased lift, reduced engine power (from carburettor icing), and instrument errors (e.g., blocked pitot tube).*

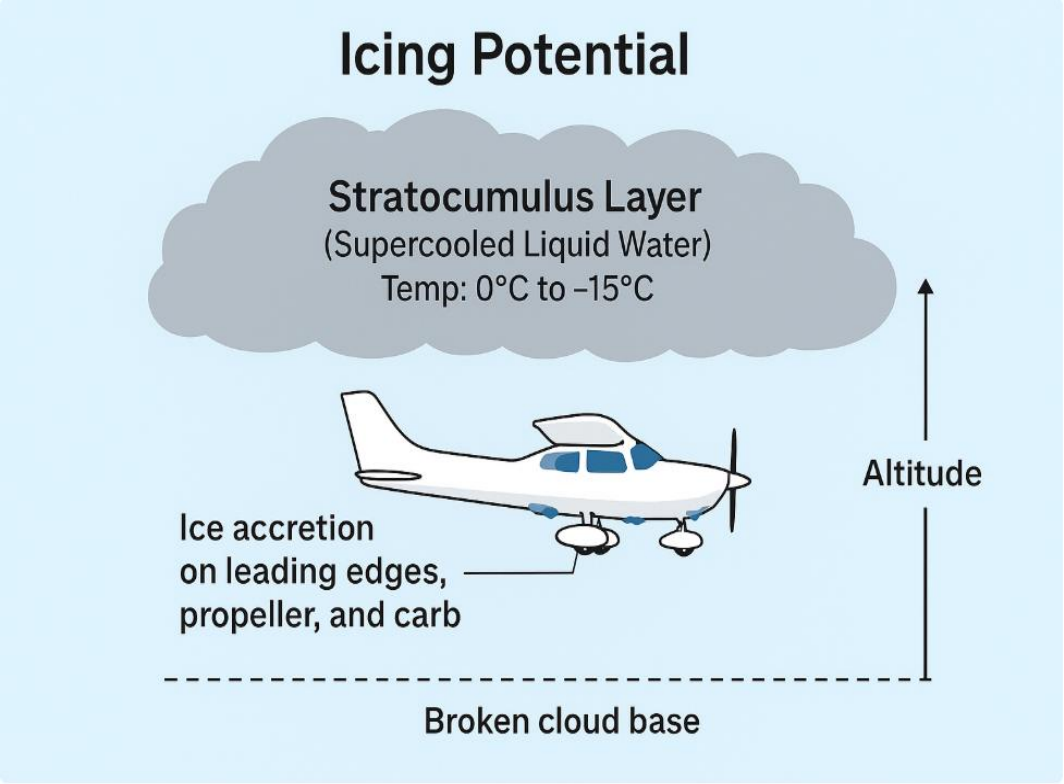

Diagram 2: Diagrammatic illustration of icing potential.

1.19. Useful or Effective Investigation Techniques

1.19.1. None.

2. ANALYSIS

2.1. General

From the available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any organisation or individual.

2.2. Analysis

2.2.1. The pilot had a valid Commercial Pilot Licence (CPL) and an appropriate current medical certificate at the time of the accident. Additionally, the pilot was endorsed to operate the Cessna 182T Skylane, the aircraft type involved in this accident.

2.2.2. During the flight, the aircraft lost engine power. In response to the engine power loss, the pilot identified a public road on which to perform a forced landing. The decision to carry out an off-airport landing was consistent with standard emergency procedures, as well as prioritising the preservation of the occupants on-board.

2.2.3. The aircraft's most recent MPI was completed and certified; at the time of the accident, the aircraft had accumulated an additional 17.2 flight hours since the inspection. This indicated that the aircraft was within the prescribed maintenance interval which suggested that maintenance currency or inspection lapse was not a contributing factor to this accident.

2.2.4. The aircraft had a valid Certificate of Airworthiness (C of A). Records indicated that it had also received a recent Certificate of Release to Service (CRS) which confirmed that it was considered airworthy and serviceable prior to the flight. Post-accident, the engine was recovered and transported to an approved AMO facility in FAWB, Pretoria, for further examination and testing.

2.2.5. A comprehensive examination was conducted to determine whether any mechanical faults or anomalies had contributed to the reported in-flight engine power loss. During the ground run testing under controlled conditions, the engine performed normally across all power settings, including idle-, partial- and full-power settings. Engine response and performance were stable with no signs of abnormal fluctuations or power loss. Furthermore, no issues were detected in the ignition system, such as misfiring, rough running or delayed ignition. A thorough inspection of the aircraft's fuel system revealed that there was sufficient fuel on-board at the time of the accident. Fuel samples showed no evidence of contamination, including water or debris. Based on these findings, no mechanical defects or fuel-related issues were identified that could explain the engine power loss experienced during the flight.

2.2.6. The aircraft's calculated take-off weight of 3 007.3 lbs was found to be within the maximum allowable take-off weight of 3 100 lbs as specified in the POH. This indicated that the aircraft was operating within the prescribed weight limitations; therefore, excessive loading was not a contributing factor to this accident.

2.2.7. The corresponding dew point depression placed the weather conditions (temperature 13°C; dew point 10°C) within the range that was conducive to the formation of serious carburettor icing at any power setting. The ambient temperature and humidity levels were conducive to carburettor ice formation. High relative humidity (79%) significantly increased the potential for ice accumulation within the carburettor venturi which led to airflow restriction and fuel-air mixture imbalance. The reported symptoms, including engine unresponsiveness and loss of power, were consistent with the effects of carburettor icing.

2.2.8. Satellite imagery at the time of the accident indicated the presence of broken stratocumulus cloud in the vicinity of the accident site. Broken stratocumulus clouds are typically associated with stable atmospheric conditions, but they can still produce light to moderate turbulence. Such turbulence can lead to temporary fluctuations in aircraft attitude and performance. In

addition, stratocumulus clouds often contain supercooled liquid water when temperatures range between 0°C and -15°C, creating a potential for carburettor icing. Given these conditions, and the pilot's statement of "flying through broken cloud", it is probable that the aircraft was exposed to localised turbulence and icing conditions within the stratocumulus layer. These environmental factors may have adversely affected engine performance and aircraft handling, which contributed to the sequence of events that led to this accident.

3. CONCLUSION

3.1. General

From the available evidence, the following findings, causes and contributing factors 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 conclusion 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.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability.

3.2. Findings

Pilot

3.2.1. The pilot had a Commercial Pilot Licence (CPL) that was initially issued on 22 November 2017. The licence was reissued on 22 November 2023 with an expiry date of 30 November 2024. The aircraft type was endorsed on his licence and logbook.

3.2.2. The pilot had a Class 1 aviation medical certificate that was issued on 31 May 2024 with an expiry date of 31 May 2025 with no medical restrictions.

Aircraft

3.2.3. The last mandatory periodic inspection (MPI) of the aircraft was conducted and certified on

2 April 2024 at 3 437.9 airframe hours. The aircraft had accrued 17.2 hours since the said MPI.

3.2.4. The aircraft was issued a Certificate of Release to Service (CRS) on 2 April 2024 at 3 437.9 hours with an expiry date of 1 April 2025 or at 3 536.7 hours, whichever comes first.

3.2.5. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 6 March 2018. The C of A was renewed on 31 March 2024 with an expiry date of 31 March 2025.

3.2.6. The Certificate of Registration (C of R) was issued to the present owner on 13 June 2013.

3.2.7. Post-accident, the engine was recovered and examined at an approved aircraft maintenance organisation (AMO). Ground run testing and inspection revealed no mechanical faults or abnormalities in the engine or ignition system. The fuel system showed sufficient and uncontaminated fuel.

3.2.8. The aircraft's take-off weight of 3 007.3 lbs was within the maximum allowable limit of 3 100 lbs as specified in the POH; therefore, excessive loading was not a contributing factor to this accident.

Meteorological

3.2.9. The temperature (13°C), dew point (10°C) and relative humidity (79%) created conditions that were conducive for serious carburettor icing formation.

3.2.10. Broken stratocumulus cloud in the area likely exposed the aircraft to localised turbulence and icing conditions.

3.3. Probable Cause/s

3.3.1. The aircraft experienced serious carburettor icing which led to a loss of engine power and the subsequently unsuccessful forced landing.

3.4. Contributory Factor/s

3.4.1. None.

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. None.

5. APPENDICES

5.1. Appendix A: South African Weather Service (SAWS) report.

This report is issued by:

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

South African Weather Service

Private Bag X097, Pretoria, 0001 • Tel: + 27 (0) 12 367 6000 • www.weathersa.co.za • USSD: *120*7297#

AIRCRAFT ACCIDENT REPORT

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SUMMARY OF OBSERVED WEATHER AT ESTIMATED TIME OF INCIDENT

Satellite Image

The Day Natural Colour RGB (DNC) satellite images of the MeteoSat Second Generation (MSG) shows a presence of localised stratocumulus cloud in the vicinity of the accident region (See white location pin in images) prior (figure 1 at 0615Z), during the incident (figure 2 at 0633Z) and post the time of incident (figure 3 at 0645Z).

Figure 1: Day Natural Colour satellite image valid for 0615Z on 11 June 2024. (Copyright MSG)

Figure 2: Day Natural Colour satellite image valid for 0630Z on 11 June 2024. (Copyright MSG)

Figure 3: Day Natural Colour satellite image valid for 0645Z on 11 June 2024. (Copyright MSG)

Surface data

The Polokwane and Tzaneen surface observation for the times 0600Z to 0700Z was used.

Table 1: Polokwane weather station surface observations for 11 June 2024.

	Temperature (°C)	Humidity (%)	Wind direction	Wind speed (KT)	QNH (hPa)
06Z	6.7	75	200	4	1033
07Z	10.1	74	0	0	1034

In Polokwane, winds were light and variable during the time of the incident and humidity ranged from 74-75%, which may have indicated the presence of scattered low-level cloud in the region. This coincides with the stratocumulus cloud observed on the satellite image.

Table 2: Tzaneen weather station surface observations for 11 June 2024.

	Temperature (°C)	Humidity	Wind direction	Wind speed (KT)	QNH (hPa)
06Z	9.0	92	0	0	1017
07Z	13.3	79	0	0	1018

In Polokwane, winds were light and variable during the time of the incident and humidity ranged from 79-92%, which may have indicated the presence of scattered to broken low-level cloud in the region. This also coincides with the stratocumulus cloud observed on the satellite image.

Significant Weather Chart

Figure 4 is the low -level chart valid for 0600Z on 27 October 2024. Although it is valid for 6Z, forecasters accommodate forecasts for a few hours before and after validity period. According to the forecast in figure 4, broken stratocumulus clouds were forecasted, otherwise no other significant weather was forecasted. This broken stratocumulus forecast coincides with the stratocumulus clouds observed in the satellite images.

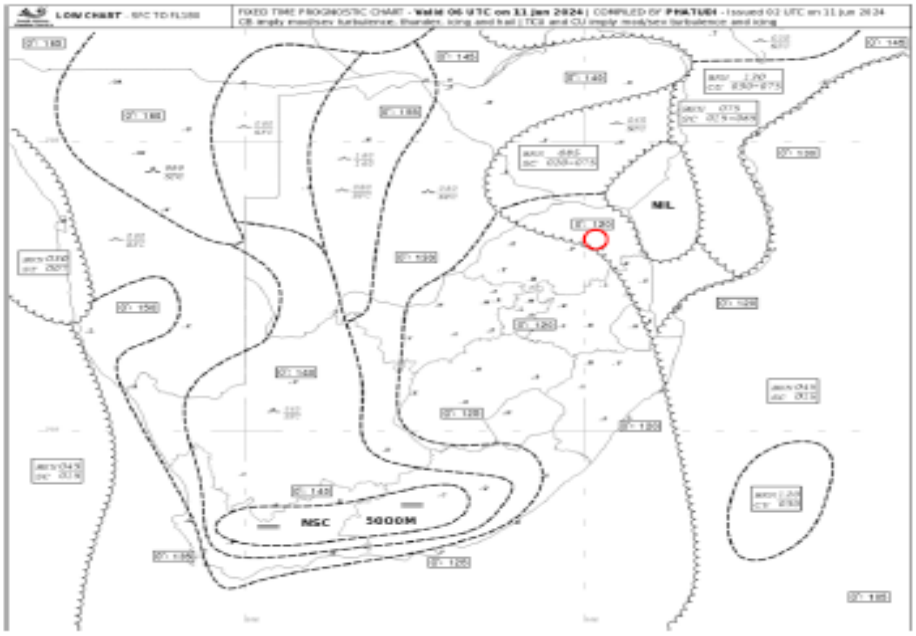

Figure 4: Low level significant weather chart valid for 0900Z (Accident area demarcated in red).

CONCLUSION

At the time of the incident broken stratocumulus clouds was observed on the satellite imagery, although the cloud base is unknown due to the absence of METARs. This also coincides with the humidity levels above 75% in the region. Given the above forecast and observations, the significant weather at the time of the incident may have been broken stratocumulus cloud.

End of Document