AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/2/3/10022	
Aircraft Registration	**ZU-FZZ**	**Date of Accident**		9 July 2021		**Time of Accident**	0720Z
Type of Aircraft	Sling 2			**Type of Operation**		Training (Part 141)	
Pilot-in-command Licence Type	Student Pilot Licence (SPL)		**Age**	44		**Licence Valid**	Yes
Pilot-in-command Flying Experience		**Total Flying Hours**		25.9		**Hours on Type**	25.9
Last Point of Departure	Panorama Airfield, Gauteng Province						
Next Point of Intended Landing	Panorama Airfield, Gauteng Province						
Damage to Aircraft	Destroyed						

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)

Open field approximately 120 metres (m) to the left of Runway 02 at Panorama Airfield (GPS position: 26º19'41.2" South 028º03'57.3" East), at an elevation of 5 050 feet (ft)

Meteorological Information	Surface wind: 290º/6 kts, temperature: 16ºC; dew point: 1ºC; CAVOK QNH: 1030hPa						
Number of People On-board	1+0	**Number of People Injured**	0	**Number of People Killed**	1	**Other (On Ground)**	0

Synopsis

On Friday morning, 9 July 2021, a flight instructor and a student pilot on-board a Sling 2 aircraft with registration ZU-FZZ took off from Panorama Airfield in Gauteng province with the intention to conduct circuit training and touch-and-go exercises at the same airfield. The flight was conducted under visual flight rules (VFR) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The student pilot completed three touch-and-go circuits successfully, whereafter he landed the aircraft and the flight instructor disembarked. The student pilot then took off again to undertake a solo consolidation flight in which he completed five circuit-and-landing exercises without incident. However, on the sixth circuit, the student pilot changed from landing Runway 20 to landing Runway 02 after observing the windsock and noticing that the wind direction had changed from south-westerly to north-westerly. During landing, the student pilot lost directional control of the aircraft and veered off to the left-side of the runway. He took a corrective action by opting to lift off again to avoid colliding with vegetation (shrubs/trees), but the aircraft's landing gears got caught by vegetation; this caused the aircraft to stall and, subsequently, crash on an open field, 120m to the left of Runway 02.

The student pilot was fatally injured during the accident sequence, whilst the aircraft was destroyed by impact and a post-impact fire that erupted thereafter.

Probable Cause

The student pilot lost directional control of the aircraft during landing, and it veered off the runway. Whilst attempting to lift off to clear vegetation ahead of the aircraft's flight path it, however, impacted the vegetation and stalled before it crashed to the ground.

SRP Date	7 June 2022	Publication Date	20 June 2022

Occurrence Details

Reference Number	**:** CA18/2/3/10022
Occurrence Category	**:** Category 1
Type of Operation	**:** Training (Part 141)
Name of Operator	**:** Johannesburg Flying Academy
Aircraft Registration	**:** ZU-FZZ
Aircraft Make and Model	**:** Sling 2
Nationality	**:** South African
Registration	**:** ZU-FZZ
Place	**:** Panorama, Gauteng Province
Date and Time	**:** 9 July 2021 at 0720Z
Injuries	**:** Fatal
Damage	**:** Destroyed

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.

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.

Investigation Process

The Accident and Incident Investigations Division (AIID) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence on 9 July 2021 at 0730Z. The investigators had dispatched to the accident site for this occurrence, which was classified as an accident according to the CAR 2011 Part 12 and ICAO Standard Annex 13 definitions. Notifications were sent to the State of Registry/Operator/Design/Manufacturer in accordance with CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The AIID is leading the investigation as the Republic of South Africa is the State of Occurrence.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Aircraft — the Sling 2 involved in this accident
   Investigation — the investigation into the circumstances of this accident
   Pilot — the pilot involved in this accident
   Report — this accident report

2. *Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AC	Alternating Current
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AOA	Angle of Attack
ATF	Authority to Fly
CAR	Civil Aviation Regulations
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CRS	Certificate of Release to Service
EFIS	Electronic Flight Instrument System
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knots
m	Metre
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
Mph	Miles per Hour
QNH	Altitude Above Mean Sea Level
RWY	Runway
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBO	Time Between Overhaul
UTC	Coordinated Universal Time
VFR	Visual Flight Rules
VMC	Visual Metrological Conditions
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Friday morning, 9 July 2021, a flight instructor and a student pilot on-board a Sling 2 aircraft with registration ZU-FZZ took off from Runway (RWY) 20 at Panorama Airfield in Gauteng province with the intention to conduct circuit training and touch-and-go exercises at the same airfield. Visual meteorological conditions (VMC) prevailed at the time of flight. The flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2. The student pilot carried out three circuit-and-landing exercises with the flight instructor on-board. Thereafter, the student pilot landed the aircraft and the flight instructor disembarked, allowing the student pilot to continue to conduct a solo consolidation flight which consisted of circuit-and-landing exercises. The student pilot carried out five solo circuit-and-landing exercises on RWY 20 without incident (see Figure 1). However, during the sixth circuit, the student pilot decided to change from landing RWY 20 to RWY 02 after observing the windsock and noticing that the wind had changed direction from a south-westerly to a north-westerly.

1.1.3. As the aircraft touched down on RWY 02, the student pilot lost directional control and the aircraft veered off to the left-side towards the vegetation (shrubs) which was next to the runway. In an attempt to avoid colliding with vegetation, the student pilot decided to pull back the control stick to lift off, however, the aircraft clipped the top of the shrubs and it stalled as it flew over the road that was running parallel to the runway and impacted the ground in a left-wing low attitude, approximately 26 metres (m) from the first point of impact.

1.1.4. According to an eyewitness who was standing next to Kromvlei Road which runs parallel to the runway, the aircraft lifted off and then made a descent, flying low over Kromvlei Road in a left-wing low attitude. He then witnessed the aircraft hit the ground with the left-wing first; thereafter, it flipped over, and the propeller struck the ground. The aircraft came to rest in an inverted attitude. Moments later, he saw the aircraft catch fire (see Figure 2).

1.1.5. The eyewitness further stated that upon witnessing the accident, he ran to the flying school to inform them of the occurrence. After receiving the information and whilst the authorities (South African Police Service) were notified of the accident, the flight instructors who were at the school grabbed the fire extinguishers and ran to the scene where they attempted to extinguish the fire, as well as help the student pilot out of the aircraft. However, the fight instructors were unable to reach the student pilot because the flames were intense, and their

fire extinguishers were inadequate. The student pilot was fatally injured during the accident sequence whilst the aircraft was destroyed by a fuel-fed post-impact fire.

1.1.6. The accident occurred during daylight on an open field, approximately 120 metres (m) west of RWY 02 at Panorama Airfield at Global Positioning System (GPS) co-ordinates determined to be: 26º19’41.2” South 028º03’57.3” East, at an elevation of 5 050 feet (ft).

Figure 1: Runway 20 circuit pattern. (Source: Google Earth)

Figure 2: The student pilot changed the circuit pattern to land RWY 02. The green arrow shows the position of the witness. (Source: Google Earth)

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	1	-	-	1	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	**1**	**-**	**-**	1	**-**

Note: Other means people on ground.

1.3. Damage to Aircraft

1.3.1. The aircraft was destroyed by impact forces as well as fuel-fed post-impact fire.

Figure 3: The aircraft at the accident scene post-accident.

1.4. Other Damage

1.4.1. Several shrubs were clipped by the aircraft prior to ground impact.

Figure 4: Shrubs on the left-side of Runway 02 that were clipped by the aircraft.

1.5. Personnel Information

1.5.1 Student Pilot

Nationality	South African	Gender	Male	Age	44
Licence Type	Student Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	9 February 2023				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

1.5.2 The student pilot was issued a Student Pilot Licence (SPL) on 12 March 2021 with an expiry date of 11 March 2022.

The student pilot's Class 2 aviation medical certificate was issued on 9 February 2021 with an expiry date of 9 February 2023, with no restrictions.

Flying Experience:

Total Hours	25.9
Total Past 24 Hours	1.0
Total Past 7 Days	2.4
Total Past 90 Days	20.8
Total on Type Past 90 Days	20.8
Total on Type	25.9

1.5.3 The student pilot had started flying on 2 March 2021 and accumulated 21.7 dual hours and 4.2 solo hours, according to his pilot's logbook. The flight was the student pilot's solo consolidation in which he had to carry out circuit-and-landing exercises.

1.5.4 When the student pilot's training file was reviewed, it was evident that the student pilot used to fly an average of 0.86 hours on dual circuit training and an average of 0.84 hours on solo circuits. The student pilot had undergone training on how to change a circuit should the wind direction change.

1.5.5 On the day of the accident, the student pilot needed 0.8 hours of flight time to complete his solo consolidation. The student pilot had flown 0.6 hours before he decided to change the circuit direction due to wind direction changes. After changing the circuit, he possibly flew 0.2 hours, which would have covered the quota needed for him to complete his solo consolidation.

1.6. Aircraft Information (Source: Slingaircraft.com)

1.6.1 The Sling 2 is a two-seat (side-by-side), single-engine, tricycle undercarriage aluminium aircraft with a conventional low-wing design. The aircraft is based upon the European Union Aviation Safety Agency (EASA) CS-VLA (Certification Standard Very Light Aircraft) standard, with a maximum all-up weight of 700kg. Designed to be a perfectly balanced aircraft, the Sling 2 is a stressed-skin, semi-monocoque aircraft made to precise standards from aviation grade aluminium, punched using CNC machines. Rugged aluminium lines combined with cutting-edge tech advances ensure that the Sling looks the way an aircraft should, and flies even better. The aircraft is fitted with a conventional landing gear. In the cockpit, the aircraft type is fitted with an Electronic Flight Instrument System (EFIS) as well as an Airspeed indicator, Altimeter, Compass and a slip indicator.

Engine: (Source: Rotax engine Operator's Manual)

This aircraft is fitted with a Rotax 912S engine which is a four stroke, four cylinders which are horizontally opposed, spark ignition engine, single central camshaft with hydraulic tappets. It has liquid cooled cylinder heads with ram air cooled cylinders. It has a dry sump forced lubrication system. This engine has dual ignition of breaker less, capacitor discharge design with two constant depression carburettors. It is fitted with a mechanical fuel pump. It has an electric starter, and it is fitted with an integrated alternating current (AC) generator with external rectifier regulator. The propeller drive is integrated via a gearbox with mechanical shock absorber, and overload clutch. This aircraft will stall at 46 knots indicated air speed (KIAS) at maximum all up weight with flaps fully retracted. With flaps, it will stall at 42 KIAS.

Figure 5: The cockpit of the aircraft prior the accident. (Source: ATO)

Airframe:

Manufacturer/Model	Sling Aircraft, Sling 2	
Serial Number	052	
Year of Manufacture	2013	
Total Airframe Hours (At Time of Accident)	1 129.2	
Last Inspection (Date & Hours)	11 June 2021	1071.5
Airframe Hours Since Last Inspection	57.7	
CRS Issue Date	11 June 2021	
ATF (Issue Date & Expiry Date)	12 April 2018	30 April 2022
C of R (Issue Date) (Present Owner)	19 June 2015	
Operating Category	Training (Part 141)	
Type of Fuel Used	MOGAS	
Previous Accidents	None	

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

1.6.2 The last maintenance inspection prior to the accident flight was carried out on 11 June 2021 at 1071.5 airframe hours. The aircraft was issued a Certificate of Release to Service (CRS) on 11 June 2021 with an expiry date of 10 June 2022 or at 1171.45 airframe hours, whichever occurs first. The aircraft was flown an additional 57.7 hours post-inspection. The maintenance records were reviewed, and no failures were recorded or reported prior to the flight.

1.6.3 The aircraft was issued an Authority to Fly (ATF) on 12 April 2018 with an expiry date of 30 April 2022.

1.6.4 The current owner of the aircraft was issued a Certificate of Registration (C of R) on 19 June 2015.

1.6.5 The approved person (AP) for the aircraft was issued an Approved Person certificate on 9 October 2019 with an expiry date of 8 October 2021. According to the reviewed records, the aircraft type was endorsed on his certificate, and he was rated on this aircraft type.

Engine:

Manufacturer/Model	Bombardier Rotax 912iS
Serial Number	4923329
Hours Since New	175
Hours Since Overhaul	TBO not reached

Propeller:

Manufacturer/Model	Maglin SR 107
Serial Number	V 2700
Hours Since New	50.3
Hours Since Overhaul	TBO not reached

1.7. Meteorological Information

1.7.1. The weather information below was obtained from the Meteorological Routine Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS), recorded on 9 July 2021 at 0720Z at Panorama Airfield (Gauteng) which is located 120m from the accident site.

Wind Direction	290º	Wind Speed	6kts	Visibility	9999m
Temperature	16ºC	Cloud Cover	CAVOK	Cloud Base	CAVOK
Dew Point	1°C	QNH	1030hPa		

Figure 6: The windsock showing a north-westerly wind direction at 0719Z (0919LT).
(Source: Aviation Webcams)

1.7.2 Crosswind Component:

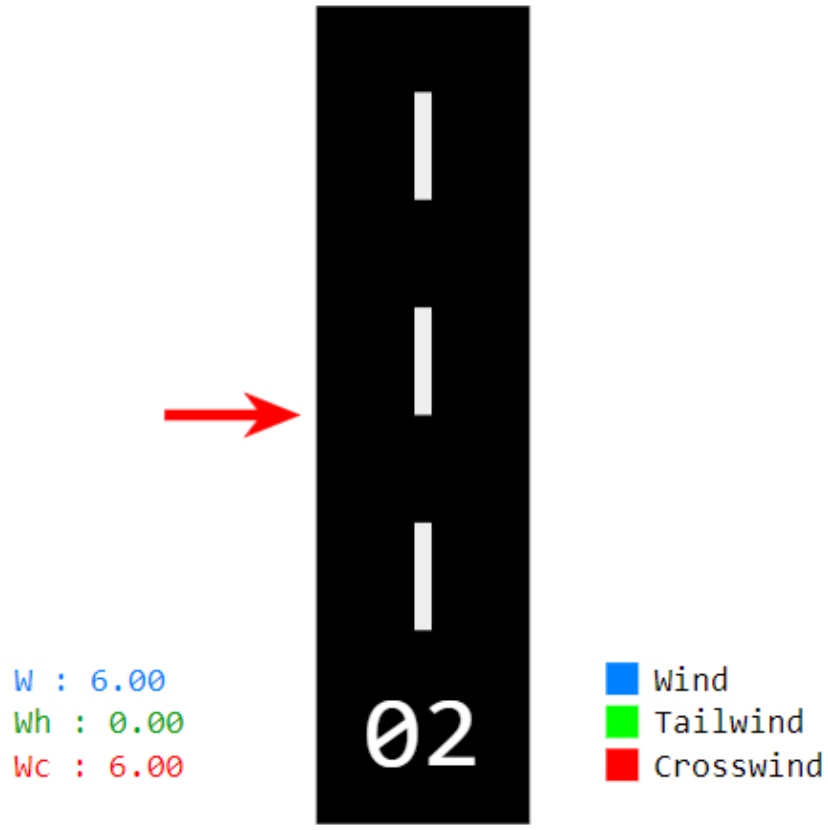

Figure 7: Indication of the wind values. (Source: www.e6bx.com/wind-components/)

1.8. Aids to Navigation

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records indicating that the navigational system was unserviceable prior to the accident.

1.9. Communication

1.9.1. The aircraft was equipped with a standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the accident.

1.10. Aerodrome Information

1.10.1. The accident occurred during daylight on an open field, approximately 120m to the left of RWY 02 at Panorama Airfield at GPS co-ordinates determined to be: 26º19'41.2" South

028º03’57.3” East, at an elevation of 5050ft.

Aerodrome Location	Panorama Airfield, Gauteng Province		
Aerodrome Status	Unlicensed		
Aerodrome GPS coordinates	26°19'34.31" South 028°04'01.70" East		
Aerodrome Elevation	5050 feet		
Runway Headings	02/20	05/23	12/30
Dimensions of Runway Used	974 x 30m	700 x 20m	600 x 20m
Heading of Runway Used	02		
Surface of Runway Used	Grass		
Approach Facilities	None		
Radio Frequency	124.40 MHz		

1.10.2. Panorama Airfield is privately owned and comprises three runways. The approved training organisation (ATO) through which the student pilot trained, is based at this airfield.

1.11. Flight Recorders

1.11.1. The aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the aircraft type.

1.12. Wreckage and Impact Information

1.12.1. The first ground markings which were caused by the landing gear wheels were observed towards the left of RWY 02 at approximately 287m from the threshold, and again at approximately 407m; this is evident that the aircraft started to veer off to the left-side of RWY 02 (see Figure 8). The ground markings stopped a few metres before the vegetation (shrubs), therefore, evidence indicates that the aircraft became airborne again and made contact with the top of the shrubs (see Figure 9).

Figure 8: Wheel markings of where the aircraft started to veer off to the left.

Figure 9: Wheel markings of the aircraft heading towards the vegetation.

1.12.2 The aircraft impacted the ground in a left-wing low attitude (see Figure 10). Figure 12 displays some debris from the nose cone of the aircraft, as well as one of the propeller blades, about 8m from the first point of impact. The aircraft came to rest in an inverted attitude before it caught alight (see Figure 11). The control cables were visible and there was continuity in the control cables. The landing gear wheels trail was first seen from the threshold of RWY 02 (approximately 287m from the threshold) and again at approximately 407m from the threshold of RWY 02.

Figure 10: First ground marking after the left wing contacted the ground.

Figure 11: The left-wing with impact damage on the wing tip.

Figure 12: Debris from the propeller and nose cone.

1.12.3 The cockpit and the instruments on the panel were consumed by post-impact fire.

1.13. Medical and Pathological Information

1.13.1. The student pilot's available medical records were reviewed, and no medical conditions were noted that could have contributed or have caused the accident.

1.13.2. The student pilot's post-mortem report was not available at the time of concluding this report. Should the post-mortem report become available, and should it contain evidence that might alter the outcome of the investigation, a revised investigation report will be compiled and issued.

1.14. Fire

1.14.1. A fuel-fed post-impact fire had erupted post-accident which consumed most of the aircraft (fuselage).

1.15. Survival Aspects

1.15.1. The accident was considered not survivable due to the damage caused to the cockpit and cabin area by impact forces and post-impact fire.

1.16. Tests and Research

1.16.1. The components that remained post-accident were inspected. Other than being degraded by fire, the flap motor was found in the configuration of 'flaps up'.

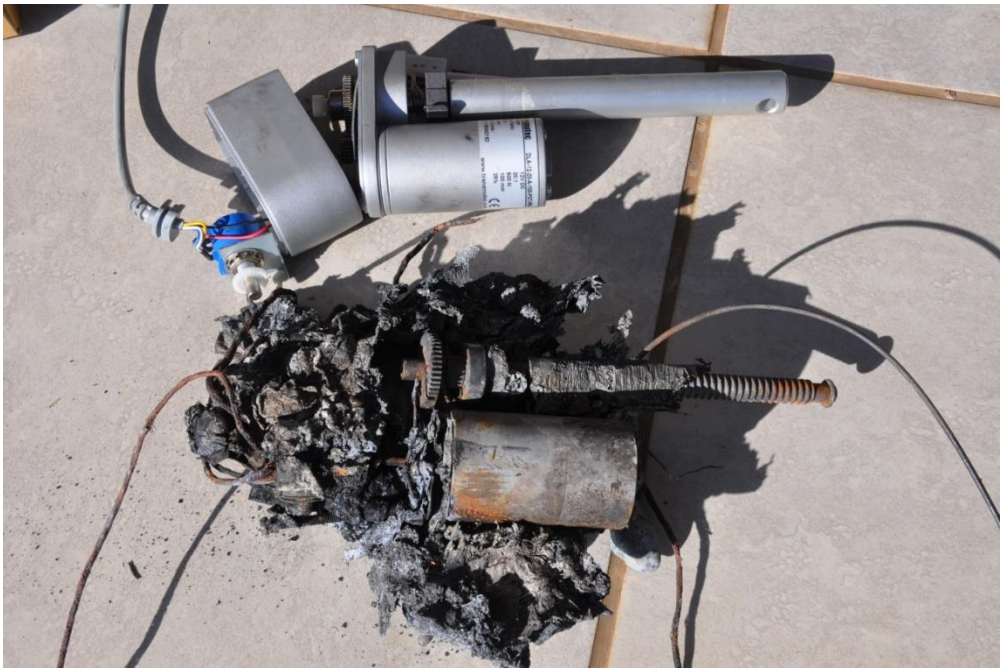

Figure 13: A serviceable flap motor in the retracted configuration (top); and a fire damaged flap motor in the retracted configuration (bottom).

1.17. Organisational and Management Information

1.17.1. The aircraft was maintained by an aircraft maintenance organisation (AMO) in accordance with Part 44 of the Civil Aviation Regulations (CAR) 2011 as amended, as well as aircraft maintenance manuals.

1.17.2. The flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended. The ATO was issued an Approved ATO certificate by the Regulator on 27 August 2020 with an expiry date of 31 August 2025. According to the reviewed records, the aircraft type was endorsed on the ATO's certificate.

1.17.3. The AP who performed the last annual inspection on the aircraft prior to the accident flight was in possession of an AMO-approval certificate. The AP was issued an Approved Person certificate on 9 October 2019 with an expiry date of 8 October 2021. According to the reviewed records, the aircraft type was endorsed on his certificate, and he was rated on this aircraft type.

1.18. Additional Information

1.18.1 Panorama Airfield circuit procedures for RWY 02 (Source: Johannesburg Flying Academy)

Take off:

Full power-minimum 4800 rpm. Airspeed alive and increasing temps and pressures in the green.

After take-off checks at 300ft AGL (5350):

Brakes (Apply pressure)

Undercarriage N/A

Power (Reduce approximately 5500 rpm)

Pitch

Mixture N/A

Fuel pump – OFF, Check pressure

Flaps – retract, speed 65 kts

Landing lights

Crosswind

Climbing turn

Max. 15º-20º AoB

Altitude 4850 feet

Reduce power

Downwind Checks

Brakes (Check pressure)

Undercarriage N/A

Mixture N/A

Pitch (Set-climb)

Power (Reduce approximately 4500rpm speed 75kts)

Fuel pump – On

Flaps – Set 1 (Trim)

Landing light – ON

Base checks

Flaps – 2 (Trim)

Speed – 70kts

Power – reduce

Altitude – Descend to 5500 feet

Final approach

power – Reduce to control rate of descent

Undercarriage – N/A

Flaps – Set 3 (Trim)

Fuel – Check selector pump ON

Landing light – ON

At 5350 feet check stable

Correct speed and power

Correct glide path 3º

Within 20º of runway heading

Within 10º of runway centreline

Configured for landing

1.18.2 Stalls (Source: Federal Aviation Authority Airplane Flying Handbook)

A stall is an aerodynamic condition which occurs when smooth airflow over the airplane's wings is disrupted, resulting in loss of lift. Specifically, a stall occurs when the AOA—the angle between the chord line of the wing and the relative wind—exceeds the wing's critical AOA. It is possible to exceed the critical AOA at any airspeed, at any attitude, and at any power setting

For these reasons, it is important to understand factors and situations that can lead to a stall and develop proficiency in stall recognition and recovery. Performing intentional stalls will familiarize the pilot with the conditions that result in a stall, assist in recognition of an impending stall, and develop the proper corrective response if a stall occurs. Stalls are practiced to two different levels:

Impending Stall—an impending stall occurs when the AOA causes a stall warning but has not yet reached the critical AOA. Indications of an impending stall can include buffeting, stick shaker, or aural warning.

Full Stall—a full stall occurs when the critical AOA is exceeded. Indications of a full stall are typically that an uncommanded nose down pitch cannot be readily arrested and may be accompanied by an uncommanded rolling motion. For airplanes equipped with stick pushers, their activation is also an indicator of a full stall.

Although it depends on the degree to which a stall has progressed, some loss of altitude is expected during recovery. The longer it takes for the pilot to recognize an impending tall, the more likely it is that a full stall will result. Intentional stalls should therefore be performed at an altitude that provides adequate height above the ground for recovery and return to normal level flight.

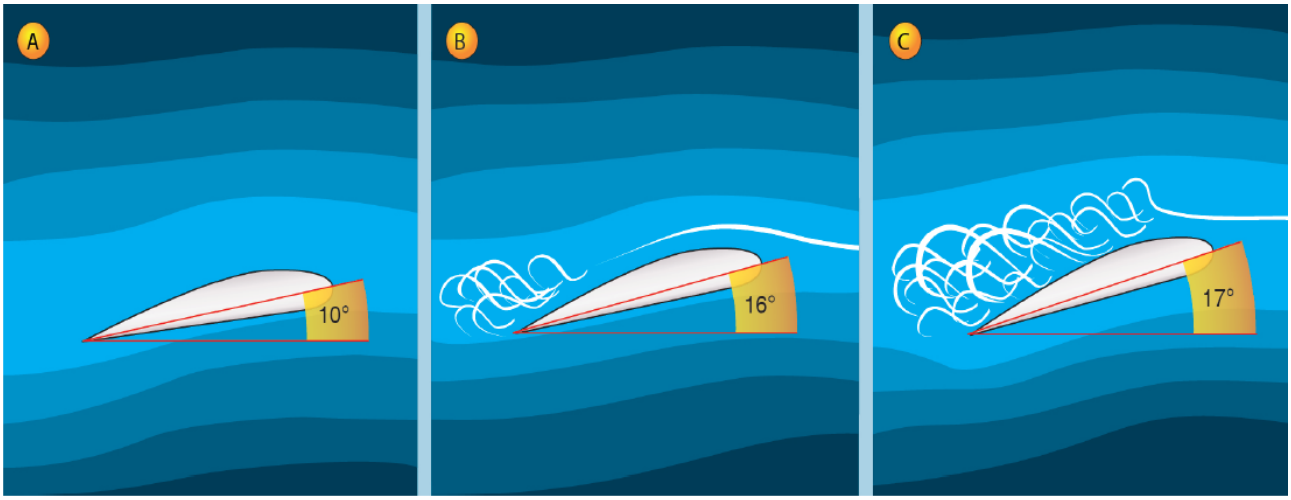

Illustration 1: Critical angle of attack and stall. (Source: Federal Aviation Authority Aeroplane Flying Handbook)

1.18.3 Flap control system (Source: Sling 2 Maintenance Manual)

A flap comprises a conventional stressed-skin semi-monocoque structure comprising ribs and riveted sheet metal skin, without a spar. Flap hinges (on the aileron side) comprise of sealed ball bearings pressed into shaped plates attached to the flaps.

The flap control system is push-pull type with a linking torque tube (torsion bar). An actuator motor is installed in the centre channel between the seats. It controls an arm attached to a torque tube. Control arms are connected to each extremity of the torque tube. Each control arm is connected to a pushrod, which in turn is connected to a wing flap. Micro-switches positioned within the actuator motor automatically interrupt the electric current when the flaps reach extreme (up/down) positions, shutting off the actuator motor. The flap controller is located on the instrument panel.

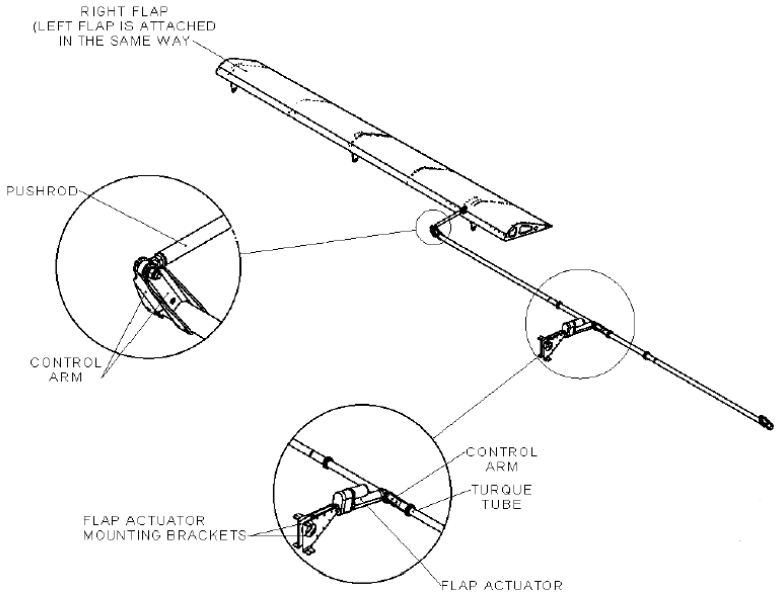

Diagram 1: Flap control system. (Source: Sling 2 Maintenance Manual)

1.18.4 The South Africa Civil Aviation Technical Standards (SACATS) 61.02.5 states how many hours a student pilot must complete to obtain their solo consolidation, but does not state how much of that time could be completed in a day (24 hours).

CATS 61.02.5 Privileges and Limitations of Student Pilot Licence

Dual competency check flight, dual check flight and dual progress check flight

(1) A dual competency check flight must be conducted before the student pilot is permitted to undertake his first solo flight.

(2) The dual competency first solo check flight shall be conducted by the Chief Flying Instructor (CFI) or a Grade II or Grade I instructor appointed by the CFI.

(3) Before a student pilot is authorised to conduct his first solo flight (exercise 14), the instructor who conducted the dual competency check flight must endorse the student's logbook in accordance with SA-CATS 61.

(4) The dual competency first solo check flight must include but is not limited to –

(a) at least 3 take-offs and landings;

(b) one glide approach to a landing;

(c) one simulated engine failure during initial climb out;

(d) one go-around from a full flaps configuration.

(5) A dual check flight shall be conducted by a suitably rated instructor prior to each solo flight during the first 3 hours of the student's solo flight time –

(a) subsequently a minimum of 1hour dual instruction shall be conducted for every 5 hours solo flight time until a private pilot's licence is obtained.

1.19. Useful or Effective Investigation Techniques

1.19.1. None.

2. ANALYSIS

2.1. General

From the available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any organisation or individual.

2.2. Analysis

Man

2.2.1. The student pilot was issued a Student Pilot Licence (SPL) on 12 March 2021 with an expiry date of 11 March 2022. The pilot's Class 2 aviation medical certificate was issued on 9 February 2021 with an expiry date of 9 February 2023, with no restrictions. The pilot had started flying on 2 March 2021; he accumulated 21.7 dual hours and 4.2 hours solo, according to his pilot's logbook.

2.2.2. This flight was a solo consolidation in which the student pilot had to carry out circuit-and-landing exercises. On the accident day, the student pilot needed to achieve 0.8 hours. The student pilot had flown 0.6 hours before changing from RWY 20 to RWY 02, whereafter he flew another 0.2 hours which would have covered the quota needed for him to complete his solo consolidation. The student pilot had undergone training on how to change a circuit should the wind direction change. When the student pilot's training file was reviewed, it was evident that he was used to flying an average of 0.86 hours on dual circuit training and an average of 0.84 hours on solo circuits.

Aircraft

2.2.3 The annual inspection on the aircraft was conducted on 11 June 2021 at 1071.5 airframe hours and the aircraft had been flown a further 57.7 hours after the last inspection.

2.2.4 The aircraft was issued a Certificate of Registration to Service (CRS) on 11 June 2021 with an expiry date of 10 June 2022 or at 1171.45 hours, whichever occurs first. No evidence of pre-existing failures could be found on the aircraft during an on-site investigation as well as wreckage examination post-accident. The cockpit and the instruments on the panel were consumed by fire which made it impossible to download the engine parameters as the EFIS was also consumed by fire. The aircraft's flap motor indicated that the flaps were retracted (in the up position) during the accident.

2.2.5 The aircraft was issued an Authority to Fly (ATF) on 12 April 2018 with an expiry date of 30 April 2022. The current owner of the aircraft was issued a Certificate of Registration (C of R) on 19 June 2015.

Environment

2.2.6 The wind direction changed during the student pilot's solo consolidation, prompting him to change the circuit pattern direction from RWY 20 to RWY 02. According to the crosswind component calculator, there was a crosswind from the left of 5.7 knots when the student pilot landed on RWY 02. However, weather was not a factor in this accident.

2.2.7 The risk of allowing vegetation of this nature to grow close to a runway increased the risk of aircraft colliding with it in the event that a pilot veers off to the left of RWY 02 or right of RWY 20 during landing or take-off phases or during an aborted take-off.

Conclusion

2.2.8 The student pilot landed on RWY 02 after undertaking a total of nine circuit-and-landing exercises, which included a runway change. It is not clear if the student pilot completed the downwind checks because the flaps motor was up post-accident; this meant that the stall speed and stopping distance would increase. During the landing roll, the student pilot lost directional control on the 30m wide runway, and the aircraft veered off to the left-side of RWY 02. This was evident from the landing gear wheel markings on the grass surface next to RWY 02. Upon realising that there was vegetation (shrubs) in front of him, the student pilot elected to take an avoidance action by adding power and rotating the aircraft (*this action has two dangerous consequences: the airspeed drops because the nose is up, and the aircraft stalls much faster*). The aircraft was airborne, but the gears got caught by vegetation that the student pilot was attempting to avoid. This resulted in a further decay of airspeed which, at this stage of flight, must have been fairly low and the flight controls were not responding to any input from the student pilot. The student pilot had pitched the aircraft's nose down (to increase the speed) as was observed by the eyewitness. However, the aircraft was unable to sustain flight; the stalling intensified, followed by the left wing impacting the ground. The student pilot was fatally injured, and the aircraft was consumed by post-impact fire.

2.2.9 It is likely that the accident could be attributed to the student pilot's lack of flying experience and poor decision-making.

3. CONCLUSION

3.1. General

From the available evidence, the following findings, causes and contributing factors were made with respect to this accident. These shall not be read as apportioning blame or liability to any organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusion heading:

- **Findings —** are statements of all significant conditions, events, or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability.

3.2. Findings

Student pilot

3.2.1. The student pilot was issued a Student Pilot Licence (SPL) on 12 March 2021 with an expiry date of 11 March 2022. The pilot's Class 2 aviation medical certificate was issued on 9 February 2021 with an expiry date of 9 February 2023, with no restrictions.

3.2.2. The student pilot started flying on 2 March 2021 and accumulated 21.7 dual hours and 4.2 solo hours according to his pilot's logbook. This flight was a solo consolidation flight which consisted of circuit-and-landing exercises.

Aircraft

3.2.3 The aircraft was issued an Authority to Fly (ATF) on 12 April 2018 with an expiry date of 30 April 2022.

3.2.4 The aircraft was issued a Certificate of Registration (C of R) on 13 December 2016.

3.2.5 The last annual inspection was conducted on 11 June 2021 at 1071.5 airframe hours and the aircraft had been flown a further 57.7 hours since the last inspection.

3.2.6 The aircraft was issued a Certificate of Registration to Service (CRS) on 11 June 2021 with an expiry date of 10 June 2022 or at 1171.45 airframe hours, whichever occurs first.

3.2.7 The aircraft was issued an Authority to Fly (ATF) on 12 April 2018 with an expiry date of 30 April 2022. The current owner of the aircraft was issued a Certificate of Registration (C of R) on 19 June 2015.

3.2.8 No evidence of pre-existing failures could be found on the wreckage during an on-site investigation. The cockpit and the instruments on the panel were consumed by post-impact fire which made it impossible to download engine parameters as the EFIS was also consumed by fire.

3.2.9 The aircraft's flap motor indicated that the flaps were in the up position; this suggested that the pilot had retracted them while "cleaning the aircraft" or that the student landed with the flaps in the "up" position.

Approved Training Organisation (ATO)

3.2.10 The student pilot's training file was reviewed and it was evident that the student pilot was accustomed to flying an average of 0.86 hours on dual circuit training and an average of 0.84 hours on solo circuits.

3.2.11 The student pilot took a decision based on the wind direction and changed runways. According to the weather report from SAWS, the wind conditions at the time of the accident were not severe to have resulted in the runway change.

Airfield

3.2.12 Panorama Airfield is unlicensed and is being used for flight training, considering that there is no airfield rescue services on site.

3.2.13 Vegetation was allowed to grow close to the runway, which posed a threat to the safety of aircraft taking off or landing on RWY 02/20.

3.2.14 The pilot had an unstable directional control during ground roll.

Weather

3.2.15 The weather at the time of the accident was recorded as follows: surface wind: 290° at 6 knots; visibility: 9999m; cloud: ceiling and visibility okay (CAVOK); temperature: 16°C. The crosswind component was calculated to be 5.7kt from the left.

3.3. Probable Cause

3.3.1 The student pilot lost directional control during landing, and the aircraft veered off to the left-side of the runway. Whilst attempting to lift off to clear the vegetation ahead of the flight path, the aircraft impacted the vegetation, stalled and crashed to the ground.

3.4. Contributory Factor/s

3.4.1. None.

4. SAFETY RECOMMENDATIONS

4.1. General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2. Safety Recommendation/s

4.2.1 It is recommended that the vegetation growing close to the runway be removed to reduce obstacles that pilots could possibly encounter in an event of unstable landings or approaches.

4.2.2 It is recommended that at uncontrolled/unlicensed aerodromes – where flight training takes place – instructors maintain constant contact with their student pilots through the use of two-way radios to minimise student pilots making complex decisions on their own without their guidance.

5. APPENDICES

5.1. None.

This report is issued by:

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