SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/1448						
Classification	Serious Incident	**Date**	22 April 2024		**Time**	0500Z	
Type of Operation	Private (Part 94)						
Location							
Place of Departure	New Tempe Aerodrome (FATP), Free State Province	Place of Intended Landing	Springs Aerodrome (FASI) Gauteng Province				
Place of Occurrence	On a gravel road in a private farm at Brandfort, north-east of New Tempe Aerodrome (FATP)						
GPS Co-ordinates	Latitude	28° 44' 49"S	Longitude	026°22'18"E	Elevation	4 450ft	
Aircraft Information							
Registration	ZU-DXZ						
Make; Model; S/N	Shadow Lite CC, J160 (Serial Number: 026)						
Damage to Aircraft	None	Total Aircraft Hours	2 686.10				
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL)	Gender	Male	Age	40		
Licence Valid	Yes	Total Hours	3 624	Total Hours on Type	74.0		
Total Hours 30 Days	0.6	Total Flying on Type Past 90 Days	0.6				
People On-board	1+0	**Injuries**	None	**Fatalities**	0	**Other (on the ground)**	0

What Happened

On Monday morning, 22 April 2024, a pilot on-board a Jabiru J160 aircraft with registration ZU-DXZ was on a private flight from New Tempe Aerodrome (FATP) in Free State province to Springs Aerodrome (FASI) in Gauteng province. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot stated that he conducted a pre-flight inspection of the aircraft and no anomalies were found. The aircraft had a total of 100 litres (L) of Avgas 100LL in the tanks. According to the Pilot's Operating Handbook (POH), the fuel capacity of the aircraft is 134L, of which 10L is unusable. At approximately 0430Z, the aircraft took off from FATP and climbed to 5 500 feet (ft) above mean sea level (AMSL). Approximately 27 nautical miles (nm) from FATP, the pilot contacted Johannesburg (JHB) South Information to activate the flight plan. The pilot was then directed by JHB South Information to climb to 8 500ft. After about 5 minutes whilst in a climb, the engine power decreased, but it recovered after a few seconds. However, a few minutes later, the engine stopped. The pilot spotted a gravel road in a private farm and he executed a successful forced landing on it. The aircraft was not damaged, and the pilot was not injured.

According to the pilot, he had recently purchased the aircraft from the previous owner; however, he had not yet received the POH. Therefore, he flew the aircraft without the POH on-board.

The serious incident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 28° 44' 49" South 026°22'18" East, at an elevation of 4 450 feet.

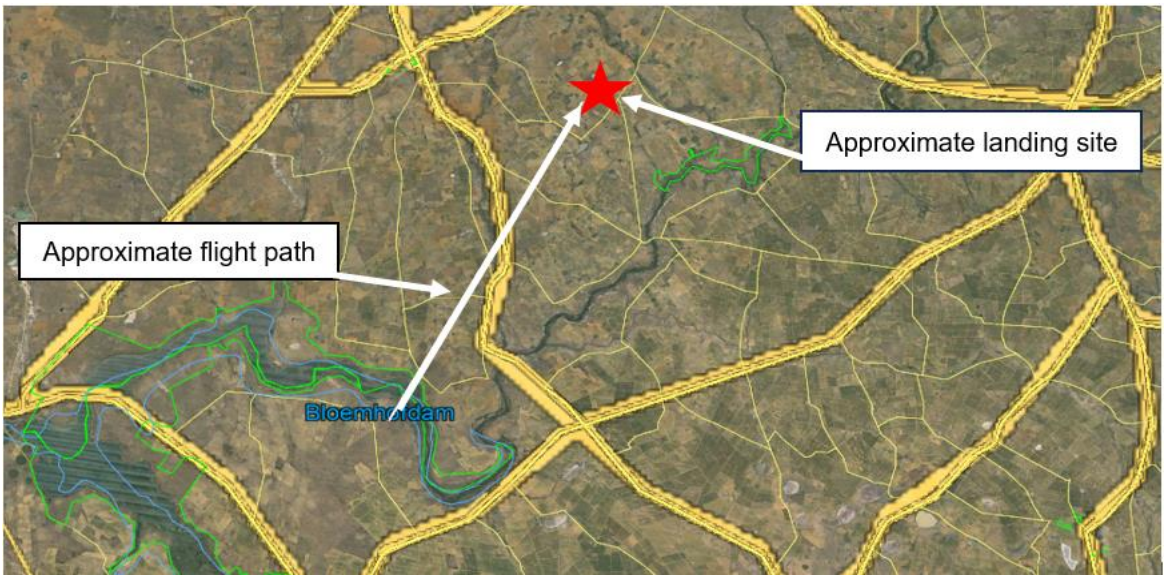

Figure 1: Aerial view of FATP and the approximate area where the aircraft landed. (Source: Google Earth).

Figure 2: The aircraft as it came to a stop after the forced landing on a farm. (Source: Pilot)

Post-incident Investigation

During post-incident investigation, about 90L of fuel was found in the tanks; the fuel was free of contaminants. On Monday afternoon, 22 April 2024, the aircraft's wings were removed from the fuselage and the aircraft maintenance engineers (AMEs) recovered the aircraft to an approved aircraft maintenance organisation (AMO) at FATP. On 27 June 2024, the aircraft was transported on a trailer

to the Jabiru aircraft agent in George Airport (FAGG), Western Cape province, for further engineering test. The Jabiru 2200 4-cylinder engine with serial number 22A2036 was inspected, and no anomalies were found in the fuel system. The engine was then started, and power was increased in stages; the parameters outlined in the operator's manual were met.

Weather Information

The weather information in the table below was issued by the South African Weather Service (SAWS) for Bram Fischer International Airport (FABL) in Free State province on 22 April 2024 at 0500Z. FABL is located 37 kilometres (km) from the serious incident site.

Wind Direction	360°	Wind Speed	04kts	Visibility	9999m
Temperature	20°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	19°C	QNH	1015hPa		

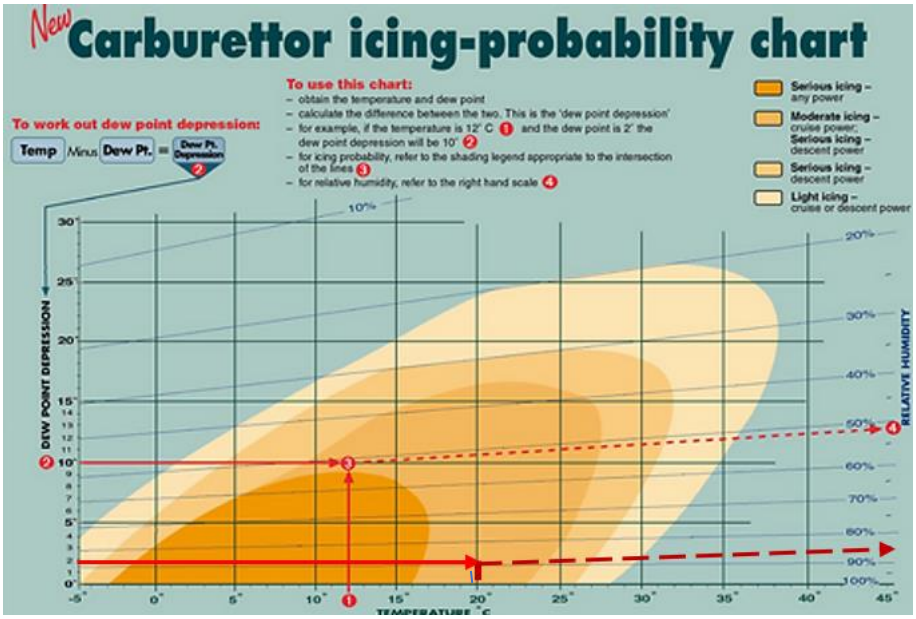

Figure 3: The carburettor icing probability chart calculation.

(Source: https://forums.x-plane.org/index.php?/forums/topic/260282-use-of-carburetor/)

Conclusion

According to the carburettor icing chart calculations, the temperature was 20°C and the dew point was 19°C; therefore, the dew point depression was 1°C. When plotting data on the carburettor icing chart, the relative humidity was calculated at approximately 92%, with moderate icing conditions on cruise and serious icing conditions on descent. When the pilot was asked if he applied carburettor heat after experiencing the engine power loss before it stopped, he stated that he did not as there

was no visible moisture in the area and that he thought the carburettor ice would be an unlikely problem.

Engine Failure In-flight (Source: POH)

1 Airspeed	*Best glide angle 65 KIAS 1*
2 Carburettor Heat	*ON*
3 Fuel Shutoff Valve	*ON*
4 Fuel Pump	*ON*
5 Ignition Switches	*ON*

Findings

1. The pilot was initially issued a Commercial Pilot Licence (CPL) on 20 June 2014. His last validation was conducted on 19 July 2023 with an expiry date of 31 October 2024. The aircraft was endorsed on the pilot's licence. A Class 1 medical certificate was issued to the pilot on 27 June 2023 with an expiry date of 30 June 2024.

2. The last annual inspection of the aircraft was certified on 7 February 2024 at 2 680.10 airframe hours. At the time of the serious incident, the aircraft had accrued a total of 2 686.10 airframe hours. The aircraft was flown for 6 hours since the last annual inspection.

3. The approved person (AP) who certified the last inspection was appropriately certified to conduct maintenance of the aircraft.

4. The aircraft was issued a Certificate of Release to Service (CRS) on 7 February 2024 at 2 680.10 airframe hours with an expiry date of 6 February 2025 or at 2 780.10 airframe hours, whichever occurs first.

5. The maintenance records indicated that the aircraft was maintained in accordance with (IAW) the regulations and approved procedures; there were no defects recorded in the flight folio that would have precluded normal operation before the flight.

6. The aircraft's Certificate of Registration (C of R) was issued to the current owner on 1 February 2024.

7. The Authority to Fly (ATF) was initially issued on 1 March 2021. The latest ATF was reissued on 1 February 2024 with an expiry date of 31 March 2025.

8. The fuel remaining in the tanks after the serious incident was 90L, which equated to three hours of endurance; therefore, the aircraft had sufficient fuel on-board.

9. The pilot flew the aircraft on his first flight without having seen or studied the POH.

Probable Cause(s)

It is probable that the engine stoppage during the climb was caused by carburettor icing which led the pilot executing a successful forced landing on a gravel road.

Contributing Factor(s)

None.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

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

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.

Disclaimer

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