SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/1472										
Classification	Serious Incident		**Date**	11 March 2025			**Time**	1218Z			
Type of Operation	Training (Part 141)										
Location											
Place of Departure	Virginia Aerodrome (FAVG) Durban, KwaZulu-Natal Province		Place of Intended Landing			Virginia Aerodrome (FAVG) Durban, KwaZulu-Natal Province					
Place of Occurrence	Tinley Manor Beach in Zinkwazi, KwaZulu-Natal Province										
GPS Co-ordinates	Latitude	S29°26'28.05"	Longitude	E31°17'31.8"		Elevation	7 feet				
Aircraft Information											
Registration	ZU-STA										
Make; Model; S/N	Sling II (Serial Number: 242)										
Damage to Aircraft	None			Total Aircraft Hours		3 459.3					
Pilot-in-command											
Licence Type	Airline Transport Pilot Licence (ATPL)		Gender	Female		Age	33				
Licence Valid	Yes	Total Hours	2 051.5		Total Hours on Type		525.8				
Total Hours Past 30 Days	46.1		Total Hours on Type Past 90 Days			36.1					
People On-board	2 + 0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0				

What Happened

On Tuesday afternoon, 11 March 2025, a Grade II flight instructor (FI) and a pilot with a Commercial Pilot Licence (CPL) on-board a Sling II aircraft with registration ZU-STA took off on a training flight from Virginia Aerodrome (FAVG) in Durban, KwaZulu-Natal province, with the intention to return to the same aerodrome. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The crew performed the pre-flight inspection of the aircraft, and nothing abnormal was found. The fuel gauge on the electronic flight instrument system (EFIS) screen showed that the aircraft had 120 litres (L) of Aviation Gasoline (Avgas) 100LL (low lead) in the two tanks. The operator had previously fuelled the aircraft with Motor Gasoline (Mogas). *Both gasoline types are recommended by the manufacturer*. The aircraft had flown a total of 6 hours since the switch to Avgas 100LL.

The pilot receiving training had completed a flight instructor course through the approved training organisation (ATO) and, at the time of the flight, he was undergoing a practical Flight Instructor Conversion training. The pilot had logged approximately 16.4 hours of patter flying (*patter flying is conducted with the pilot being trained seated in the right front seat*).

The crew had planned to be airborne for two hours, as well as route along the coast. The FI was the pilot flying (PF) at the start of the flight. The FI stated that she started the engine and allowed it to warm up until all indications were in the green arch. Thereafter, she broadcasted their intentions to FAVG tower on frequency 120.60-Megahertz (MHz). After a few minutes, she taxied the aircraft to the threshold of Runway 23. At approximately 1118Z, the FI advanced the throttle to 4 830 revolutions per minute (RPM) and commenced with the take-off run. The aircraft rotated and climbed to 2 200 feet (ft). They flew along the coast at an air speed of 94 knots (kts). Later, the crew switched roles during which the pilot (who was receiving training) became the PF as required by the exercises that they were conducting. After being airborne for about an hour whilst in the vicinity of Tinley Manor Beach, approximately 49 kilometres (km) north-east of FAVG, the crew felt a vibration that was emanating from the engine. At that time, the engine revolutions per minute (RPM) that showed on the EFIS screen were fluctuating between 4 600RPM and 5 010RPM; the pair had not moved (manoeuvred) the power lever.

Figures 1 and 2: The red arrow on the EFIS screen shows the engine power at 4 600RPM (left picture). The red arrow on the same screen shows the engine power at 5 010RPM (right picture).
(Source: video footage taken by the FI)

Note: The wind indication on the EFIS screen is not reliable.

The FI took back the control of the aircraft and tried to troubleshoot the cause of the vibration by reducing the power setting to 4 200RPM during which the vibration momentarily decreased. However, a few seconds later, the engine vibrations intensified and the crew could not maintain the aircraft's altitude. As the aircraft descended to approximately 800ft above ground whilst overhead the mouth of the Tugela River, the engine lost power. The FI switched the radio frequency to King Shaka International Airport (FALE) control tower (118.450 VHF MHz) and declared a Mayday. The FI informed FALE control tower that ZU-STA will be executing a forced landing due to loss of engine power. The FI also provided details of the aircraft and fuel endurance, as well as requested

assistance. Around 1218Z, the FI performed a successful forced landing on Tinley Manor Beach in Zinkwazi. When the aircraft came to a stop, the FI turned off the master switch. The crew unbuckled their safety harnesses and disembarked from the aircraft. The aircraft was not damaged and the crew was not injured.

The serious incident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 29°26'28.05" South 31°17'31.8" East, at an elevation of 7 feet (ft).

Figure 3: The yellow arrow indicates the approximate area where the aircraft had landed. (Source: Google Earth)

Figure 4: The aircraft as it came to rest on the beach. (Source: FI)

Aircraft Description (Source: Pilot's Operating Handbook [POH])

The Sling II is a two-seat, low wing, all metal aircraft with tricycle fixed landing gear made from composites. The aircraft is powered by a Rotax 912UL engine with serial number 9142346 rated at 80 horsepower (hp). The engine makes use of liquid cooled cylinder heads with air cooled cylinders. The lubrication system is forced lubrication, and the ignition makes use of dual contactless capacitor discharge magneto type ignition system that is engine control unit (ECU) controlled. The engine is fitted with the engine driven fuel pump and an auxiliary fuel pump. The aircraft is equipped with a Garmin G3X EFIS multifunction touch screen that displays the primary flight instruments and situational awareness.

The weather information entered in the table below was supplied by the pilot via the pilot questionnaire.

Wind Direction	220º	Wind Speed	5 knots	Visibility	9999 m
Temperature	23ºC	Cloud Cover	Scattered	Cloud Base	3 000ft
Dew Point	19ºC	QNH	Unknown		

Post-accident Examination of the Aircraft

On Tuesday evening, 11 March 2025, engineers from the operator's facility at FAVG dispatched to the serious incident site. Upon arrival, they inspected the aircraft and no damage was found. The propeller rotated as expected with normal range compression on each cylinder. The rocker arm, valve train and accessory gear continuity was established. All spark plugs displayed normal operating signatures, and both magnetos sparked in firing sequence when rotated. The engine cowl was removed to visually inspect the engine compartment and fuel system; no irregularities were noted. About 100L of Avgas 100LL (50L per tank) was drained. Fuel samples were taken from each tank; both samples were of the correct grade and blue in colour, with no contaminants. According to the weather report provided by the FI, the recorded temperature and dew point at the time indicated zero carburettor icing probability.

The wings were removed from the fuselage and the aircraft was rolled and loaded onto a recovery trailer before it was transported to FAVG. Upon arrival at FAVG, the aircraft was unloaded from the recovery vehicle and rinsed with fresh water to mitigate possible corrosion as well as remove sand contamination. Thereafter, the aircraft wings were reinstalled to the fuselage, and all fuel lines were reconnected. *An investigator from the Accident and Incident Investigations Division (AIID) dispatched to FAVG on Wednesday morning, 12 March 2025, to inspect the aircraft as he was in the area.*

The aircraft, which was parked on the apron, was refuelled with Avgas 100LL from a bowser; each tank was refuelled with 50L. One of the engineers boarded the aircraft to perform the engine ground run as the investigator observed. The engine started immediately and was allowed to warm up until the temperature and pressures were within the normal operating range. The throttle was advanced to maximum RPM, and no anomalies were noted.

Figure 5: The aircraft on the apron during the engine run.

Figure 6: The engine RPM indication (left side yellow arrow) on the EFIS screen shows 4 950 and the auxiliary (AUX) fuel pump switch (right side yellow arrow) in the middle console is in the OFF (down) position.

The engine was shut down and restarted after it was allowed to cool down. The throttle was advanced to maximum power; the RPM remained constant when fuel tanks were changed, and the AUX pump was switched ON and OFF and no changes were observed in engine performance and fuel flow. Moreover, there was no engine vibration.

Figure 7: The right EFIS screen shows the engine RPM at 4 930 with the AUX pump in the ON (up) position and with the left fuel tank selected.

The carburettor bowls on both sides were removed after the engine ground run. They both contained Avgas 100LL fuel that was free of contamination. The floats in each of the bowls were removed and

weighed, and they were found to be within limits in accordance with (IAW) the maintenance manual (mm). In conclusion, post-serious incident examination of the engine did not reveal any anomalies that would have precluded operation of the engine prior to the occurrence.

Figure 8: The carburettor bowls after being removed from the engine.

Findings

1. Personnel Information

1.1 The flight instructor (FI) had an Airline Transport Pilot Licence (ATPL) that was issued by the Regulator (SACAA) on 28 September 2023 with an expiry date of 31 October 2025. The pilot had flown a total of 2 051.5 hours of which 525.8 hours were on the aircraft type.

1.2 The FI had a Grade II Flight Instructor rating that was issued on 12 October 2024 with an expiry date of 31 October 2025.

1.3 The flight instructor had a Class 1 aviation medical certificate that was issued on 26 August 2024 with an expiry date of 31 August 2025 with a stipulation to wear lenses to correct near-vision.

1.4 The pilot in training had a Commercial Pilot Licence (CPL) that was issued by the Regulator on 21 January 2025 with an expiry date of 31 December 2025. The pilot had flown a total of 231 hours of which 16.4 hours were on the aircraft type.

1.5 The pilot had a Class 1 aviation medical certificate that was issued on 17 October 2024 with an expiry date of 31 October 2025 with no restrictions.

2. Aircraft Information

2.1 The last annual inspection of the aircraft was certified on 5 February 2025 at 3 406.3 airframe hours. The aircraft had accrued 53 hours since the last inspection.

2.2 The aircraft maintenance organisation (AMO) that conducted the last inspection was issued the AMO Certificate on 4 November 2024 with an expiry date of 31 October 2025.

2.3 The operator had the Approved Training Organisation (ATO) Certificate that was issued on 30 June 2021 with an expiry date of 30 June 2026.

2.4 The operator was issued an Operator Specifications Certificate on 1 November 2024. The Sling II aircraft with registration ZU-STA was listed on the certificate.

2.5 The aircraft's Certificate of Registration (C of R) was issued to the present owner on 2 February 2018.

2.6 The aircraft had a valid Authority-to-fly (ATF) Certificate that was initially issued by the Regulator on 1 June 2027. The latest ATF Certificate had an expiry date of 30 June 2025.

2.7 The aircraft had a Certificate of Release to Service that was issued on 5 February 2025 with an expiry date of 4 February 2026 or at 3 506.3 airframe hours, whichever comes first.

2.8 The post-serious incident engine ground run did not reveal any anomalies that could have caused a severe vibration in-flight.

3. Meteorological Information

3.1 Based on the weather information provided by the FI, fine weather conditions prevailed at the time of the flight. The weather had no bearing to this serious incident.

Probable Cause
The cause of in-flight vibration could not be determined.
Contributing Factors
None.
Safety Action(s)
None.
Safety Recommendation
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 desktop inquiries 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 apportion blame or liability.
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