AIRCRAFT ACCIDENT SHORT REPORT

CA18/2/3/9824 In-flight engine failure which resulted in an unsuccessful forced landing.

Date and time	:	2 October 2019; 0744Z
Aircraft registration	:	ZU-CVI
Aircraft manufacturer and model	:	Solo Wing; Windlass Aquilla
Last point of departure	:	Groutville Airfield, KwaZulu-Natal
Next point of intended landing	:	Groutville Airfield, KwaZulu-Natal
Location of accident site with reference to easily defined geographical points (GPS readings if possible)		Right-hand side of Runway 23 at Groutville Airfield, GPS estimated to be approximately 29˚24´39.30˝ S, 31˚16´43.24˝ E and at an elevation of 233 feet
Meteorological information	:	Wind: 120˚/2-3kts; Temperature: 21˚C; Dew point: 11˚C; Cloud: High and scattered at ±6000ft
Type of operation	:	Training flight (Part 96)
Persons on board	:	2+0
Injuries	:	0
Damage to aircraft	:	Substantial

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 of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (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.***

Disclaimer:

This report is produced without prejudice to the rights of the South African Civil Aviation Authority (SACAA), which are reserved

1. SYNOPSIS

1.1 On Wednesday, 2 October 2019, an instructor (pilot flying) accompanied by a student pilot were conducting a training flight at Groutville Airfield when the accident occurred. The instructor stated that during take-off on Runway 23, the aircraft's engine lost power and later stopped during a climb phase, approximately 300 feet or 91 metres above ground level (AGL). The instructor attempted to land the aircraft back on the runway; and while doing so, the right-hand main gear made contact with a slope on the edge of the runway. The instructor lost control of the aircraft, which veered off to the right of the runway. The aircraft's nose gear impacted a rock and broke off, causing the boom to dig into the ground before the aircraft nosed over.

1.2 The aircraft was substantially damaged during the accident sequence; however, both occupants were not injured.

1.3 The investigation revealed that it is likely that the aircraft was refuelled with an incorrect fuel-to-oil mixture ratio, which resulted in the in-flight engine power loss before the engine stopped. The instructor opted to do a forced landing, which was unsuccessful.

2. FACTUAL INFORMATION

2.1 On Wednesday 2 October 2019, an instructor accompanied by a student pilot took off from Groutville Airfield on a training flight with the intention to land back at the same airfield. This was an introduction flight for the student pilot, with the instructor as the pilot flying (PF). The flight was conducted under visual flight rules (VFR) by day.

2.2 The instructor stated that during take-off on Runway 23 and whilst climbing, the aircraft experienced an engine power loss and later stopped. The aircraft was approximately 300 feet (ft) or 91 metres (m) above ground level (AGL). The instructor attempted to land the aircraft back on the runway, and in doing so, the right-hand main gear made contact with a slope on the right edge of Runway 23. The instructor lost control of the aircraft, which veered off to the right of the runway and onto a harvested sugar cane field.

2.3 The nose gear impacted a rock and broke off, causing the boom to dig into the ground. This resulted in the aircraft nosing over before coming to rest facing a westerly direction. The aircraft had substantial damage to the nose landing gear, right landing

2.4 gear, wing sail and battens, king post, nose plates, front suspension, front rim, dual steering and profile tube.

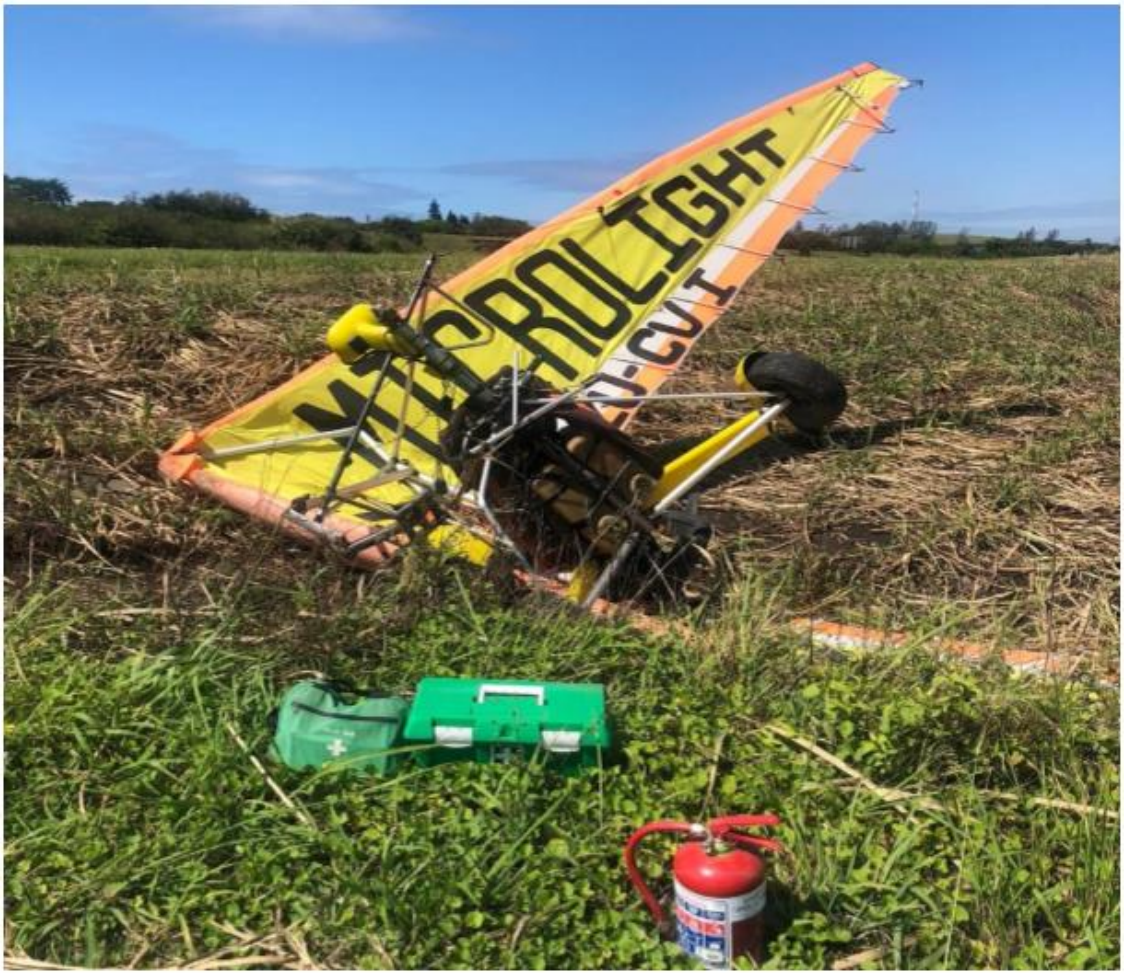

Figure 1: The aircraft at the accident site. (Source: Pilot)

2.5 The instructor and the student pilot were not injured during the accident sequence.

2.5 The accident occurred during daylight at Geographical Positioning System (GPS) determined to be S29°24'39.30" E031°16'43.24" and at an elevation of 233ft.

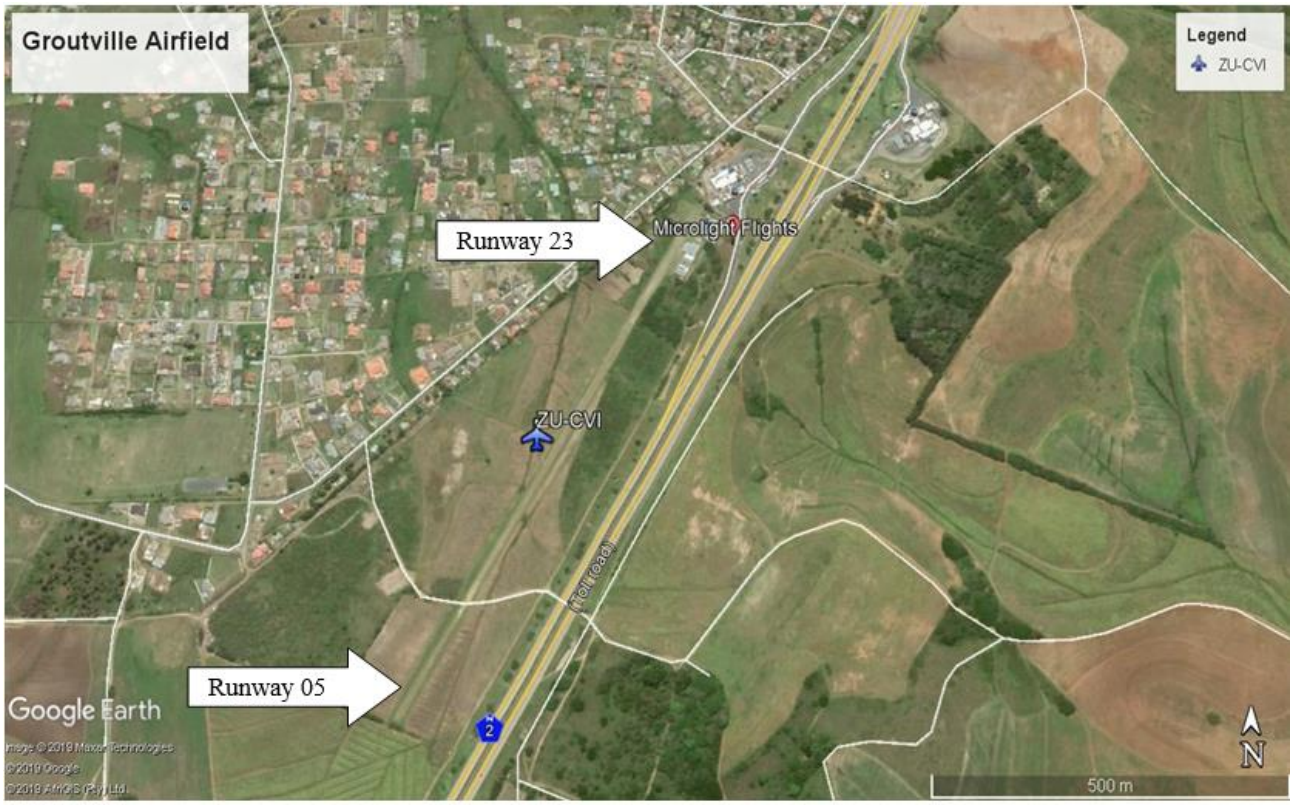

Figure 2: View of the accident site superimposed on Google Earth.

3. Additional Information

3.1 The aircraft maintenance organisation (AMO) which recovered the aircraft post-accident conducted inspections to determine the possible cause of power loss and stoppage. The AMO stated that the engine was initially inspected through the exhaust ports and spark plug ports. Thereafter, the engine was rotated manually. The AMO did not detect any anomalies with the engine and its electrical systems.

3.2 According to the AMO, the possibility of incorrect fuel mixture usage was the cause of the engine stoppage. The AMO stated that they had recently changed fuel suppliers. The aircraft (ZU-CVI) was using fuel from the new supplier for the first time which, like the fuel from the last fuel supplier, was 95 Unleaded mixed with 2-stroke engine oil. The fuel-to-oil mixture ratio is 5:1. The operator stated that they were responsible for mixing fuel and oil. They concluded that fuel from the new supplier might have been contaminated or not compatible to the 2-stroke oil they were using.

3.3 After the accident, fuel from ZU-CVI was used to top-up a fuel tank of another similar aircraft (ZU-BWI) with the same engine type as ZU-CVI. The engine of ZU-BWI was then ground run. Initially, the engine showed no signs of fuel problems, possibly due to the “old” fuel still present in the fuel system. However, when full power was applied

to the aircraft's engine, it emitted excessive amount of smoke from the exhaust. Thereafter, approximately 20 seconds at full throttle, the ZU-BWI engine stopped.

3.4 The fuel from ZU-BWI was then drained and the aircraft was re-fuelled with the previous supplier's fuel. The engine responded perfectly at full throttle during the ground run. The operator concluded that the fuel from the new supplier was the cause of the engine stoppage, however, it is possible that the fuel-to-oil mixture was incorrect.

3.5 From these tests, it is possible that the fuel-to-oil mixture ratio used was incorrect.

4. FINDINGS

4.1 The instructor (pilot flying) was initially issued a National Pilot Licence (NPL) on 9 November 2005. The instructor's last skills test was carried out on 18 October 2017. His licence was reissued on 18 October 2017 with an expiry date of 17 October 2019.

4.2 The instructor was issued a Class 2 aviation medical certificate on 26 September 2018 with an expiry date of 31 October 2021.

4.3 The instructor had accumulated a total of 1181.1 flying hours and 130.1 hours of the total were on the aircraft type.

4.4 The flight was an introduction flight for the student pilot, meaning that it was the student pilot's first flight.

4.5 The aircraft was last maintained and issued a certificate of released to service (CRS) on 10 July 2019 at 1400.1 hours with an expiry date of 9 July 2020 or at 1500.1 hours. The aircraft had a total of 1443.5 hours at the time of the accident and had flown a total of 43.4 hours since its last maintenance.

4.6 The aircraft was issued an Authority to Fly (ATF) certificate on 10 July 2019 with an expiry date of 31 July 2020.

4.7 The operator was not issued an Aviation Training Organisation (ATO) certificate at the time of the accident.

4.8 The aircraft was issued a Certificate of Registration on 20 November 2018.

4.9 The aircraft's engine failed at approximately 300ft/91m AGL. The instructor, who was the pilot flying, decided to land back on the runway. The instructor lost control of the aircraft after the right-hand main landing gear made contact with a slope on the right

edge of the runway, causing the aircraft to veer off to the right and onto a harvested sugar cane field.

4.10 The instructor and the student pilot were not injured in the accident sequence; the aircraft was substantially damaged.

4.11 The investigation revealed that it is likely that the aircraft was refuelled with an incorrect fuel-to-oil mixture ratio, which resulted in the engine losing power and, hence, the subsequent engine stoppage. The instructor opted to do a forced landing, which was unsuccessful.

5. PROBABLE CAUSE

5.1 During take-off, the aircraft's engine started to lose power and, subsequently, stopped. The pilot attempted to land back on the runway, however, he lost control of the aircraft following impact with the runway slope. The aircraft veered off to the right on to a sugar cane field.

5.2 Contributory cause:

5.2.1 The engine stopped as a result of possible incorrect fuel-to-oil mixture ratio.

6. REFERENCES USED ON THE REPORT

6.1 Pilot and Owner/Operator questionnaires.

7. SAFETY RECOMMENDATION

7.1 None.

8. ORGANISATION

8.1 This was a training flight which was conducted under the provisions of Part 96 of the Civil Aviation Regulations (CAR) 2011 as amended. The operator did not have an ATO-approval and was not supposed to be conducting training.

9. TYPE OF SAFETY ACTION

9.1 None.

This report is issued by:

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