SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED ACCIDENT INVESTIGATION REPORT

Reference Number	CA18/2/3/10023				
Classification	Accident	**Date**	16 July 2021	**Time**	1454Z
Type of Operation	Private (Part 94)				
Location					
Place of Departure	Vrischgewaagol private farm, Mpumalanga Province	Place of Intended Landing	Vrischgewaagol private farm, Mpumalanga Province		
Place of Occurrence	Vrischgewaagol private farm, Mpumalanga Province				
GPS Co-ordinates	Latitude	S 26°11'46.7"	Longitude	E029°39'22.3"	Elevation	5300 ft
Aircraft Information					
Registration	ZU-DDX				
Model/Make	Z194 Cheetah				
Damage to Aircraft	Substantial damage	Total Aircraft Hours	1246.6		
Pilot-in-command					
Licence Valid	Yes	Gender	Male	Age	32
Licence Type	National Pilot Licence				
Total Hours on Type	38.7	Total Flying Hours	38.7		
People On-board	1 + 1	Injuries	0	Fatalities	0	Other	0

What Happened

On 16 July 2021, a pilot accompanied by a passenger on-board the Z194 Cheetah aircraft registered ZU-DDX took off from Vrischgewaagol private farm airstrip, Mpumalanga province, on a local private scenic flight in the area. A pre-flight inspection was conducted, and the aircraft was set for take-off with 45 litres of fuel in the tanks. The flight was conducted under visual meteorological conditions by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that the aircraft's engine started splattering shortly after take take-off with the cockpit engine revolutions per minutes (RPM) instrument indicator showing a rapid decrease at about 100 feet above ground level (AGL). The aircraft engine subsequently stopped and could not be restarted. The pilot elected to execute a forced landing back on the private strip instead of ahead or on either side of the nose to minimise loss of altitude. The pilot made a right-side turn but the aircraft lost height rapidly during the turn; he then attempted to land on a harvested maize field to the right of the take-off strip approximately 900 metres from the runway. The aircraft crashed on the maize field during a forced landing and sustained substantial damage to the left main gear, nose landing gear and horizontal tail stabiliser before coming to stop. The two occupants did not sustain any injuries during the forced landing.

SRP date: 18 January 2022 Publication date: 21 January 2022

The aircraft registration certificate was issued on 20 January 2020 to the current owner. An Authority to Fly certificate was issued on 26 October 2018 with an expiry date of 31 December 2021. According to the Rotax engine 912 Series Aircraft Maintenance Manual Edition 3/Revision1: 1 January 2013; Chapter 05.20.00: Section 2.2, time limit of the fuel pump is five years, and the fuel pump must be replaced every five years. The aircraft was in operation for less than two years at the time of the accident, therefore, the fuel pump was not due for replacement. The last annual maintenance inspection of the aircraft was carried out at 1209.0 airframe hours. The aircraft flew 37.6 airframe hours since its last maintenance inspection. The engine had a total of 573 engine hours since new. The time before overhaul (TBO) of the engine is 1000 hours or 10 years, whichever comes first. A Certificate of Release to Service was issued on 22 January 2020 at 1209 airframe hours.

The pilot reported that there was enough fuel in the aircraft for the flight with 40 litres drained from the fuel tanks, which was put back after inspection. The fuel had some contamination in the form of dirt. Post-accident inspection by the approved person (AP) who removed both the carburettor bowls found no sign of fuel in the bowls. Further inspection found that the mechanical vacuum type fuel pump had failed, and as a result, the auxiliary electrical pump could not supply fuel to the forward carburettor which led to fuel starvation to the engine. Following the above inspections and findings, the AP simulated the scenario by disconnecting the two fuel supply lines at the carburettor inlets and switching on the auxiliary fuel pump, which only supplied fuel to the aft carburettor. The engine would have been restored if the electric pump was switched on.

Figure 1: The aircraft as it came to rest.

Probable cause:
Unsuccessful forced landing after an engine failure by not choosing a landing field ahead or to the left or right of the nose (of the aircraft). The cause of engine stoppage after take-off was due to fuel starvation because of the failed mechanical fuel pump.

Safety Action/s

None.

Safety Message/s and/or Safety Recommendation/s

Pilots are encouraged to always inspect drums visually for contaminants prior to refuelling; regularly inspect fuel pump filters; and conduct fuel drains from the aircraft to visually check for contaminants.

Pilots must make sure that they choose a field directly ahead or slightly to either side of the take-off path in case of engine failure after take-off.

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 produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

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

To Whom it may concern. **30.07.2021**

ZU-DDX.

Based on the site visit done by Skyreach on Wednesday the 28th of July we found that the most probable cause for the engine stoppage was due to fuel starvation. The above was confirmed by removing both the carburettor bowls and the forward carburettor bowl showed no signs of fuel. This was caused by the failure of the mechanical vacuum type fuel pump; due to the failure of the mechanical pump the auxiliary electrical pump could also not supply fuel to the forward carburettor. We simulated the exact scenario by disconnecting the two fuel supply lines at the carburettor inlets and switching on the auxiliary fuel pump which only supplied fuel to the aft carburettor.

The aircraft damage report was compiled and sent through to the customer.