LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10145										
Classification	Accident		**Date**	15 April 2022			**Time**	1745Z			
Type of Operation	Private (Part 94)										
Location											
Place of Departure	Brakpan Aerodrome (FABB), Gauteng Province			Place of Intended Landing			Brakpan Aerodrome (FABB), Gauteng Province				
Place of Accident	Area (grass surface) between Runway 36 and 03 threshold at FABB, Gauteng Province										
GPS Co-ordinates	Latitude	26º14’31.51” S		Longitude	28º18’08.98” E		Elevation	5 346 feet			
Aircraft Information											
Registration	ZS-BGL										
Model/Make	De Haviland Tiger Moth (Serial Number: T7852)										
Damage to Aircraft	Substantial			Total Aircraft Hours			4 920.7				
Pilot-in-command											
Licence Type	Private Pilot Licence (PPL) Aeroplane			Gender		Female		Age	51		
Licence Valid	Yes										
Total Hours on Type	150			Total Flying Hours			1 677.1				
People On-board	1 + 1	Injuries	0	Fatalities	0		Other (on ground)	0			
What Happened											

On Friday afternoon, 15 April 2022, a pilot and a passenger on-board a De Haviland Tiger Moth aircraft with registration mark ZS-BGL departed Brakpan Aerodrome (FABB), Gauteng province, on a private flight to conduct a circuit flight with the intention to land on Runway 03 (grass runway) at the same take-off aerodrome. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that they carried out the pre-flight checks, and no anomalies were found. She then took off from Runway 36 and climbed to approximately 500 feet (ft) above ground level (AGL), then made a right turn and flew overhead the grassy Runway 21/03 for inspection as she intended to execute a teardrop turn and land on Runway 03. She further explained that another reason to land on the grass runway was to slow down the aircraft because a Tiger Moth, by design has no

brakes. When the aircraft was abeam the windsock of Runway 03 and approximately 100ft AGL, the engine stopped without warning or spluttering and lost height as the indicated airspeed was 95 miles per hour (mph) at that time. The pilot then turned left to stay within the airfield boundary and, this time, she planned to land on Runway 36. However, she could not make it to Runway 36 and, thus, landed on the grass area between Runway 03 and 36 thresholds. The aircraft landed hard and, as a result, the right landing gear broke and the right wing impacted the ground. Thereafter, the aircraft skidded for approximately 20m before it came to a stop. The aircraft was substantially damaged, and the pilot and the passenger were not injured.

The accident occurred during day time at Brakpan Aerodrome (FABB) between Runway 03 and 36 thresholds at Global Positioning System (GPS) co-ordinates determined to be 26°14′31.51″ South 28°18′08.98″ East at an elevation of 5346 feet (ft).

Figure 1: The accident site at Brakpan Aerodrome. The arrow shows the direction of take-off and the white star shows the position of the aircraft post-accident. (Source: Google Earth)

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

What was found:

- The pilot was initially issued a Private Pilot Licence (PPL) Aeroplane on 12 July 2016. Her last validation was on 23 November 2021 with an expiry date of 31 October 2023. A De Havilland DH-82 Tiger Moth rating was endorsed on her licence. Her Class 2 medical certificate was issued on 6 July 2021 with an expiry date of 31 July 2022 with a waiver to wear corrective lenses. On the day of the accident, the pilot flew the aircraft for an hour and landed safely. Prior to that, she last flew the aircraft type on 15 March 2022. The pilot had a total of 1677.1 flying hours and 150 hours on type.

- The current owner was issued the aircraft's Certificate of Registration (C of R) on 3 March 2016. The aircraft was initially issued an Authority to Fly (ATF) on 30 October 2017 with an expiry date of 30 October 2022.

- According to the latest Certificate of Release to Service (CRS), the aircraft's last annual inspection was carried out on 27 August 2021 at 4901.4 airframe hours. At the time of the accident, the aircraft had 4920.7 airframe hours and had been flown for 18.7 airframe hours since the annual inspection.

- Examination of the flight folio and defect reports showed no outstanding defects that required rectification prior to the accident.

- The last maintenance was carried out by an approved person (AP) with a valid approval certificate.

- The aircraft was recovered to a hangar at FABB where an AP tested the engine. The AP followed the De Havilland Tiger Moth Owner's Handbook procedures. The technical report is presented below:

1) Checked fuel in the tank, and there was adequate fuel.
2) Disconnected the fuel pipe to carburettor and switched the fuel cock to "on'
There was a strong flow of fuel.
3) Checked Fuel filter for contaminants and found clean.
4) Carried out compression test on cold engine and all cylinder above 65/80
5) Checked Magnetos for any visible sign of defect and none found.
6) Checked magneto timing and found to be correct
So far, no fault found
7) At this point it seemed prudent to start the engine as no defect had been found
8) Engine started and ran normally; Oil pressure was up to within 15 seconds at 35 PSI which is normal at idle.
9) Increased RPM to 1600. Oil pressure increased to 45 psi, Check Magnetos.
10) Rh mag drop was in limits; LH mag drop 300 rpm. This is not correct but not sufficient to cause engine to stop dead.

- According to the flight folio records, the aircraft was refuelled with 20 litres of Avgas on 13 February 2022, bringing the total fuel on-board to 110 litres. Fuel consumption is 25 litres per hour on this aircraft; the aircraft had 4.4 hours of endurance. The aircraft flew a total of 3.3 hours since being refuelled, including the accident flight which lasted 0.3 hours. After the accident, the aircraft had 27.5 litres remaining. The AP confirmed that there were no contaminants in the remaining fuel. The fuel capacity of the aircraft is 113 litres, with 2 litres unusable fuel. Therefore, after the accident, the aircraft was left with 25 litres of usable fuel.

- A weather report was obtained from the South African Weather Service which stated that the temperature was 17°C and the dew point was 8°C on the day. The dew point depression was calculated to be 9°C, whilst the relative humidity was at 55%. Thus, according to the Carburettor Icing-probability Chart, the icing probability was serious at descent power (see Figure 3).

- The carburettor was blocked by ice build-up (ice particles). Therefore, the engine was starved of fuel which resulted in engine stoppage.

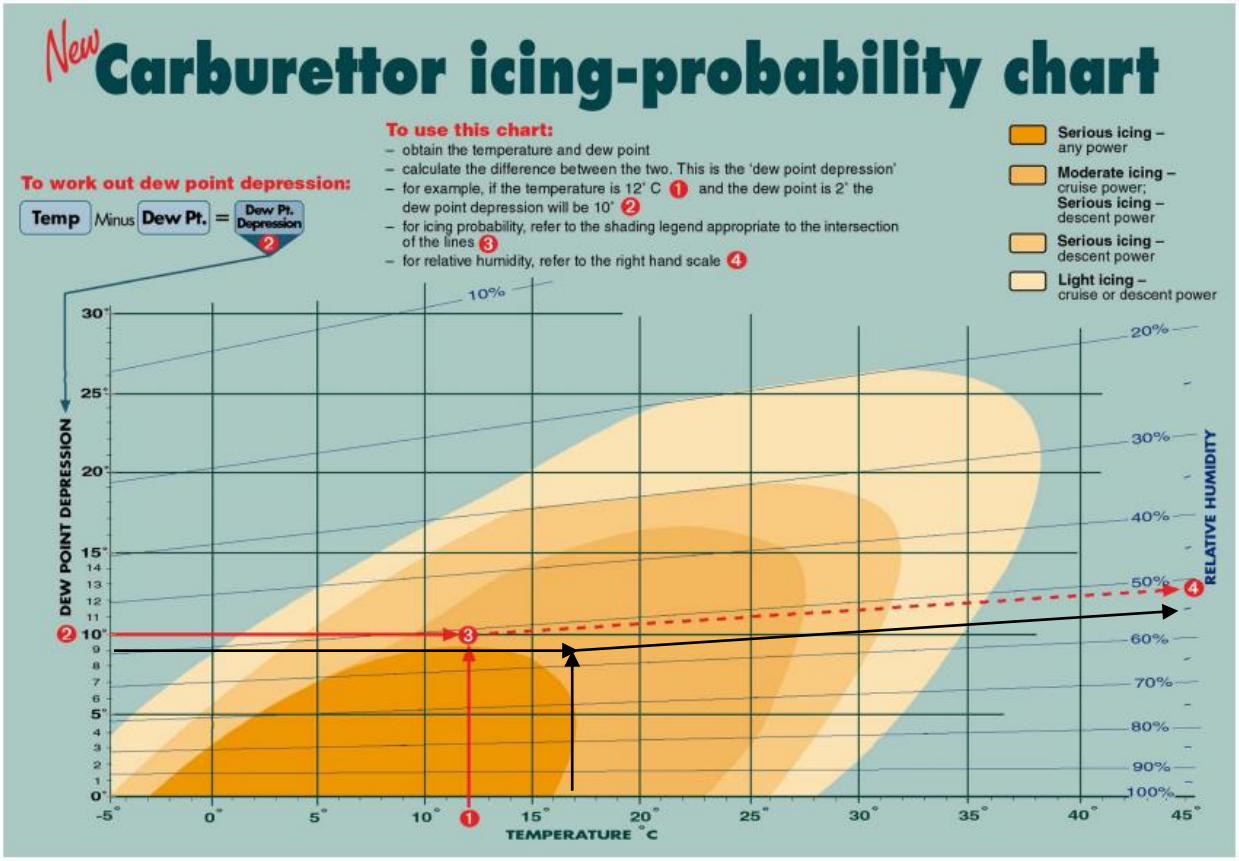

Figure 3: The Carburettor Icing-probability Chart.
(Source: https://www.atsb.gov.au/media/47763/carb_icing.pdf)

Probable cause:

Unsuccessful forced landing on an open field.

Contributory factor:

Engine stoppage during descent as a result of ice formation in the carburettor, which blocked fuel flow to the engine.

Safety Action/s

None.

Safety Message

Pilots are reminded to consider the effects of carburettor icing when operating in cooler weather conditions and when planning flights.

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****.*

About this Report

Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no 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 brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information 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 accident.

This report provides an opportunity to share safety message/s in the absence of an investigation.

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.

Disclaimer

This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa