SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/2/3/9736		
Aircraft Registration	ZS-PZT	**Date of Accident**	8 October 2018		**Time of Accident**	0920Z	
Type of Aircraft	Cessna C172L		**Type of Operation**		Training (Part 141)		
Pilot-in-command Licence Type	Student Pilot		**Age**	21	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		37.7		Hours on Type	37.7	
Last Point of Departure	Grand Central Aerodrome (FAGC), Gauteng						
Next Point of Intended Landing	Grand Central Aerodrome (FAGC), Gauteng						
Location of the accident site with reference to easily defined geographical points (GPS readings) if possible							
Residential property, Vorna Valley (S26°00'02" E028°06'25")							
Meteorological Information	FAGC 080900Z; Temperature: 17°C; Dew Point: 02°C; Wind: 300°/6 kts; CAVOK QNH: 1028 hPa						
Number of People On Board	1 + 0	**No. of People Injured**	0	**No. of People Killed**	1 (On board) and 1 (On ground)		
Synopsis							

On Monday 8 October 2018 at 0833Z, the pilot departed Grand Central Aerodrome (FAGC) on a solo training flight with the intention of remaining in the circuit to practise touch-and-go landings.

Following the pilot's fifth touch-and-go, while the aircraft was on the upwind leg, another Cessna 172 with registration ZS-SCB entered the left-hand circuit from the north of Runway 35 on an early downwind. The pilot flying ZS-PZT was requested by air traffic control (ATC) at FAGC to enter the downwind leg behind the aircraft ZS-SCB. Once ZS-PZT was established on the downwind leg, the pilot was requested to carry out one orbit to the right and re-establish on the downwind to assist in determining appropriate distance between the two aircrafts in the circuit.

An inaudible transmission was heard on the FAGC tower radio frequency. Immediately after this transmission, the ATC attempted multiple times to make radio contact with ZS-PZT, but to no avail. It was subsequently found that the aircraft crashed, and the pilot sustained fatal injuries .

One bystander on the ground also sustained fatal injuries during the accident sequence. The aircraft was destroyed on impact.

The investigation revealed that during a right-hand orbit, the aircraft made a steep right turn and entered a spiral dive. The pilot was able to recover and correct the aircraft and, in an attempt, to avoid colliding with trees spanning across the aircraft's flight path, the aircraft was stalled and entered spiral dive which the pilot could not recover from and it crashed. The aircraft was destroyed on impact and the pilot was fatally injured in the accident.

SRP Date	11 June 2019	Publication Date	19 June 2019

ABBREVIATION	DEFINITIONS
AMSL	Above Mean Sea Level
AIID	Accident and Incident Investigations Division
ATC	Air Traffic Control(ler)
ATS	Air Traffic Services
ATO	Aviation Training Organisation
CARs	Civil Aviation Regulations
CAVOK	Ceiling and Visibility OK
ELT	Emergency Locator Transmitter
FAGC	Grand Central Aerodrome
FALA	Lanseria International Aerodrome
FAOR	OR Tambo International Airport
GPS	Global Positioning System
MHz	Megahertz
MPI	Mandatory Periodic Inspection
NTSB	National Transportation Safety Board
PIC	Pilot-in-command
SACAA	South African Civil Aviation Authority
SACARs	South African Civil Aviation Regulations of 2011
SACATs	South African Technical Standards of 2011
SAWS	South African Weather Service
SPL	Student Pilot's Licence
VFR	Visual Flight Rules
VHF	Very High Frequency
VMC	Visual Meteorological Conditions

Reference Number : CA18/2/3/9736
Name of Owner : Lanseria Flight Centre (Pty) Ltd
Manufacturer : Cessna
Model : C172L
Nationality : South African
Registration Marks : ZS-PZT
Place : Vorna Valley, Midrand, Gauteng
Date : 8 October 2018
Time : 0920Z

All times given in this Report are Coordinated 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 (CAR), 2011, this Report was compiled in the interests of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.

Investigations Process:

The Accident and Incident Investigation Division (AIID) was notified of the accident on 8 October 2018 at about 0930Z. The investigators went to Vorna Valley later that day. The investigators coordinated with all authorities on-site, initiating the accident investigation process according to CAR Part 12 and investigation procedures. The AIID of the South African Civil Aviation Authority (SACAA) is leading the investigation, as the Republic of South Africa is the State of Occurrence. The United States of America (USA) National Transportation Safety Board (NTSB), as the state of manufacture, has appointed a non-travelling accredited representative.

Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:
   - Accident – this investigated accident
   - Aircraft – the Cessna C172L 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 are taken from different sources and may be adjusted from the original for the sole purpose of improving the clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression, or enhancement of colour, brightness, contrast, or addition of text boxes, arrows or lines.

Disclaimer:

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Monday 8 October 2018 at 0833Z, a pilot flying a Cessna 172L with registration marking ZS-PZT, took-off from Grand Central Aerodrome (FAGC) on a solo training flight. The pilot's intention was to remain in the circuit (Figure 1) to practise touch-and-go landings at FAGC on Runway 35. The flight was operated under the provisions of Part 141 of the South African Civil Aviation Regulations (CAR) 2011.

Note: A touch-and-go landing is described as: "A landing with just enough time on the ground to reconfigure the airplane for another take-off. The purpose of a touch-and-go is to compress more landings (and take-offs) into a flying lesson." Extract: Mastery Flight Training Inc. in the Federal Aviation Administration FLYING LESSONS, 27 January 2011.

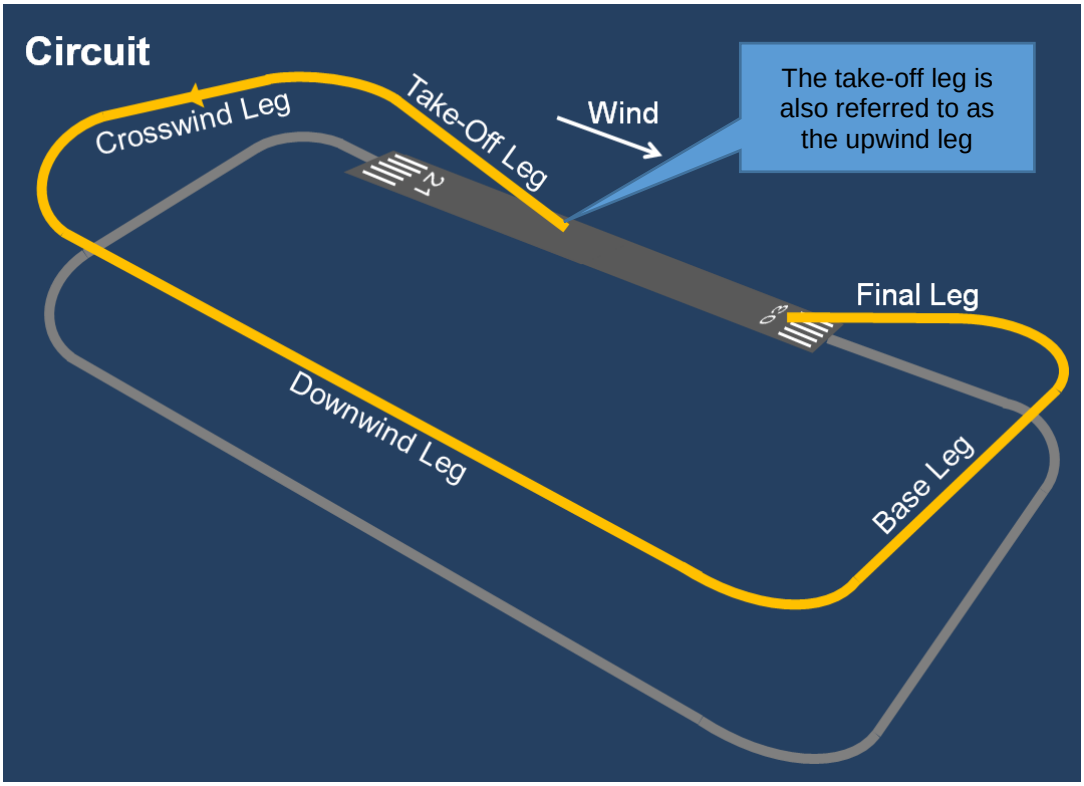


Figure 1: Example of an airfield circuit layout (parafield airport)

1.1.2 Following her fifth touch-and-go exercise, while the aircraft was on the upwind leg, another Cessna 172 with registration ZS-SCB entered the left-hand circuit of runway 35 on an early downwind. The ATC requested the pilot flying the accident aircraft to enter the downwind leg behind ZS-SCB.

1.1.3 Once the accident aircraft was established on the downwind leg at 0916Z, the pilot was requested to carry out one orbit to the right and re-establish on the downwind due to the short distance between the two aircrafts in the circuit.

Note: An Orbit is defined as: "A 360 degree, rate one turn manoeuvre, either to the left or right as instructed." This reference is used by the training school as their definition of an orbit.

1.1.4 An eyewitness reported that the aircraft entered the right-hand orbit, but as the turn continued, the turning angle got steeper up to a point at which the nose dropped and the aircraft entered a spiral dive.

Note: "*A spiral dive, a nose low upset, is a descending turn during which airspeed and G-load can increase rapidly and often result from a botched turn. In a spiral dive, the airplane is flying very tight circles in a nearly vertical attitude and will be accelerating because it is no longer stalled."* Extract: *The Federal Aviation Administration (FAA) Airplane Flying Handbook (Chapters 4–23)*

1.1.5 A second eyewitness stated that the aircraft had banked abruptly to the right after it had entered the orbit. The aircraft continued to fly with a high bank angle up until the eyewitness lost sight of the aircraft.

1.1.6 A third eyewitness, who was in proximity to the Accident site, stated that the aircraft had flown in front of his car at a low level and had rapidly pitched up. The witness described the aircraft as performing a manoeuvre similar to a hammerhead turn, after which the right wing lost lift and the aircraft impacted the ground.

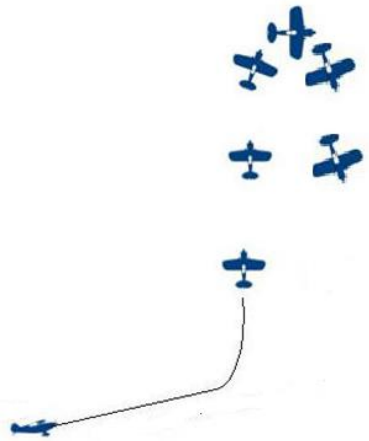


Figure 2: According to the third eyewitness, the aircraft entered a turn similar to the illustration above (hammerhead turn) and impacted the ground (source: http://www.aerobatica.pt)

Figure 3: The location of each eyewitness as stated on eyewitnesses' questionnaire (Source: Google Earth)

1.1.7 At 0917Z, an inaudible transmission was heard on the FAGC tower frequency.

Immediately after this transmission, the ATC attempted multiple times to make radio contact with the Accident aircraft, but to no avail.

1.1.8 The aircraft wreckage was located in the back yard of a residential property in Vorna Valley, GPS coordinates S26°00'02" E028°06'25", at an elevation of about 4 880ft above mean sea level (AMSL).

Figure 4: Google Earth overlay indicating the location of the Accident site (Source: Google Earth)

1.1.9 The aircraft wreckage was located in the back yard of a residential property in Vorna Valley. The aircraft came to rest in an inverted position; the fuselage was broken in half after impacting a tree.

Figure 5: The Accident aircraft at the Accident site

1.1.10 The pilot and a person on ground working on the property at the time of the Accident sustained fatal injuries. The aircraft was destroyed during the impact sequence.

1.1.11 Damage to property on the ground included a section of the roof structure of the

neighbouring house, the perimeter wall between the two properties, a shed and some vegetation.

1.1.12 The flight was conducted in visual meteorological conditions (VMC) by day.

Figure 5: The aircraft prior to the Accident (Source: www.hebels.nl)

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Other
Fatal	1	-	-	1
Serious	-	-	-	-
Minor	-	-	-	-
None	-	-	-	-

1.2.1 The pilot of the aircraft was South African. The person on ground who sustained fatal injuries was Malawian citizen.

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during the Accident sequence.

Figure 6: The aircraft as it came to rest

1.4 Other Damage

1.4.1 The neighbouring house sustained minor damage to its roof and some vegetation.

1.4.2 The house of the final impact location sustained damage to its perimeter wall, a shed and some vegetation. (See Figure 9 and 10)

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC):

Nationality	South African	Gender	Female	Age	21
Licence Number	0275007668	Licence Type	Student Pilot Licence (SPL)		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Single Engine Land				
Medical Expiry Date	27 June 2023				
Restrictions	None				
Previous Accidents	None				

1.5.2 PIC Flying Experience:

Total Hours	37.7
Total Past 90 Days	34.8
Total on Type Past 90 Days	34.8
Total on Type	37.7

1.5.3 The pilot had completed her introduction flight on 10 June 2018 and had begun flying training on 6 July 2018.

Note: Flying hours accrued during the introduction flight are included as dual training hours.

1.5.4 On 13 September 2018, the pilot was signed off to fly solo. She had accumulated a total of 29.9 hours of dual flying time before being signed off to fly solo.

1.5.4.1 On 25 September 2018, one dual circuit was conducted, but no solo flights were carried out due to the wind being ‘out of perceived limit’ for solo student flying.

1.5.4.2 On 26 September 2018, five dual circuits were carried out; again, the wind was ‘out of perceived limits’ for solo flying.

1.5.4.3 On 1 October 2018, the pilot flew 0.8 hours solo. A note made by the instructor during the debrief stated that the pilot should correct and maintain the circuit altitude when on the downwind leg.

1.5.4.4 On 1 October 2018, the pilot flew an additional 0.8 hours solo, bringing the pilot’s total solo hours to 2.0.

1.5.4.5 On 2 October 2018, the pilot flew 0.6 hours dual circuit and no solo time due to weather conditions.

1.5.4.6 On 7 October 2018, the pilot conducted four dual circuits. A note made in the training file of the pilot by the instructor suggested that the pilot had a tendency to freeze at the controls.

1.5.5 All the pilot's training had been conducted at the same Aviation Training Organisation (ATO) based at FAGC. All departures and arrivals were at FAGC except for one landing, which was conducted at Lanseria International Airport (FALA), to demonstrate diversion procedures.

1.5.6 The PIC had completed stall recovery training on 20 July 2018 and was signed out as competent by the instructor. The PIC had also completed all necessary circuit pattern training. (Refer to Appendix E)

1.5.7 Prior to the morning of the Accident flight, the pilot had last flown ZS-PZT on 2 October 2018. The flights that day comprised a 0.6 hour (36 minutes) dual flight followed by a 0.3 hour (18 minutes) dual flight. No solo flights were carried out on the day due to weather limitations. The last solo flight carried out by the pilot while operating ZS-PZT prior to the Accident flight was on 13 September 2018.

1.5.8 Instructor:

Nationality	South African	Gender	Male	Age	21
Licence Number	**********	Licence Type	Commercial Pilot Licence (CPL)		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Single Engine Land, Multi Engine Land, Night, Instrument, Instructor Grade 2				
Medical Expiry Date	13 August 2019				
Restrictions	None				
Previous Accidents	None				

1.5.10 Instructor Flying Experience:

Total Hours	475.0
Total Past 90 Days	72.5
Total on Type Past 90 Days	52
Total on Type	278.4

1.5.11 The instructor was in possession of a valid commercial pilot licence, which was initially issued on 14 August 2017. The last competency test was carried out on 22 June 2018 and was due to expire on 31 August 2019. The instructor held a valid class one aviation medical, which was issued on 31 August 2018 and due to expire on 31 August 2019.

1.5.12 According to the South African Civil Aviation Technical Standards (SACAT) 2011, 61.01.5.1.(4): "Each solo training flight must be personally supervised by the holder of a valid flight instructor rating or a person appointed by the Chief Flying Instructor." This responsibility was carried out by another grade two instructor from the school who was in the control tower of FAGC at the time of the Accident.

1.5.12 Air Traffic Controller:

Nationality	South African	Gender	Male	Age	34
Licence Number	**********	Licence Type	ATS		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	AD, ATSA, ATSA/CLD, ATSA/COORD, ATSA/FIS, Instructor				
Medical Expiry Date	30 April 2022				
Restrictions	None				

1.5.13 The air traffic controller on duty had signed on for his shift at 0342Z. He held a valid air traffic services (ATS) licence and was certified to provide aerodrome control at FAGC. His last proficiency check was carried out on 18 May 2018, and expiring on 17 May 2019. The controller was in possession of a valid class 3 aviation medical certificate that was issued on 23 April 2018, and expiring on 30 April 2022.

1.6 Aircraft Information

1.6.1 Airframe:

Type	C172L	
Serial Number	17260377	
Manufacturer	Cessna	
Date of Manufacture	1972	
Total Airframe Hours (At time of Accident)	10 457.34	
Last MPI (Date & Hours)	4 October 2018	10 450.20
Hours Since Last MPI	7.14	
C of A (Issue Date)	1 September 2008	
C of A (Expiry)	30 September 2019	
C of R (Issue Date) (Present Owner)	26 November 2008	
Operating Categories	Standard	

1.6.1.1 The recommended fuel use for this aircraft was Avgas 100LL. The last fuel uplift was carried out the night before the accident flight, and no further flights were conducted thereafter until the Accident flight. A total of 78 litres of fuel was uplifted (Note: this was not recorded in the flight folio; a fuel receipt was provided as evidence). The total fuel on-board according to the flying instructor prior to commencing the dual check was approximately 112 litres (3.5 hours' endurance).

1.6.1.2 After scrutinising the flight folio, the investigation concluded that there were 82 litres of fuel being on-board the aircraft prior to departure on the morning of the accident flight. This equates to a fuel endurance of 2.56 hours. (See Appendix A for fuel calculations)

1.6.1.3 No evidence of fuel contamination was found during the uplift and no other operator at FAGC reported an instance of fuel contamination after this date.

1.6.1.4 There were no defects recorded in the airframe logbook, which may have contributed to the accident.

1.6.2 Engine:

Type	Lycoming O-320-E2D
Serial Number	L-28012-27A
Hours Since New	4 603.0
Hours Since Overhaul	226.1

1.6.2.1 There were no recorded defects in the engine logbook prior to the accident.

1.6.3 Propeller:

Type	McCauley IC160CTM7553
Serial Number	ZG44023
Hours Since New	8 348.14
Hours Since Overhaul	387.80

1.6.3.1 There were no recorded defects in the propeller logbook prior to the accident.

1.7 Meteorological Information

1.7.1 Grand Central Airport (FAGC) provided an official report detailing the meteorological conditions prevailing at the time of the Accident.

Wind direction	300°	Wind speed	6 kts	Visibility	CAVOK
Temperature	25°C	Cloud cover	Nil	Cloud base	Nil
Dew point	2°C	QNH	1 028 hPa		

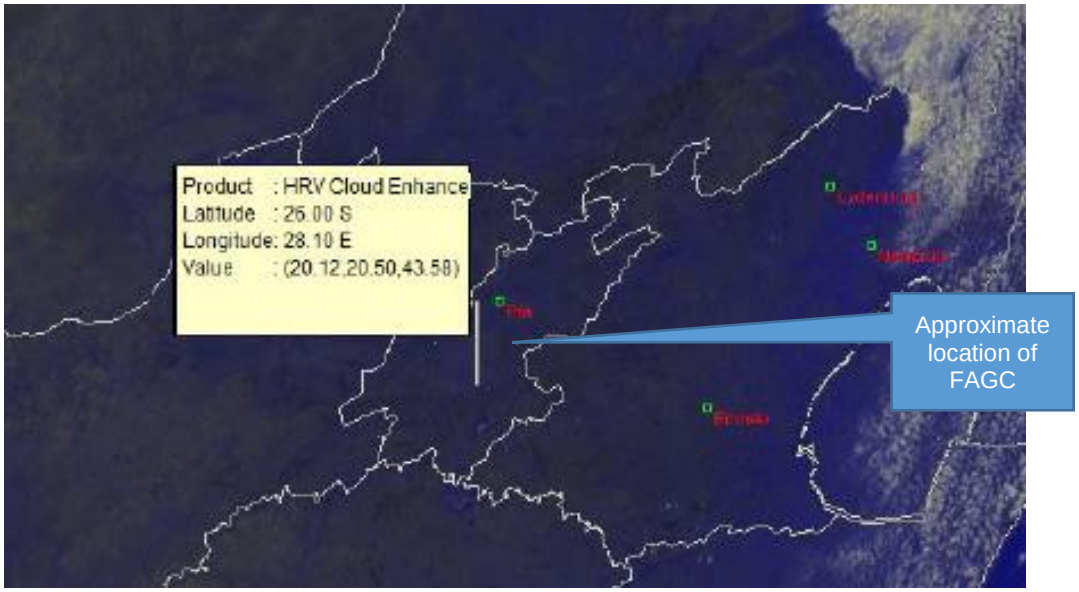


Figure 7: Clear skies over Gauteng at the time of the accident (Source: SAWS)

1.7.2 No significant weather conditions were reported at the time of the accident.

1.7.3 The flight was conducted in daylight conditions with clear skies and good visibility. At the time of entering the orbit, the sun would have been on the left of the pilot, very close to its zenith.

1.8 Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as required by the Regulator. There were no defects reported with the navigational equipment prior to the flight.

1.8.2 The flight was conducted under visual flight rules (VFR) by day; and the pilot was conducting circuit training.

1.9 Communication

1.9.1 The aircraft was equipped with standard communication equipment as required by the Regulator. There were no defects reported with the communication equipment prior to the flight.

1.9.2 All communication was on the very high frequency (VHF) 122.8 MHz for FAGC tower. No faults regarding the communication system were reported by FAGC tower on the day of the accident. (Refer to Appendix F)

1.9.3 No Mayday call was transmitted, although an inaudible call was transmitted to the FAGC tower very close to the time of approximate impact. Prior to the accident, all communications were normal, and there is no evidence to suggest that there was a failure prior to the accident.

1.10 Aerodrome Information

1.10.1 The accident occurred in a built-up residential area, approximately 2.5nm (4.6km) from FAGC. The location of the accident site is Vorna Valley, Midrand, with GPS coordinates S26°00'02" E028°06'25", at an elevation of approximately 4 880ft. AMSL.

Figure 7: The accident site in Vorna Valley, Midrand (Source: Google Earth)

1.10.2 The aircraft was conducting circuit training at FAGC at the time of the accident. The

aircraft was on a left hand downwind circuit for Runway 35 (Refer to Appendix B).

Aerodrome Location	Grand Central, Gauteng
Aerodrome Coordinates	25°59'13.44"S 028°08'25.97"E
Aerodrome Elevation	5235ft.
Runway Designations	35/17
Runway Dimensions	1828x23 m
Runway Used	Runway 35
Runway Surface	Asphalt
Approach Facilities	None

1.11 Flight Recorders

1.11.1 The aircraft was not equipped with a flight data recorder (FDR) or cockpit voice recorder (CVR), nor were these required to be installed, according to the Regulations.

1.12 Wreckage and Impact Information

1.12.1 The aircraft was seen flying at a low level in a southerly direction. After crossing Albertyn Street, the aircraft pitched up to a near vertical position. The aircraft lost momentum, stalled and nosed over to the right. The final heading before coming to rest was in a westerly direction.

1.12.2 The pitch angle prior to impact was approximately between 30° and 60° as the aircraft still possessed sufficient forward momentum to continue on its ground trajectory for a further 23m.

Figure 8: The direction of the aircraft leading up to the Accident
(Source: Google Earth)

1.12.2 The first impact occurred when the aircraft struck the roof and a tree of a neighbouring

house. The aircraft continued in a westerly direction, impacting a precast wall and a person on the ground.

1.12.3 The aircraft came to rest against a tree in the backyard of a residential property. The distance from the first point of impact to the final resting point was 23m. Considering the damage sustained, the aircraft impacted the precast wall in a right wing low attitude with most of the impact forces affecting the right wing. The aircraft then skidded and impacted the tree on the right side of the fuselage.

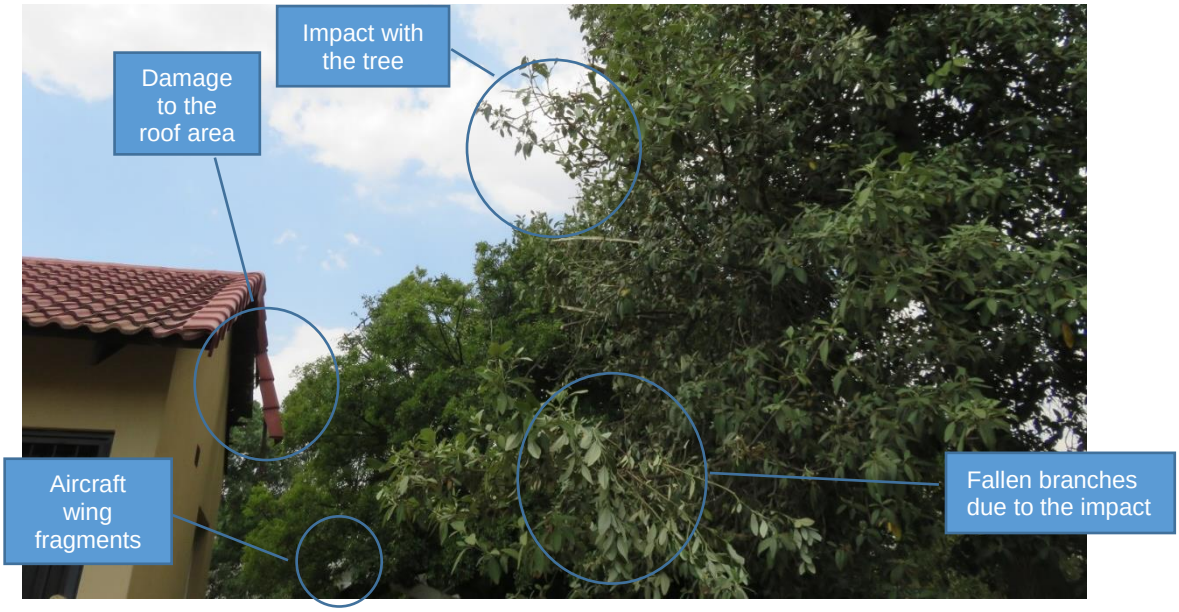


Figure 9: The first impact during the Accident sequence

Figure 10: Damage to the precast wall and a piece from the damaged roof

Figure 11: The aircraft fuselage broke in half after impacting a tree

1.12.4 The accident site was in a built-up residential area. The wreckage path was limited to the backyard areas of the two affected properties. Both properties had trees and other plants in their gardens. A precast-type wall separated the two properties.

1.13 Medical and Pathological Information

1.13.1 This report was concluded prior to the autopsy report being made available. Should there be any significant facts gathered from the autopsy report, which have impact on the cause of the accident, the report will be reviewed.

1.13.2 The pilot was a holder of a valid class 2 aviation medical certificate, which had been issued on 27 June 2018 with an expiry date of 30 June 2023. The certificate was issued with no restrictions.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-fire impact.

1.15 Survival Aspects

1.15.1 The aircraft was not equipped with an emergency locater transmitter. No Mayday call was transmitted, although an unreadable call was transmitted to the FAGC tower very close to the time of the Accident.

1.15.2 After the loss of communication with FAGC tower, the ATC on duty requested ZS-SCB to reroute towards the last known position of ZS-PZT. The fire services at FAGC were subsequently placed on standby.

1.15.2 The fire services received a report stating that an aircraft had crashed in the Vorna Valley area and they dispatched to the site.

1.15.3 The aircraft suffered damages to the left door and the fuselage was distorted during impact sequence. The pilot's seat mounts failed during impact sequence; the waist safety belt was still intact as the pilot had remained restrained to the seat. The pilot succumbed to her injuries at the accident scene.

1.15.4 Due to the high impact forces during the accident sequence, it was deemed that the Accident would not have been survivable. The cockpit area was distorted from the impact. All the cockpit windows had shattered and the PIC's door had broken off at the hinges. The instrument panel had dislocated from its mounts in the cockpit and some instruments were ejected from the panel. The engine mounts had broken, causing the engine to impact the firewall and, subsequently, push back into the cockpit area.

1.15.5 The person on the ground survived the initial impact, but succumbed to his injuries before he could be evacuated from the scene.

1.16 Tests and Research

1.16.1 On 6 March 2019, an engine teardown was conducted at an approved Aircraft Maintenance Organisation (AMO) in order to investigate whether the engine may have had any mechanical anomalies prior to the accident. The teardown inspection of the engine did not reveal any pre-impact mechanical failure that would have caused the engine to deviate from normal operating perimeters. (Refer to Appendix C).

1.16.2 Due to the extensive damage sustained to the airframe during the accident sequence, a limited visual inspection was carried out on the accident site by the investigation team (Refer to Appendix D). The inspection did not reveal any pre-impact failures.

1.17 Organisational and Management Information

1.17.1 Aviation Training Organisation:

1.17.1.1 The Aviation Training Organisation (ATO) held a valid training approval certificate for Part 141 operations (ATO), issued by the Regulator on 7 July 2017, with an expiration date of 30 June 2022.

1.17.1.2 The pilot was trained by four instructors at various stages of her training. All the instructors held valid licences and the required instructor ratings to carry out training.

1.17.2 Air traffic services at FAGC:

1.17.2.1 The ATS unit at FAGC was licensed by the South Africa Civil Aviation Authority (SACAA) to provide aerodrome control services. The ATS unit approval certificate had been issued on 16 January 2018 and was due to expire on 31 October 2018.

1.18 Additional Information

1.18.1 In the South African CARs 2011, solo and dual instruction flight time are defined as:

- "***Solo flight*** *means flight time during which the pilot is the sole occupant of the aircraft and in which there is no other person present in the aircraft, be it an instructor, a safety pilot, another pilot or any other passenger.*"
- "***Dual instruction time****, in terms of flight training, mean flight time during which a person is receiving flight instruction from a properly authorised pilot on-board the aircraft.*"

1.18.2 Spiral dive:

1.18.2.1 The Federal Aviation Administration *Airplane Flying Handbook* (Chapters 4–23) defines a spiral dive as follows: "*A spiral dive, a nose low upset, is a descending turn during which airspeed and G-load can increase rapidly and often results from a botched turn. In a spiral dive, the airplane is flying very tight circles, in a nearly vertical attitude, and will be accelerating because it is no longer stalled.*"

1.18.2.2 The instrument indications that the aircraft has entered a spiral dive include the following:

- Increasing airspeed
- Attitude indicator showing nose below the horizon
- Loss of altitude
- Turn coordinator showing a full deflection in the direction of the dive
- Heading indicator changing
- Vertical speed indicator showing a rapid descent

Figure 12: An example of the instrument panel of an aircraft in a spiral dive (Source: http://www.studyflight.com/spiral/)

1.18.2.3 In order to exit the spiral dive, engine power needs to be reduced. The next step requires the wings to be rolled level and a gentle climb should be commenced to exit the dive. Once the aircraft is in a climbing attitude and the airspeed is in the safe band, power can be reapplied. Caution must be taken during the recovery process not to abruptly correct the dive. An abrupt correction may overstress the aircraft or cause a high-speed stall.

1.18.2 Aerodynamic stall:

1.18.2.1 An aerodynamic stall is defined by Skybrary as follows: *"… a sudden reduction in the lift generated by an aerofoil when the critical angle of attack is reached or exceeded.*"

1.18.2.2 At a low angle of attack (a small angle between the chord line and the relative airflow), the airflow over the wing is laminar and smooth. As the angle of attack increases, the smooth airflow over the wing starts to become turbulent. When the critical angle of attack is reached, the airflow over the wing breaks away and all lift is rapidly reduced. This angle is referred to as the stall angle.

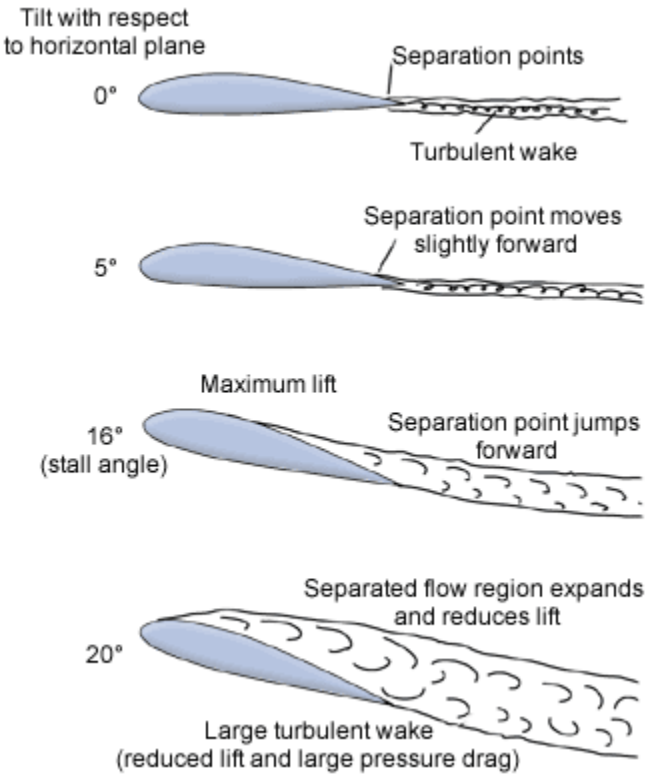


Figure 13: The angle of attack in relation to airflow over the wing (Source: lapeeraviation.com)

1.18.3 Signs of an impending stall:

1.18.3.1 Prior to stall occurring, the aircraft may experience one or more of the following symptoms:

- High nose angle
- Low airspeed
- Ineffective flight controls
- Buffeting tail plane flight controls
- Stall warning sound or stall warning light illumination

1.18.4 After a stall occurs:

1.18.4.1 The aircraft will experience a loss of altitude and a nose-down pitching moment. Aileron input may cause the aircraft to auto rotate, which could develop into a spin.

1.18.5.1 The SACAA Flight Instructors Manual of Training Procedures states the following stall recovery procedure:

- Simultaneously apply: Sufficient opposite rudder to prevent further yaw
- Control column centrally forward until symptoms cease
- Full power
- Sufficient opposite rudder to prevent further yaw
- Use ailerons to level wings when flying speed regained while maintaining balance
- Ease out of resultant descent and complete after take-off checks once established in the climb
- Regain entry altitude."

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2. ANALYSIS

From the evidence available, the following analysis was made with respect to this accident. The points below should not be read as apportioning blame or liability to any particular organisation or individual.

2.1 The pilot was a holder of a valid pilot licence with the required rating to operate the aircraft. The pilot accumulated a total of 37.7 hours on the Cessna 172 and had been signed out to fly solo after accumulating 29.9 of dual training. On 1 October 2018, a note made in the pilot's training file stated that the pilot needs to correct and maintain altitude when on the downwind leg. On 7 October 2018, a note made in the pilot's training file stated that the pilot had a tendency to freeze at the controls.

2.2 The pilot was in possession of a valid aviation medical certificate.

2.3 The aircraft was serviceable at the time of the accident. No reported defects that may have been attributed to the accident were evident either prior to or during the on-site investigation. The aircraft had sufficient fuel on-board for the operation. The certificate of airworthiness and registration were both valid at the time of the accident. The last mandatory periodic inspection (MPI) was carried out on 4 October 2018 and the aircraft had flown five hours since then. The aircraft had sufficient fuel on-board to conduct the flight.

2.4 An inspection of the aircraft and its systems post the accident did not reveal any failures that may have contributed to the accident; neither were there any defects recorded in the flight folio prevailing at the time of the accident. The engine strip down did not reveal any signs of failure prior to the accident and neither were there any prevailing defects recorded in the flight folio or engine logbook. The propeller was inspected post impact and did not reveal any failures that may have contributed to the accident; neither were there any defects recorded in the propeller logbook or flight folio prior to the accident.

2.5 The weather at the time of the accident was VMC with no reports of any significant conditions that may have adversely affected the operation of the aircraft. Visibility was CAVOK and the wind was 300° at 6 knots.

2.6 The ATO held the necessary certifications to carry out flying training and the instructor who flew with the pilot on the morning of the accident held a valid commercial pilot license and instructor's rating.

2.7 FAGC is a licensed-manned aerodrome. The runway in use at the time was Runway 35, which is a left hand circuit. The ATC on duty at the time held a valid licence and aviation medical certificate. Due to spacing in the circuit between ZS-SCB that was on a mid-down and ZS-PZT that was on an early downwind, the ATC requested ZS-PZT to carry out one orbit to the right. The above is procedural to ensure minimum separation between two aircrafts in the circuit.

2.8 Two eyewitnesses stated that they saw the aircraft enter into a right-hand turn, which would indicate that the aircraft had entered the right-hand orbit. Both eyewitnesses then stated that the angle of bank got steeper and the aircraft began losing altitude in a spiral motion.

2.9 9 During the orbit, the aircraft entered into a spiral dive. This occurs when an aircraft banks/turns at high angle and a loss of altitude is not corrected. The normal bank/turning angle is 30° (3° per second). This angle was exceeded, which led to the aircraft entering a spiral dive. The pilot had recovered from the spiral dive and levelled off at low height and below the trees that spanned along the aircraft's flight path. The recovery from a spiral dive requires the pilot to reduce the power, roll the wings level and gently bring the aircraft out of the dive.

2.10 A third eyewitness who was in proximity to the accident site stated that the aircraft flew directly in front of him at a low height, in a straight and level attitude and rapidly pulled up to avoid trees in its flight path. The aircraft pitched up to a near vertical state before nosing over to the right and disappearing from sight.

2.11 Following the recovery from the first spiral dive, the aircraft was manoeuvred to avoid collision with trees spanning across its flight path. During this manoeuvre (nose pitched up), the aircraft entered a second stall, which the pilot could not recover from, and it impacted the ground.

2.12 The investigation revealed that during a right hand orbit, the aircraft made a steep right turn and entered into a spiral dive. The pilot was able to recover and correct the aircraft and in an attempt to avoid colliding with trees spanning across the aircraft's flight path, the aircraft was stalled and entered spiral dive which the pilot could not recover from and it crashed. The aircraft was destroyed on impact and the pilot was fatally injured in the accident.

3. CONCLUSIONS

3.1 General:

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

3.1.2 To serve the objective of this investigation, the following sections are included in this conclusions section:

- **Findings:** statements of all significant conditions, events or circumstances in this accident. The findings are significant steps in this accident sequence but are not always causal or nor do they always indicate deficiencies.
- **Causes:** actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors:** actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or 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

3.2.1 Pilot:

3.2.1.1 The pilot licence was issued on 26 July 2018 and was due to expire on 25 July 2019. The aircraft type was endorsed on the pilot's licence. The pilot held a valid class 2 aviation medical certificate, due to expire on 27 June 2023.

3.2.1.2 Prior to the flight carried out on 8 October 2018, the pilot had accumulated a total of 37.7 flying hours, of which 2.0 hours were solo flight time and 35.7 hours were dual flight instruction time.

3.2.1.3 All the flying hours accrued by the pilot were on the Cessna 172 type aircraft, and all flying training was carried out by the same ATO.

3.2.2 Aircraft:

3.2.2.1 The aircraft involved in the accident was a Cessna 172L, manufactured in 1972 and first registered in South Africa on 3 January 2008.

3.2.2.2 The aircraft was issued with a Certificate of Airworthiness, initially issued on 1 September 2008 and due to expire on 30 September 2019.

3.2.2.3 The last MPI prior to the accident had been carried out on 4 October 2018 at 10 450.2 airframe hours. The Certificate of Release to Service had been issued on 4 October 2018 and was due to expire on 3 October 2019 or at 10 500.2 hours (whichever comes first). The aircraft had flown approximately five hours since its last MPI.

3.2.2.4 No defects were listed in the flight folio since the last MPI.

3.2.2.5 The aircraft had been refuelled on the morning of the flight; 78 litres of Avgas (100LL) had been uplifted. By the time the pilot commenced with the flight, the aircraft still had a three hours' flight endurance with the fuel on-board the aircraft.

3.2.3 Environment:

3.2.3.1 The flight was conducted during daylight conditions, with VMC prevailing.

3.2.3.2 The METAR for FAGC at 0900Z on the date of the accident indicated the following weather conditions:

Surface wind: 300°/6 kts, temperature: 25°C, dew point: 2°C, clouds: CAVOK, QNH: 1028 hPa

3.2.3.3 The runway in use at FAGC at the time of the accident was Runway 35. This runway has a left-hand circuit pattern.

3.2.3.4 The accident site was in a residential area, approximately 2nm south-west of FAGC.

3.2.4 Air Traffic Services:

3.2.4.1 The controller on duty had signed on for his shift at 0342Z. He held a valid ATS licence and was certified to provide aerodrome control at FAGC. The last proficiency check was carried out on 18 May 2018 and was due to expire on 17 May 2019. The controller was in possession of a valid class 3 aviation medical certificate that was issued on 23 April 2018 and due to expire on 30 April 2022.

3.2.4.2 The ATS unit at FAGC was licensed by the SACAA to provide aerodrome control services. The ATS unit approval certificate had been issued on 16 January 2018 and was due to expire on 31 October 2018.

3.2.4.3 The accident was reported by the ATS of FAGC to the accident and Incident Investigation Division (AIID) at 0954Z.

3.2.5 The investigation revealed that during a right-hand orbit, the aircraft made a steep right turn and entered a spiral dive. The pilot was able to recover and correct the aircraft and, in an attempt, to avoid colliding with trees spanning across the aircraft's flight path, the aircraft was stalled and entered spiral dive which the pilot could not recover from and it crashed. The aircraft was destroyed on impact and the pilot was fatally injured in the accident.

3.3 Probable Cause:

3.3.1 During a right hand orbit, the aircraft made a steep right turn and entered into a spiral dive. The pilot was able to recover and correct the aircraft and in an attempt to avoid colliding with trees spanning across the aircraft's flight path, the aircraft was stalled and entered spiral dive which the pilot could not recover from and it crashed. The aircraft was destroyed on impact and the pilot was fatally injured in the accident.

3.4 Contributory Factors:

3.4.1 An excessive bank angle during an orbit.

4. SAFETY RECOMMENDATIONS

4.1 General:

4.1.1 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 section 3 of this report. The AIID expects that all safety issues identified by the Investigation are addressed by the receiving states and organisations.

4.1.2 Safety Recommendation/s:

4.1.2.1None

5. APPENDICES

5.1 Appendix A (Fuel Calculations)

5.2 Appendix B (FAGC Aerodrome Plate)

5.3 Appendix C (Engine Teardown Report)

5.4 Appendix D (Airframe Inspection)

5.4 Appendix E (PIC's Circuit Procedure Training)

5.5 Appendix F (Air Traffic Control Transcript)

Appendix A

FLIGHT FOLIO AND DEFECT REPORT
VLUGFOLIANT EN VERSLAG VAN DEFEKTE

Non-Pressurised Single Piston Engine Aircraft
Nie-Drukreëling enkelsuierenjinvliegtuig

Lanseria Flight Centre
Tel.: (011) 659-2610

9487

AIRCRAFT DESIGNATION / LUGVAARTUIGBENAMING: C172 ZS: PZT AIRFRAME FLYING HOURS / LUGRAAM VLIEGURE:

NEXT INSPECTION IS A / VOLGENDE INSPEKSIE IS 'N: MPI DUE ON / BETAALBAAR OP: 2018/09/11 OR AT / OF BY: 10456.6

OIL TYPE / OLIE TIPE: W100 FUEL TYPE / BRANDSTOFTIPE: 100 LL

Date / Datum	From / Van	To / Tot	Oil Cons	Fuel Uplift	Tacho	Hobbs	Flight Time	PIC	Student	Flight Purpose
02/10/18	FAGC	FAGC	–		5462.8	4446.22	0.7	[redacted]		
02/10/18	FAGC	FAGC	68		5466.5	4449.13	2.7			
03/10	FAGC	FAGC			4566.6	4497.7	1.1			
03/10	FAGC	FALA	–	–	4567.0	4450.4	0.3			
04/10/18	FALA	FAGC	–	(Full)		4505.6	0.7			
05/10/18	FAGC	FAGC			5468.3	450.76	0.6			

Date / Datum	No.	Defects	Rec. Entry	Rectification Action	Sign.	Lic. No.

A signature in this column shall certify that the maintenance specified and all requirements prescribed in the applicable Air Navigation Regulations have been complied with.
'n Handtekening in hierdie kolom word geag dat die betrokke instandhouding en alle bepalings en vereistes van die toepaslike Lugvaartregulasies nagekom is.
N.B. See inside of front cover for instructions / L.W. Sien binnekant van voorste blad vir aanwysings.

FLIGHT FOLIO AND DEFECT REPORT
VLUGFOLIANT EN VERSLAG VAN DEFEKTE

Non-Pressurised Single Piston Engine Aircraft
Nie-Drukreëling enkelsuierenjinvliegtuig

Lanseria Flight Centre
Tel.: (011) 659-2610

9488

AIRCRAFT DESIGNATION / LUGVAARTUIGBENAMING: C172 ZS: PZT AIRFRAME FLYING HOURS / LUGRAAM VLIEGURE: 10370.5

NEXT INSPECTION IS A / VOLGENDE INSPEKSIE IS 'N: 50 HR DUE ON / BETAALBAAR OP: 2019/10/03 OR AT / OF BY: 10500.2

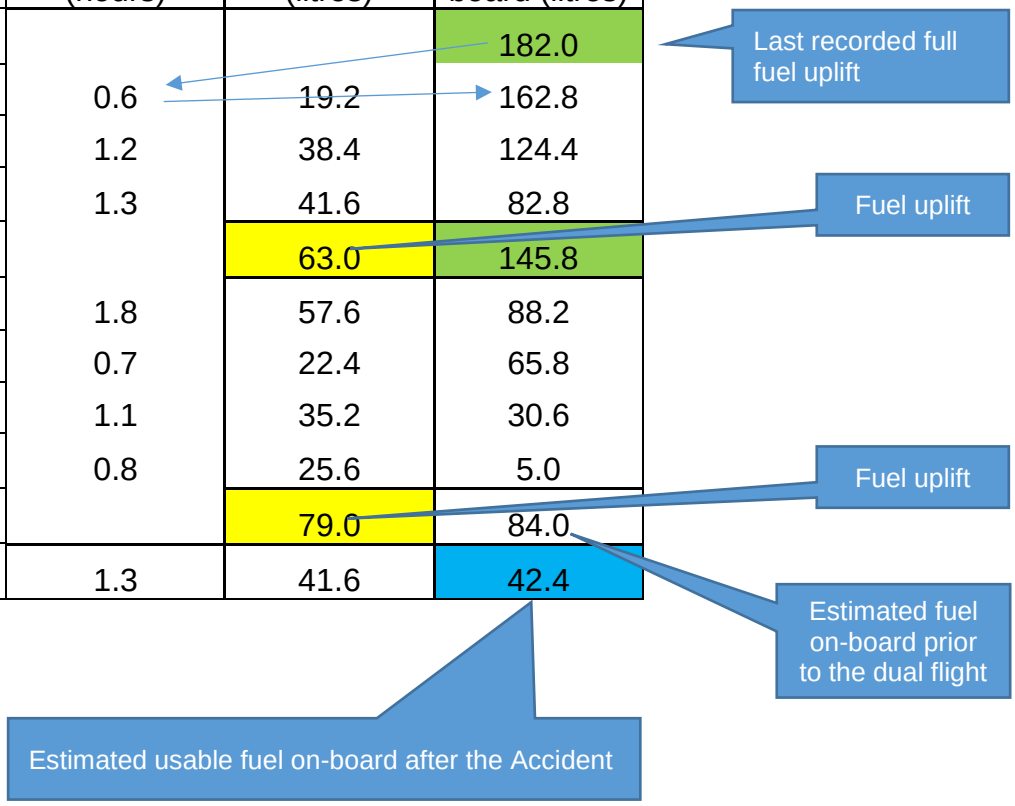
OIL TYPE / OLIE TIPE: W100 FUEL TYPE / BRANDSTOFTIPE: 100LL

Date / Datum	From / Van	To / Tot	Oil Cons	Fuel Uplift	Tacho	Hobbs	Flight Time	PIC	Student	Flight Purpose
5/10/18	FAGC	FAGC			5461.9	451.75	1.2	[redacted]		
5/10/18	FAGC	FAGC	63		5470.8	452.88	1.3			
5/10/18	FAGC	FAGC	–		5472.6	454.16	1.3			
7/10/18	FAGC	FAGC			5473.3	454.80	0.7			
7/10/18	FAGC	FAGC			5474.4	455.13	1.1			
8/10/18	FAGC	FAGC	–		5475.2	456.04	0.8			

Date / Datum	No.	Defects	Rec. Entry	Rectification Action	Sign.	Lic. No.
2018/10/3		MPI	2018/10/4	MPI C/O I.A.W. MIM SA CATS GMR 543.02.8 AIRCRAFT FIT FOR FLIGHT.		

A signature in this column shall certify that the maintenance specified and all requirements prescribed in the applicable Air Navigation Regulations have been complied with.
'n Handtekening in hierdie kolom word geag dat die betrokke instandhouding en alle bepalings en vereistes van die toepaslike Lugvaartregulasies nagekom is.
N.B. See inside of front cover for instructions / L.W. Sien binnekant van voorste blad vir aanwysings.

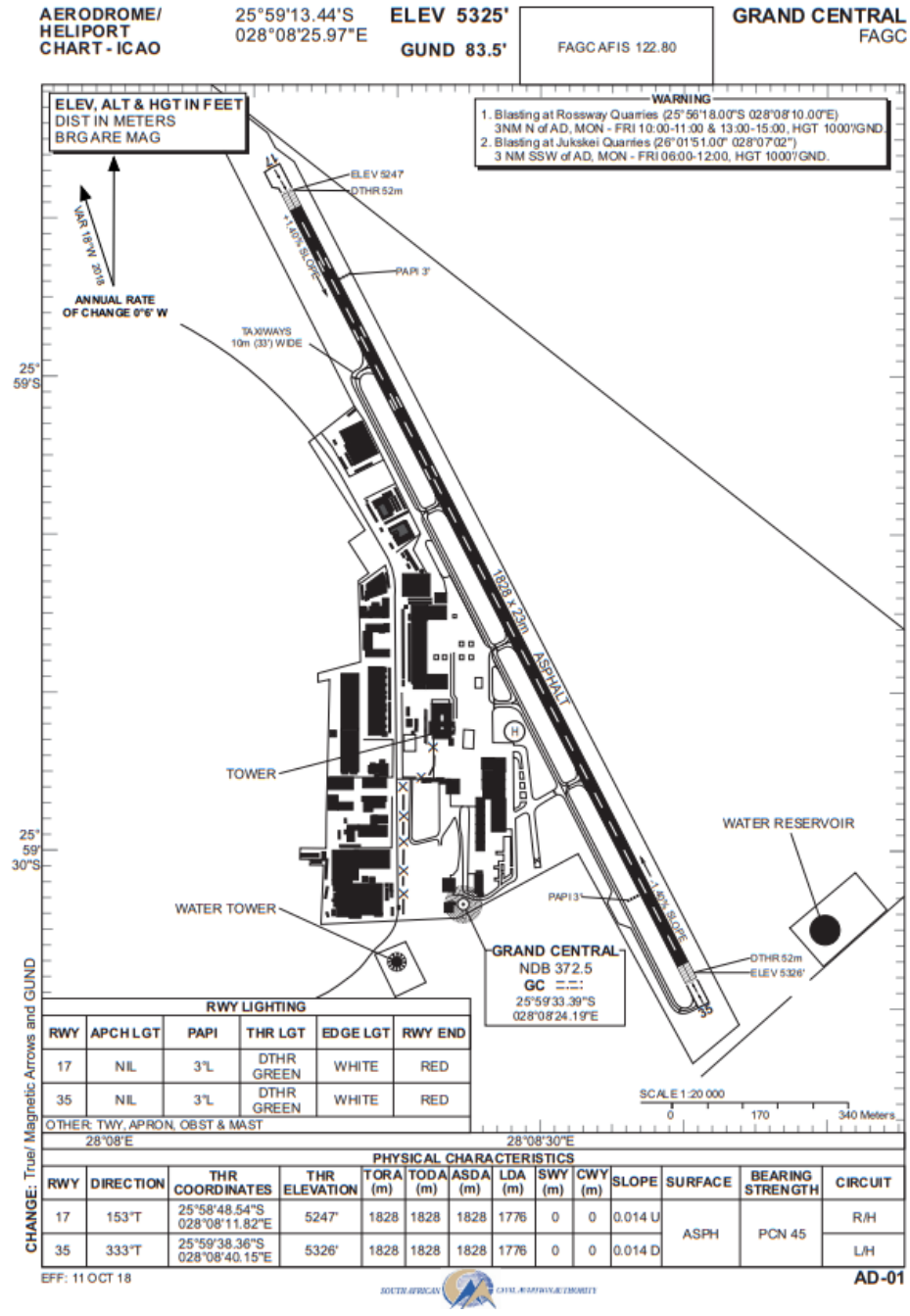
Date	Duration (hours)	Fuel burn (litres)	Quantity on board (litres)
2018/10/04			182.0
2018/10/05	0.6	19.2	162.8
2018/10/05	1.2	38.4	124.4
2018/10/05	1.3	41.6	82.8
2018/10/05		63.0	145.8
2018/10/05	1.8	57.6	88.2
2018/10/07	0.7	22.4	65.8
2018/10/07	1.1	35.2	30.6
2018/10/07	0.8	25.6	5.0
2018/10/07		79.0	84.0
2018/10/08	1.3	41.6	42.4



Notes:

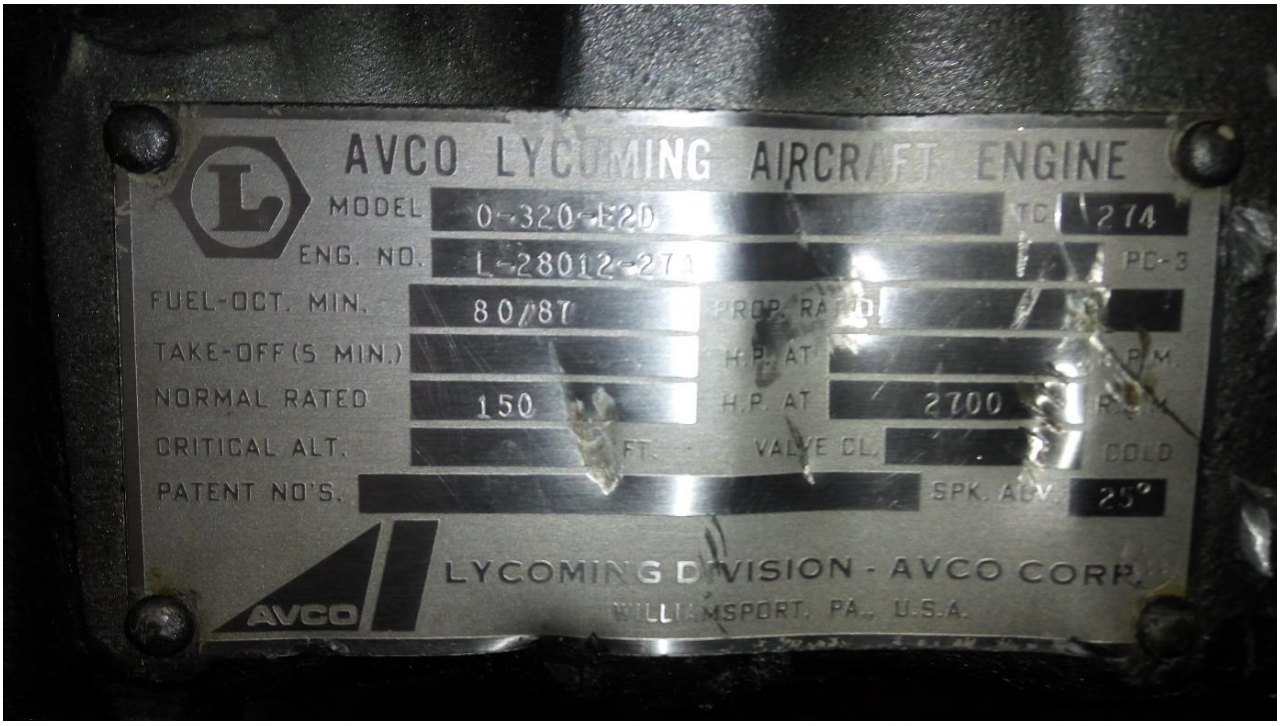
- All calculations are based on estimates
- The C172L long-range tanks' maximum quantity is 52 gallons, of which 48 gallons is usable:
  - A conversion rate of 3.78541 was used to convert gallons to litres
  - The total usable fuel with full long-range tanks is 182 litres
- Due to the training environment operations, the complexity of calculating fuel burn in each phase may be inaccurate; therefore, an average of 32 litres per hour was used as the average fuel burn
- Approximately 42.4 litres were on-board the aircraft at the time of the accident. This would equal a remaining endurance of 1.325 hours (1 hour 20 minutes).

Appendix B


AERODROME/ HELIPORT CHART - ICAO
25°59'13.44"S 028°08'25.97"E
ELEV 5325'
GUND 83.5'
FAGC AFIS 122.80
GRAND CENTRAL
FAGC
ELEV, ALT & HGT IN FEET
DIST IN METERS
BRG ARE MAG
WARNING
1. Blasting at Rossway Quarries (25°56'18.00"S 028°08'10.00"E) 3NM N of AD, MON - FRI 10:00-11:00 & 13:00-15:00, HGT 1000'/GND.
2. Blasting at Jukskei Quarries (26°01'51.00" 028°07'02") 3 NM SSW of AD, MON - FRI 06:00-12:00, HGT 1000'/GND.
VAR 18°W 2018
ANNUAL RATE OF CHANGE 0°6' W
ELEV 5247'
DTHR 52m
1.48% SLOPE
PAPI 3°
TAXIWAYS 10m (33') WIDE
1828 x 23m ASPHALT
TOWER
WATER RESERVOIR
WATER TOWER
PAPI 3°
GRAND CENTRAL
NDB 372.5
GC
25°59'33.39"S
028°08'24.19"E
DTHR 52m
ELEV 5326'
35
SCALE 1:20 000
0
170
340 Meters
25° 59'S
25° 59' 30"S
28°08'E
28°08'30"E
CHANGE: True/ Magnetic Arrows and GUND
RWY LIGHTING
RWY | APCH LGT | PAPI | THR LGT | EDGE LGT | RWY END
17 | NIL | 3°L | DTHR GREEN | WHITE | RED
35 | NIL | 3°L | DTHR GREEN | WHITE | RED
OTHER: TWY, APRON, OBST & MAST
PHYSICAL CHARACTERISTICS
RWY | DIRECTION | THR COORDINATES | THR ELEVATION | TORA (m) | TODA (m) | ASDA (m) | LDA (m) | SWY (m) | CWY (m) | SLOPE | SURFACE | BEARING STRENGTH | CIRCUIT
17 | 153°T | 25°58'48.54"S 028°08'11.82"E | 5247' | 1828 | 1828 | 1828 | 1776 | 0 | 0 | 0.014 U | ASPH | PCN 45 | R/H
35 | 333°T | 25°59'38.36"S 028°08'40.15"E | 5326' | 1828 | 1828 | 1828 | 1776 | 0 | 0 | 0.014 D | | | L/H
EFF: 11 OCT 18
AD-01

Appendix C

The engine was a Lycoming O-320-E2D, with serial number L-28012-27A, which was removed from the wreckage after recovery and was taken to an approved aircraft maintenance facility, where a teardown inspection was performed on the engine on Wednesday, 6 March 2019. Due to damage sustained during the accident sequence, the engine could not be bench tested. The propeller remained attached to the hub. The purpose of the teardown inspection was to assess the mechanical integrity of the engine. The following observations were made:



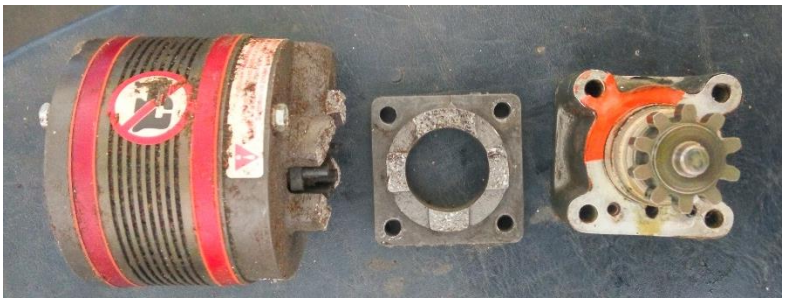
The Engine Data Plate

Engine Model	Avco Lycoming Aircraft Engine O-320-E2D
Engine Serial Number	L-28012-27A

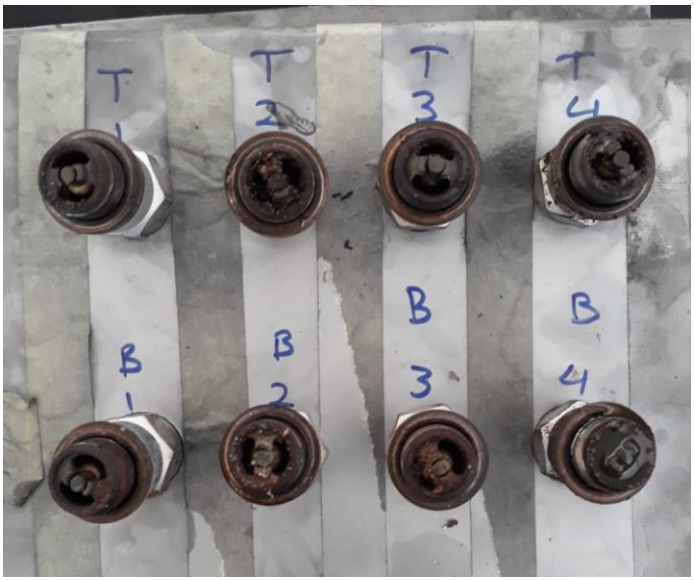
Carburettor (Marvel-Schebler Aircraft Carburetors)

Part Number	10-5009
Serial Number	MS659403
Description	The carburettor had broken off the engine during the impact sequence and sustained substantial damage. 

Vacuum Pump (RAPCO)

Part Number	RAP215CC
Serial Number	A66530
Description	The vacuum pump had broken off at its mount during the impact sequence. The adapter shaft remained in a relatively good condition. 

Spark Plugs (Champion)

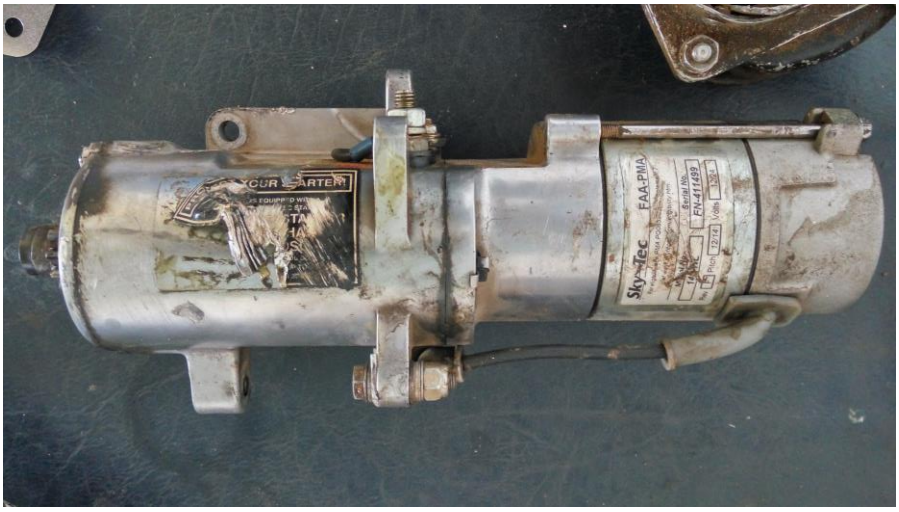
Part Number	REM40-EF
Description	All the spark plugs were removed for inspection purposes. All the spark plugs displayed a brown tint synonymous with normal operation and had the correct electrode gaps. 

Magnetos (Slick)

Part Number *(Left)*	4371
Serial Number *(Left)*	91040412
Part Number *(Right)*	4370
Serial Number *(Right)*	15010188

Description	The right-hand magneto remained attached to the engine. The left-hand magneto had broken off the engine at the mount. The units sustained serious damage and it was not possible to bench-test the units. 

Starter (Skytec)

Part Number	147-NL
Serial Number	FN-411499
Description	The starter remained attached to the aircraft. It suffered minor external damage. The adapter shaft remained in a relatively good condition. 

Oil Filter

Description	The filter remained attached to the engine and was in good condition. The unit was removed from the engine and was cut open. No metal particles were observed in the filter.

Cylinders

Description	All four cylinders were removed for inspection. All the cylinders showed signs of proper combustion and normal carbon deposits for this type of engine.

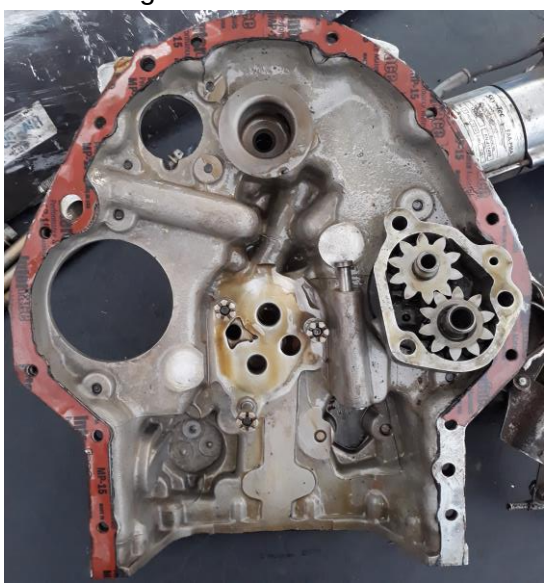
Pistons and Rings

Description	The pistons were in good condition, with some carbon build-up visible. None of the rings was broken on any of the four pistons.

Cylinder head and valves

Description	All the rocker covers were distorted due to the impact forces during the accident sequence. Once removed, all the valves and valve springs were found to be in good condition. 

Oil Pump

Description	The oil pump remained in a good condition. 

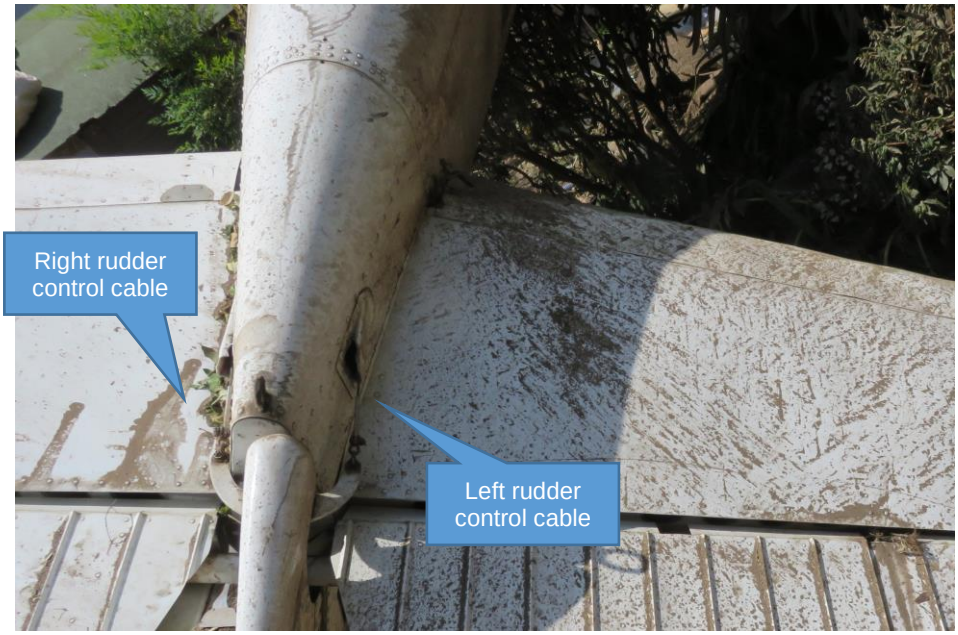
Conclusion: The teardown inspection of the engine did not reveal any pre-impact mechanical failure that would have caused the engine to deviate from normal operating perimeters.

Appendix D

ZS-PZT Data Plate

Empennage

The airframe had broken in half behind the baggage compartment after impacting a tree. The operation of the flight control cables to the elevator and rudder could not be determined. The flight control surfaces were inspected for condition and integrity. The rudder had bent due to the empennage area coming to rest in an inverted position. The rudder control cable attachements remained attached to the rudder. The elevator trim tab was visually inspected and was found to be in satisfactory condition. Both elevators remained attached to their horizontal stablisers and had denting due to the accident sequence. The damage sustained to the empennage area was due to the accident sequence and no pre-impact faults could be identified.



Right Wing

The right wing was completely destroyed during the accident sequence. The right strut had collapsed. The aileron had broken off and was located near the wreckage. The wing attached mounts had broken at their attach points. Based on the extensive damage sustained to the wing, it was determined that the damage was caused due to the accident sequence.

Left Wing

The left wing sustained serious damage to its structure, but remained partially intact. The outboard portion showed signs of crushing impact. This caused the aileron to be severely bent. The inboard portion remained largely intact. The wing strut had collapsed, but the wing remained attached to the fuselage.

Landing Gear

The nose gear remained attached to the aircraft. The tyre and hub remained in satisfactory condition. The left main landing spring strut remained in place despite its mount breaking. The right main gear had broken off and was found near the wreckage. Based on the inspection carried out, it was ascertained that all damage to the landing gear occurred during the accident sequence and no prior defects could be identified.

Fuselage and Cabin Area

The fuselage had broken into half behind the baggage compartment after impacting a tree during the accident sequence. The rear half of the fuselage remained largely intact although denting of the skin was prevalent.

The cabin area had partially collapsed due to the aircraft coming to rest in a nose down attitude. Both cabin doors had failed at the hinge points and all the Perspex windows had shattered. The engine had broken from its mounts and pushed through the firewall into the cockpit. The instrument panel mounts had broken, causing the panel to detach. The forward portion of the cockpit was crushed.

Appendix E

Note: The following training regarding the operations while in the circuit pattern was extracted from the PIC's training file. Both the instructor providing the training for the associated exercise and the PIC after the exercise debrief signed off each item below.

Procedure	Date Completed
Full stop landing with no brakes	12/08/2018
Landing back onto the runway	30/08/2018
Engine failure after take-off	05/08/2018
Crosswind take-off and landing	13/09/2018
Flapless approach and landing	20/08/2018
Glide approach and landing	20/08/2018
Stuck/jammed throttle	05/08/2018
Air speed indicator failure	13/09/2018
Short field/soft field take-off	12/08/2018
Aborted take-off	12/08/2018
Orbit	**05/08/2018**
Diversion in the circuit	22/08/2018
Engine/electrical fire	05/08/2018
Radio compliance with ATC	20/08/2018
Left hand/right hand circuit	18/09/2018
Radio failure	13/09/2018
Runway change teardrop	05/08/2018
Neutral circuit	12/08/2018
Go-around	30/07/2018

Appendix F

The following transcript is the radio communication between ATC at FAGC tower and the pilots who were operating at the aerodrome at the time of the accident. The VHF frequency in use was 122.80 MHz. Certain communications, which may be deemed irrelevant to the accident, were omitted from the transcription.

Time (Z)	From	To	Message
09:14:38	FAGC	ZS-SCB	Sierra Charlie Bravo, traffic is a Cessna 172 on the upwind is remaining in the circuit
09:14:45	ZS-SCB	FAGC	Copy the traffic Sierra Charlie Bravo
09:14:47	FAGC	ZS-PZT	Papa Zulu Tango, traffic Cessna 172 inbound from the north to join the left hand downwind
09:14:53	ZS-PZT	FAGC	Copy the Charlie 172 from the north, will keep a lookout, Papa Zulu Tango
09:15:22	ZS-SCB	FAGC	Sierra Charlie Bravo, left downwind runway 35 for a touch and go
09:15:31	ZS-PZT	FAGC	Papa Zulu Tango, have the traffic in sight and I'm on the crosswind
09:15:38	ZS-SCB	FAGC	We will fit in in front of them we on an early left downwind 35, Sierra Charlie Bravo
09:15:43	FAGC	All stations	Thank you guys I have you all in sight
09:15:45	FAGC	ZS-PZT	And Papa Zulu Tango, confirm you've got the Sierra Charlie Bravo to you one 'O' clock in sight ma'am?
09:15:49	ZS-PZT	FAGC	Affirm sir
09:15:51	FAGC	ZS-PZT	Thank you Papa Zulu Tango, fit in behind the aircraft in front of you
09:15:55	ZS-PZT	FAGC	I'll fit in behind, Papa Zulu Tango
09:15:58	FAGC	ZS-PZT	Thank you ma'am, I'll give you an orbit for spacing shortly
09:16:04	FAGC	ZS-SCB	Sierra Charlie Bravo, report final approach runway 35, number one
09:16:07	ZS-SCB	FAGC	Final approach number one next and we will "*gooi some mielies here*" (to keep the speed up)
09:16:12	FAGC	ZS-SCB	Say again there
09:16:18	FAGC	ZS-SCB	Sierra Charlie Bravo, Central
09:16:19	ZS-SCB	FAGC	Go ahead
09:16:21	FAGC	ZS-SCB	Sorry just say again there
09:16:22	ZS-SCB	FAGC	We just want to "*gooi some mielies*" so we can get a bit of separation between us
09:16:26	FAGC	ZS-SCB	Ok cool no worries, I will give a little more space
09:16:34	ZS-KKF	FAGC	Kilo Kilo Foxtrot is ready holding point runway 35
09:16:38	FAGC	ZS-KKF	Thank you, Kilo Kilo Foxtrot runway 35 clear take-off surface wind 320°/5 knots, report outbound to the north
09:16:45	ZS-KKF	FAGC	Cleared take-off runway 35, outbound to the north next, Kilo Kilo Foxtrot
09:16:50	ZS-PZT	FAGC	Papa Zulu Tango, left downwind runway 35
09:16:53	FAGC	ZS-PZT	Thank you, Papa Zulu Tango, one orbit to the right, report re-established on the left downwind

09:16:57	ZS-PZT	FAGC	One orbit to the right, report re-established on the left downwind, Papa Zulu Tango
09:17:05	FAGC	ZS-SPS	Sierra Charlie correction Sierra Papa Sierra, Central
09:17:09	ZS-SPS	FAGC	Go ahead
09:17:10	FAGC	ZS-SPS	Sierra Papa Sierra, your squawk code is 5454
09:17:14	ZS-SPS	FAGC	Squawk 5454
09:17:44	Unknown	FAGC	Inaudible scream
09:18:42	FAGC	ZS-PZT	Papa Zulu Tango, Central
09:18:51	FAGC	ZS-PZT	Papa Zulu Tango, Central
09:19:04	FAGC	ZS-PZT	Papa Zulu Tango, Central on frequency ma'am?
09:19:20	FAGC	ZS-PZT	Papa Zulu Tango, Central
09:19:28	FAGC	ZS-SCB	Sierra Charlie Bravo, Central
09:19:30	ZS-SCB	FAGC	Go ahead
09:19:31	FAGC	ZS-SCB	I might need your help here after you do the touch and go, if you are able to commence on an early left turn, I just cannot see Papa Zulu Tango who was orbiting west abeam the tower, I cannot see her at all sir
09:19:42	ZS-SCB	FAGC	OK copy that, I will go have a look now, Sierra Charlie Bravo
09:19:45	FAGC	ZS-SCB	Thanks Sierra Charlie Bravo, runway 35 cleared touch and go, surface wind is light and variable
09:19:50	ZS-SCB	FAGC	Cleared runway 35, Sierra Charlie Bravo
09:19:56	FAGC	ZS-PZT	Zulu Sierra Papa Zulu Tango, Central on frequency
09:20:24	ZS-KKF	FAGC	Kilo Kilo Foxtrot Outbound
09:20:27	FAGC	ZS-KKF	Kilo Kilo Foxtrot, broadcast 125.8 cheers
09:20:29	ZS-KKF	FAGC	125.8, good day, Kilo Kilo Foxtrot
09:20:31	ZS-SCB	FAGC	Whereabout did you see her last?
09:20:34	FAGC	ZS-SCB	She was just behind you, currently west abeam the tower, that was the last position I saw her
09:20:39	ZS-SCB	FAGC	OK copy that, I'm going to do an early left, I'm going to remain low level because I heard like a screaming sound on the radio
09:20:46	FAGC	ZS-SCB	Ja and when I listened to that, it sounded like a touch and go in that little bit of a scream, so I wasn't too sure what that was
09:20:54	ZS-SCB	FAGC	Ok copy that
09:20:56	FAGC	ZS-SCB	So I thought it was someone being funny
09:20:58	ZS-SCB	FAGC	Ja me too