SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10185						
Classification	Accident	**Date**	09 July 2022		**Time**	0550Z	
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Empangeni Airfield (FAEM), KwaZulu-Natal Province	Place of Intended Landing	Empangeni Airfield (FAEM), KwaZulu-Natal Province				
Place of Occurrence	At an open field in KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	28°35'41.82"S	Longitude	32°14'53.26"E	Elevation	1865ft	
Aircraft Information							
Registration	ZU-CJB						
Make; Model; S/N	Windlass Aquilla (Serial Number: WA 908)						
Damage to Aircraft	Substantial	Total Aircraft Hours	704.4				
Pilot-in-command							
Licence Type	National Pilot Licence (NPL)	Gender	Male	Age	60		
Licence Valid	Yes	Total Hours	96.0	Total Hours on Type	64.2		
Total Hours 30 Days	5.4	Total Flying on Type Past 90 Days	11.5				
People On-board	1+1	**Injuries**	2	**Fatalities**	0	**Other (on ground)**	0

What Happened

On 9 July 2022, a pilot and a passenger on-board a Windlass Aquilla aircraft with registration ZU-CJB were engaged in a scenic flight from Empangeni Airfield (FAEM) in KwaZulu-Natal province. The intention was to fly to the coast around Richards Bay and then towards the north (of Richards Bay) before returning to the take-off airfield for a full stop landing. Visual meteorological conditions (VMC) by day prevailed at the time of the flight. The flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot indicated that on his regular flights he always filled the fuel tank with 25 litres (L) of fuel or more to bring it to 50L, which is the full tank. However, on the day of the accident, the fuel level was at half a tank (25L). He did not top it up because he thought it would be sufficient for the planned 40-minute flight as the normal fuel consumption is 14 litres per hour on this aircraft. The maximum take-off weight (MTOW) of the aircraft is 450kg and the payload is 250kg. The pilot, passenger and the fuel weight were approximately 242kg. The pilot took off at 0520Z and climbed to 1500 feet (ft) above ground level (AGL). He stated that the wind around the coast was a bit strong, and this resulted in their ground speed reaching 38 to 40 miles per hour (mph). As a result, he decided to turn back after accumulating 34 nautical miles (nm) with very low fuel level, which was above the quarter tank mark.

The pilot planned to refuel at Richards Bay Aerodrome, which was 18.5nm away from his position. However, about five minutes later, the engine stopped. The pilot tried to restart the engine but was unsuccessful. He identified an open field on which he could perform a forced landing. At 600 feet (ft) above ground level (AGL), he lined up to land on the identified spot. He noticed two tall trees and aimed to land between them for energy absorption. The pilot indicated that as the aircraft got closer to the ground, he pushed the control bar forward to induce a stall and reduce ground speed significantly. During the forced landing, the aircraft's right undercarriage impacted a fence, and the left wing impacted the tree before the aircraft crash on the ground. The rear seat belt snapped, which caused the passenger to project forward, past the pilot, to the front of the aircraft. Both the pilot and the passenger suffered serious injuries. They were hospitalised for a couple of weeks post-accident. The aircraft sustained substantial damage to the airframe.

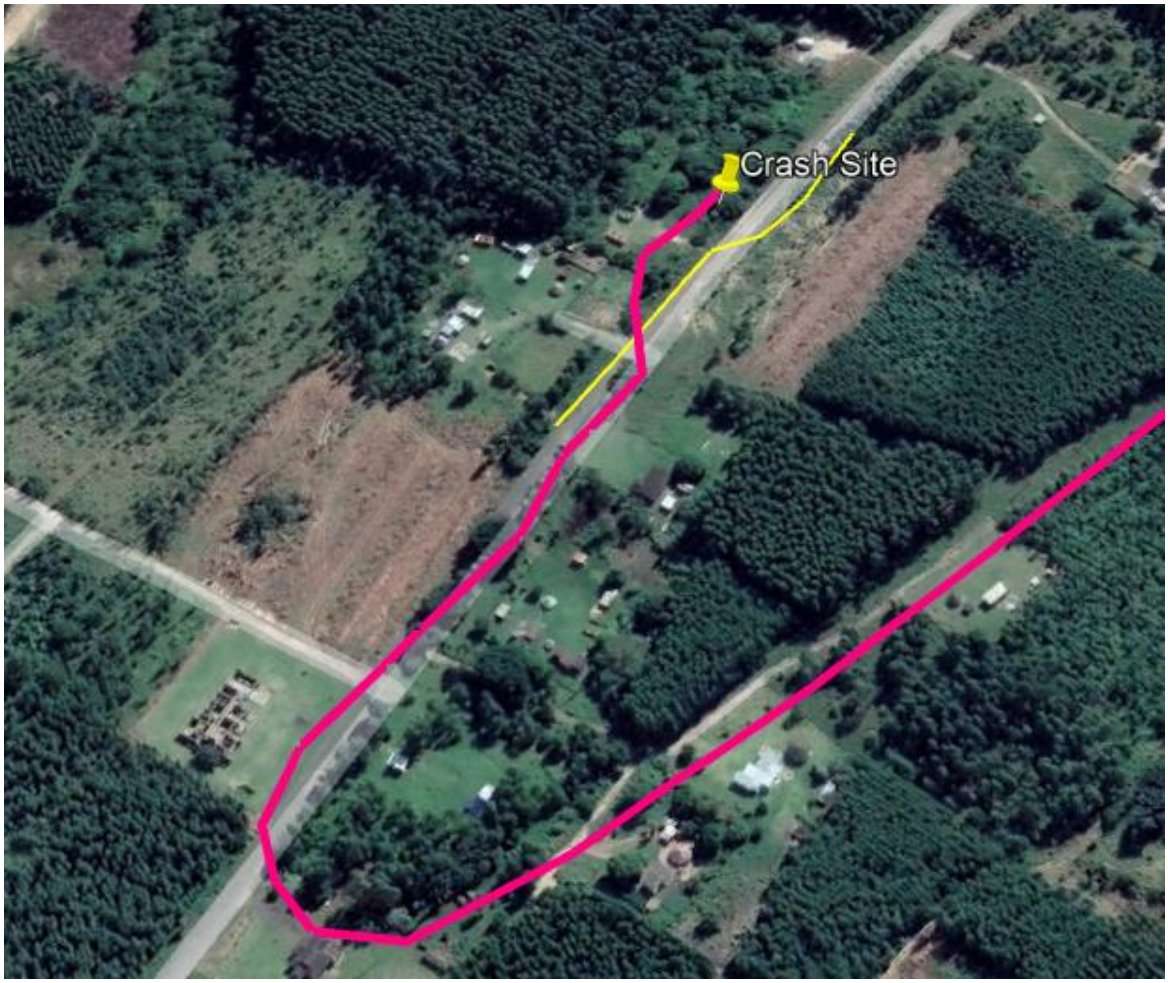

Figure 1: The pink line shows the flight path before impact. (Source: Owner)

Figure 2: The wreckage after the pilot and the passenger were removed. (Source: Medic responders)

Figure 3 and 4: Fuel filter with some fuel and vacuum (left), and bent wing ribs (right).

(iii) Spotgraph data from location of incident on 09 July 2022

No upper air observations were available on the day close to the incident, therefore, a spotgraph (vertical model profile of atmosphere) was used to get an idea as to what height the clouds were present and if there were any strong winds expected in the upper air. Considering the spotgraph data over the incident location it can be seen that the surface winds were forecasted to be 350° at 4 to 6 knots Attachment E. At a height of 1000ft above ground level it can be seen from the spotgraph that the wind direction was not forecasted to change significantly but the wind speeds increased to 18 to 22kts, which could indicate possible severe turbulence from the surface to 1000 feet above ground level. Also no clouds were forecasted as can be seen by the lack of green at 05Z which is what was observed on the satellite. The surface winds shifted from north westerly (340°) to north easterly (040°) at around 09Z. This complies well with the metars and tafs on the day.

Figure 5: Extract of the wind conditions above 1000ft AGL on the day of the flight. (Source: South African Weather Service report dated 23 September 2022)

Findings

1. Personnel Information

1.1. The pilot was issued a National Pilot Licence (NPL) on 29 March 2022 with an expiry date of 28 March 2023. The pilot had a Class 4 medical certificate that was issued on 28 July 2020 with an expiry date of 31 July 2023 with a restriction to wear corrective lenses.

2. Aircraft Information

2.1. According to the aircraft's latest Certificate of Release to Service (CRS), the last mandatory periodic inspection (MPI) was certified on 29 January 2022 at 691 airframe hours. At the time of the accident, the aircraft had flown a further 13.4 hours.

2.2. The aircraft had a valid Authority to Fly certificate which was issued on 8 February 2022 with an expiry date of 28 February 2023.

2.3. During the investigation, the fuel tank, which was not damaged, had little fuel remaining. Figure 3 shows that there was some vacuum in the fuel line.

2.4. The pilot indicated that he stalled the aircraft intentionally to lose lift quickly, and that was evident with the wing ribs that had bent downwards towards the end (tips) (see Figure 4).

2.5. The weather report extract (Figure 5) confirmed the pilot's stated strong wind condition which was 340º at 18 to 22 knots (20.7 to 25.3 mph) and which adversely affected the aircraft's ground speed. This led to a higher-than-normal fuel consumption.

2.6. If the aircraft had not encountered the strong wind, its cruise speed would have been 63mph and the range would have increased from 34nm to 43.4nm. The pilot did not file a flight plan for the flight, and did not obtain the weather information prior to the flight.

Probable Cause

Fuel exhaustion due to extended flight in strong head wind conditions which led to an unsuccessful force landing.

Contributing Factors

- The pilot did not obtain the weather information.
- Uplifted fuel was not sufficient for the flight.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

Pilots are advised to obtain weather information before each flight. This would ensure their awareness of the weather conditions throughout their navigational routes.

About this Report

Decisions to conduct a limited investigate 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

This report is issued by:

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