SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10219						
Classification	Accident		**Date**	11 September 2022		**Time**	0930Z
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Krugersdorp Aerodrome (FAKR), Gauteng Province		Place of Intended Landing	Krugersdorp Aerodrome (FAKR), Gauteng Province			
Place of Occurrence	On the side of the mountain, approximately 1.36 kilometres north of FAKR Runway 26 threshold						
GPS Co-ordinates	Latitude	26°4'3.83" S	Longitude	27°44'1.35" E		Elevation	5 249 ft
Aircraft Information							
Registration	ZU-SVF						
Make; Model; S/N	Stampe-Vertongen; SV-4C (Serial Number: 373)						
Damage to Aircraft	Substantial		Total Aircraft Hours	4541.4			
Pilot-in-command							
Licence Type	Private Pilot Licence		Gender	Male		Age	64
Licence Valid	Yes	Total Hours	1 418	Total Hours on Type			11
Total Hours Past 90 Days	1.2		Total Flying Hours on Type Past 90 Days	1.2			
People On-board	1 + 1	**Injuries** 0	**Fatalities**	0	**Other (on ground)**		0

What Happened

On Sunday, 11 September 2022, a pilot and a passenger on-board a Stampe SV-4C aircraft with registration ZU-SVF intended to conduct circuit exercises at Krugersdorp Aerodrome (FAKR) in Gauteng province. 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.

According to the approved person (AP), he observed the pilot performing a pre-flight inspection on the aircraft the morning before the flight; no anomalies were detected. On the day of the flight, the pilot stated that the aircraft had 60 litres (l) of Avgas 100LL fuel in the tank, which was free of contaminants. He then assisted his passenger into the front seat of the aircraft before he strapped himself on the rear seat. Thereafter, he started the engine, and the indications were within limits. He taxied the aircraft to the holding point of Runway 26 where run-up checks were carried out with no faults noted; later, he taxied the aircraft to the threshold of Runway 26. The pilot then opened the throttle to 2 450 revolutions per minute (RPM) and, thereafter, took off and climbed to 6 300 feet (ft) travelling at 80 miles per hour (mph). The pilot followed the circuit pattern and, whilst on a turn onto the right base leg for Runway 26, the engine stopped.

The pilot made numerous attempts to restart the engine, but without success. This led to the pilot force-landing the aircraft on the side of the mountain, approximately 1.36 kilometres (km) north of the threshold of Runway 26. The aircraft sustained substantial damages; however, the occupants were not injured during the accident sequence.

The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 26°4'3.83" South 27°44'1.35" East, at an elevation of 5 249 feet (ft).

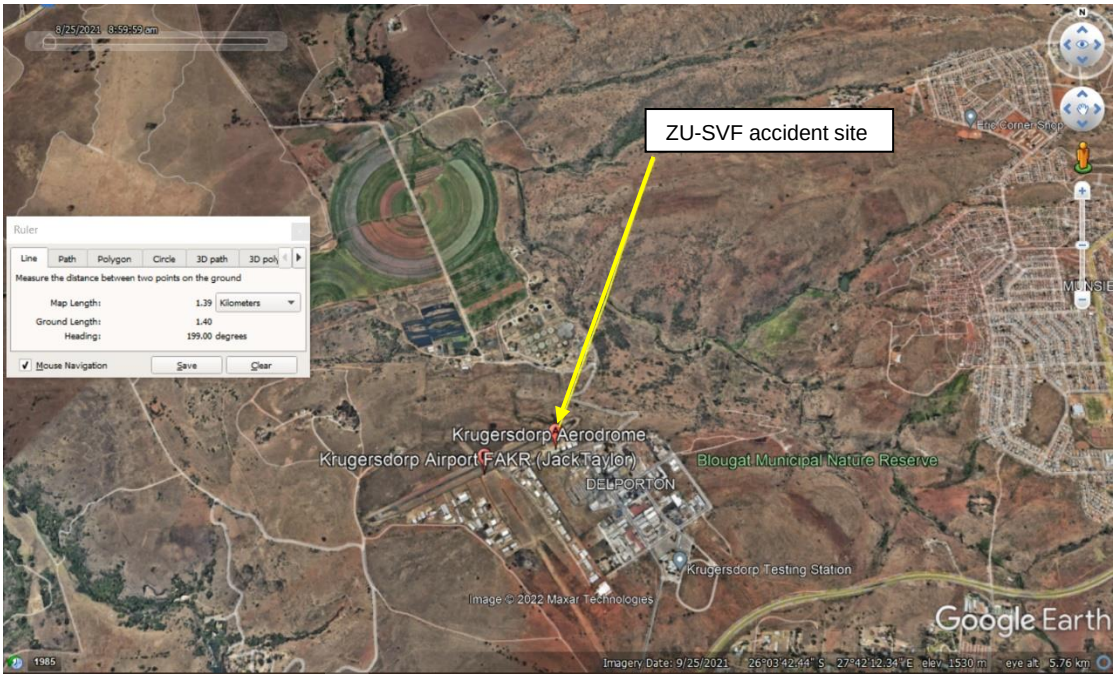

Figure 1: Distance from the accident site to the runway threshold. (Source: Google Earth)

Figure 2: The aircraft as it came to rest on the side of the mountain. (Source: Pilot)

The Pilot

The pilot was issued a Private Pilot Licence (PPL) by the South African Civil Aviation Authority (SACAA) on 30 August 2021 with an expiry date of 30 August 2023. At the time of the accident, the pilot had flown a total of 1418 hours, of which 11 hours were on the aircraft type. The pilot had the aircraft type endorsement on his licence. The aircraft type conversion/rating was conducted and overseen by the SACAA's certified Designated Flight Examiner (DFE) on 14 November 2020. The pilot had a valid Class 2 aviation medical certificate, which was issued on 28 July 2022 with an expiry date of 31 July 2023. The pilot had a restriction to wear suitable corrective lenses.

The Aircraft

The Stampe SV-4C is a two-seater trainer aircraft in tandem configuration, designed and built by Stampe et Vertongen in Belgium. The aircraft is manufactured from wood, with fabric used as covering. The wings are a single bay, staggered and swept back with steel tube interplane struts. The aircraft has non-retractable split axle type landing gear with a castering tailwheel. The pilot is usually seated on the rear seat, which was the case at the time of the accident flight.

Figure 3: File picture of the ZU-SVF aircraft. (Source: https://www.jetphotos.com)

The aircraft underwent a modification involving the replacement of the original Renault 4PO3 engine with a four-cylinder horizontally opposed Lycoming O-360-A4J engine with serial number L-16855-36A, driving a fixed pitch wooden propeller. The engine was installed as new on the aircraft and had accumulated 747.4 total hours at the time of the accident. The engine was equipped with an Ellison throttle body, which is a variable venturi diaphragm-controlled metering fuel and is configured to supply fuel and air requirements to the engine. The 60l capacity fuel tank is positioned on the centre-section of the upper wing. Fuel is gravity-fed through a hose to the fuel filter, then to the shut-off valve and finally to the engine-driven fuel pump.

The last 100-hour annual inspection prior to the accident flight was certified on 11 August 2022 at 4541.14 airframe hours. The aircraft had logged 4541.31 total hours at the time of the accident, meaning that it had been flown for a further 10 minutes since the last inspection. The Authority to Fly (ATF) was issued on 18 August 2022 with an expiry date of 31 August 2023. The Certificate of Registration (CoR) was issued to the current owner on 2 July 2022. The Certificate of Release to Service (CRS) was issued on 11 August 2022 with an expiry date of 10 August 2023 or at 554.14 hours, whichever occurs first.

Weather Information

The weather conditions estimated by the pilot at the take-off aerodrome were as follows: wind was blowing north-westerly at 5 knots, visibility was greater than 10km, temperature was 24°C, dew point temperate was 8°C.

Wind Direction	330°	Wind Speed	5 knots	Visibility	> 10km
Temperature	24°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	8°C	QNH	1024 hPa		

Post-accident examination of the wreckage

The entire aircraft was accounted for at the accident site. Pre-impact control integrity and normal operation were established during the initial examination. The engine was intact and still attached to the cradle. Damage observed on the wooden propeller blades indicated that the engine was not delivering power at the time of the accident. Compression was attained in all cylinders when the propeller was rotated by hand. The engine magnetos and ignition harnesses were inspected and found to be in good condition and properly secured. All the spark plugs and leads were correctly installed to the engine and were in good condition. Fuel was present in the fuel lines and the engine-driven fuel pumps. The carburettor bowl was found dry but clean, and free of dirt or foreign objects. Both the mechanical fuel pumps and the electrical fuel pump were operational, it was also noted that the fuel strainers and the fuel screens were serviceable and clean.

Approximately 58l of fuel remained in the tanks; it was drained by some members of the local community. The wreckage was dismantled and recovered to the maintenance facility at FAKR for further investigation; the engine was removed from the airframe for further examination. A Tygon plastic air hose/pipe connected to the Ellison throttle body, Model EFS-4-5, part number 820718 and serial number 1091 was found damaged. *The plastic air hose supplies pressurised air into the throttle body which would then push open the diaphragm to allow the corresponding amount of fuel into the carburettor for proper combustion.* Because of the damaged plastic air hose, fuel supply into the carburettor was interrupted and, as a result, caused the engine to stop. The plastic air hose is an on-condition item. Scrutiny into the aircraft's logbook indicated no history/record of when it was installed in the engine.

*NOTE: The throttle body is a crucial mechanical component that controls and regulates the amount of air flowing into the engine. When it is in a serviceable condition, the engine receives an ideal air and fuel ratio and offers optimum performance.


Figures 4 and 5: Pictures of the damaged Tygon plastic air hose/pipe.

A review of the aircraft's logbook indicated that the aircraft had no outstanding defects prior to the accident flight. The aircraft was regarded as fully serviceable.

Findings

(i) The pilot was issued a Private Pilot Licence (PPL) by the Regulator (SACAA) on 30 August 2021 with an expiry date of 30 August 2023.

(ii) The pilot had a valid Class 2 aviation medical certificate which was issued on 28 July 2022 with an expiry date of 31 July 2023. The pilot had a restriction to wear suitable corrective lenses.

(iii) The pilot had flown a total of 1418 hours of which 11 hours were on the aircraft type.

(iv) This flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

(v) The last 100-hour annual inspection prior to the accident flight was certified on 11 August 2022 at 4541.14 airframe hours. The aircraft had logged 4541.31 total hours at the time of the accident; meaning that it was flown a further 10 minutes since the last annual inspection.

(vi) The Authority to Fly (ATF) was issued on 18 August 2022 with an expiry date of 31 August 2023.

(vii) The Certificate of Release to Service (CRS) was issued on 11 August 2022 with an expiry dated of 10 August 2023 or at 554.14 hours, whichever occurs first.

(viii) Fine weather conditions prevailed at the time of the flight with the wind blowing north-westerly at 5 knots.

(ix) None of the occupants was injured.

Probable Cause

The plastic air hose which supplies pressurised air to operate a throttle body diaphragm to let fuel into the carburettor was damaged, which caused fuel starvation and the subsequent engine stoppage. This led to an unsuccessful forced landing on the side of the mountain.

Contributing Factor

It is possible that the throttle body air hose was used for a prolonged period and had deteriorated unnoticed due to increased operational loads.

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

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