AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

			Reference:	**CA18/2/3/10424**	
Aircraft Registration	**ZS-FJU**	**Date of Accident**	21 February 2024	**Time of Accident**	1450Z
Type of Aircraft	Cessna 172K		**Type of Operation**	Training (Part 141)	
Pilot-in-command Licence Type	Commercial Pilot Licence (CPL) A		**Age**	31	**Licence Valid**	Yes
Pilot-in-command Flying Experience	**Total Flying Hours**		366	**Hours on Type**	266
Last Point of Departure	Rand Airport (FAGM), Gauteng Province				
Next Point of Intended Landing	Baragwanath Aerodrome (FASY), Gauteng Province				
Damage to Aircraft	Destroyed				

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

Approximately 211 metres (m) to the left of Runway 13 threshold at GPS co-ordinates 26°20'41.61"S 27°46'25.59"E elevation 5 124 feet (ft)

Meteorological Information	Surface Wind 290° at 09kts; Visibility 9999m; Cloud Cover Nil; Temperature 29°C Dew Point 13°C; QNH 1019

Number of People On-board	2+0	**Number of People Injured**	0	**Number of People Killed**	2	**Other (On Ground)**	0

Synopsis

On Wednesday afternoon, 21 February 2024 at approximately 1410Z, a flight instructor (FI) and a student pilot (SP) on-board a Cessna 172K aircraft with registration ZS-FJU were on a training flight from Rand Aerodrome (FAGM) in Germiston to Baragwanath Aerodrome (FASY) in Westonaria, with the intention to return to FAGM. Both aerodromes are located in Gauteng province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The aircraft took off to FASY, which is an unmanned aerodrome. An eyewitness who was seated outside the aerodrome's office towards the end of Runway (RWY) 31 at FASY stated that the ZS-FJU aircraft was the only aircraft in the circuit, and that it executed two touch-and-go landings on RWY 31. During the third touch-and-go landing, the aircraft did not land, but it flew approximately a metre (m) above the runway surface and when it reached the end of the runway, it climbed (to an unknown height). The eyewitness further reported that a few seconds thereafter, the engine sound became quieter, and the aircraft made a right-side turn whilst descending towards the ground. Moments later, he heard the engine revving high before the aircraft impacted the ground. The aircraft skidded for about 20m and came to a stop. The instructor and the student pilot were fatally injured, and the aircraft was destroyed.

Probable Cause

The flight instructor and the student pilot lost control of the aircraft after a wingover manoeuvre during circuit training.

Contributory Factor

Disregard of HASELL checklist.

SRP Date	10 September 2024	Publication Date	13 September 2024

Occurrence Details

Reference Number	**:** CA18/2/3/10424
Occurrence Category	**:** Accident
Type of Operation	**:** Training (Part 141)
Name of Operator	**:** Sun Quest Trading
Aircraft Make and Model	**:** Cessna C172K
Nationality	**:** South African
Registration Marks	**:** ZS-FJU
Place	**:** Baragwanath Aerodrome, Westonaria, Gauteng Province
Date and Time	**:** 21 February 2024 at 1450Z.
Injuries	**:** Fatal (2)
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 21 February 2024 at 1450Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions. Notifications were sent to the State of Origin in accordance with the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) Annex 13 Chapter 4. The State did not appoint an accredited representative and/or advisor. The investigators were dispatched to the accident site.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Aircraft — the Cessna and 172K 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

Table of Contents

Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
AME	Aircraft Maintenance Engineer
AMO	Aircraft Maintenance Organisation
ATO	Approved Training Organisation
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CAR	Civil Aviation Regulation
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
FFS	Fire Fighting Services
FI	Flight Instructor
fpm	Feet per Minute
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knots
m	Metres
METAR	Meteorological Routine Aerodrome Report
MHz	Megahertz
nm	Nautical Miles
QNH	Altitude Above Mean Sea Level
RWY	Runway
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
SP	Student Pilot
SPL	Student Pilot Licence
TPM	Training Procedure Manual
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Wednesday afternoon, 21 February 2024 at 1410Z, a flight instructor (FI) and a student pilot (SP) on-board a Cessna 172K aircraft with registration ZS-FJU were on a training flight from Rand Aerodrome (FAGM) in Germiston to Baragwanath Aerodrome (FASY) in Westonaria, with the intention to conduct touch-and-go landing exercises before they could return to FAGM. Both aerodromes are located in Gauteng province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2. According to the eyewitness, an employee at FASY, he was seated outside the aerodrome's office which is situated towards the end of Runway (RWY) 31 when the accident aircraft arrived. He stated that the accident aircraft was the only one in the right-side circuit. The aircraft executed two touch-and-go landings. During the third circuit, the aircraft approached and was low above the runway surface. He could not understand the reason the aircraft did not touch down, but he also feared that they might fly into a small heap of rocks which were situated outside the boundary fence towards the left side at the end of the runway.

1.1.3. After the aircraft flew past the witness's position, it disappeared from his line of sight. However, he saw it (the aircraft) suddenly back in his view and climbing steeply. He could not indicate the duration of time it took to climb or determine the height, but the aircraft's engine sound became silent. The aircraft made a sharp turn to the right and started descending towards the ground. Moments later, the eyewitness heard the engine revving high and it disappeared again from his line of sight. He then heard a loud bang and saw dust rising. The aircraft did not reappear from this last position. The eyewitness then rushed to inspect what had happened. When he arrived at the site about 5 minutes later, he saw that the aircraft had crashed near a gravel road that leads to FASY. The wreckage was situated about 211m to the left of Runway 13 threshold. There was no post-impact fire, however, the aircraft was destroyed by impact forces. The FI and SP were fatally injured.

1.1.4. The accident was reported to the authorities. The South African Police Service (SAPS) and the local fire-fighting services personnel were the first responders. Upon inspection of the aircraft, they found that fuel had leaked out of the tanks; thereafter, they disconnected the battery to avoid a possible fire.

1.1.5. The accident occurred during daylight under visual meteorological conditions at Global

Positioning System (GPS) co-ordinates determined to be 26°20'41.61"S 27°46'25.59"E at an elevation of 5124 feet (ft).

Figure 1: Aerial view of the accident site. The yellow line depicts the skid marks from the point of impact, about 15m from the edge of the gravel road.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	2	-	-	2	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	**2**	**-**	**-**	2	**-**

Note: Other means people on the ground.

1.2.1. The FI and SP were fatally injured in the accident.

1.3. Damage to Aircraft

1.3.1. The aircraft was destroyed.

Figure 2: The aircraft at the accident site.

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information:

Flight Instructor (FI)

Nationality	Togolese	Gender	Male	Age	31
Licence Type	Commercial Pilot Licence (CPL) Aeroplane				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night, Instrument, Instructor Grade III				
Medical Expiry Date	30 August 2024				
Restrictions	None				
Previous Accidents	None				

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

Flying Experience:

Total Hours	366
Total Past 24 Hours	0.66
Total Past 7 Days	5.2
Total Past 90 Days	55.4
Total on Type Past 90 Days	55.4
Total on Type	266

1.5.1 The flight instructor (FI) was a Togolese citizen. He was initially issued a South African Commercial Pilot Licence (CPL) Aeroplane on 16 March 2022. His last licence validation was conducted on 17 August 2023 with an expiry date of 31 August 2024. The aircraft type was endorsed on his licence. He obtained his Grade III Instructor Licence on 20 August 2023 with an expiry date of 31 August 2024.

1.5.2 The FI had a valid Class 1 aviation medical certificate that was issued on 4 August 2023 with an expiry date of 31 August 2024 with no medical restrictions.

Student Pilot

Nationality	Tanzanian	Gender	Male	Age	23
Licence Type	Student Pilot Licence (SPL) Aeroplane				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 October 2028				
Restrictions	None				
Previous Accidents	None				

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

Flying Experience:

Total Hours	17.6
Total Past 24 Hours	0.66
Total Past 7 Days	3.6
Total Past 90 Days	17
Total on Type Past 90 Days	17
Total on Type	17.6

1.5.3 The student pilot (SP) was a Tanzanian citizen. He was initially issued a South African Student Pilot Licence (SPL) Aeroplane on 12 October 2023 with an expiry date of 11 October 2024.

1.5.4 The SP had a valid Class 2 aviation medical certificate that was issued on 8 October 2023 with an expiry date of 31 October 2028 with no medical restrictions.

1.5.5 The SP was training towards his Private Pilot Licence (PPL); he had not flown solo before the accident. He had accumulated 17.6 flying hours on this aircraft type.

1.6. Aircraft Information

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

The Cessna 172K is a four-seat, high wing monoplane aircraft of all semi-monocoque construction. The aircraft is powered by a four-cylinder, horizontally opposed, air cooled normally aspirated Lycoming engine with power output of 150 brake horsepower (BHP) at 2 700 revolutions per minute (RPM), driving a McCauley two-blade fixed pitch propeller.

Airframe:

Manufacturer/Model	Cessna Aircraft Corporation / 172K	
Serial Number	172-57168	
Year of Manufacture	1969	
Total Airframe Hours (At Time of Accident)	17 855.81	
Last Inspection (Date & Hours)	07 February 2024	17 831.83
Hours Since Last Inspection	24.5	
CRS Issue Date	07 February 2024	
C of A (Issue Date & Expiry Date)	31 January 2024	31 January 2025
C of R (Issue Date) (Present Owner)	10 October 2016	
Type of Fuel Used	Avgas	
Operating Category	Training Part 141	
Previous Accidents	**CA18/2/3/9998** - The pilot over primed the engine which caused fuel to flood the head cylinders and made its way to the carburettor where it caught fire. The fire was successfully extinguished.	

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

Engine:

Manufacturer/Model	Lycoming / O-320-E2D
Serial Number	L-41275-27A
Part Number	0-320-E20
Hours Since New	Unknown
Hours Since Overhaul	1444.16 (Tacho)

Propeller:

Manufacturer/Model	McCauley / 1C160DTM
Serial Number	A61646
Part Number	7LDM7514-0-58
Hours Since New	9692.2
Hours Since Overhaul	1413.03 (Tacho)

1.6.1. The last mandatory periodic inspection (MPI) of the aircraft was conducted on 7 February 2024 at 17 831.83 airframe hours. The aircraft maintenance organisation (AMO) that conducted the inspection had issued the aircraft's Certificate of Release to Service (CRS) on 7 February 2024 at 17 831.83 airframe hours with an expiry date of 6 February 2025 or at 17 931.83 airframe hours, whichever comes first.

1.7. Meteorological Information

1.7.1. The weather information below was obtained from the Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS), recorded at O.R. Tambo (FAOR) on 21 February 2024 at 1530Z. FAOR is located 50 kilometres (km) from the accident site.

Wind Direction	290°	Wind Speed	09kt	Visibility	9999m
Temperature	29°C	Cloud Cover	None	Cloud Base	N/A
Dew Point	13°C	QNH	1019hPa		

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 equipment was unserviceable prior to the flight.

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 flight.

1.10. Aerodrome Information

Aerodrome Name	Baragwanath Aerodrome (FASY)
Aerodrome Location	Westonaria, Gauteng Province
Aerodrome Status	Licensed
Aerodrome GPS coordinates	26°20'57.91" South, 27°46'41.80" East
Aerodrome Elevation	5 400 feet (ft)
Runway Headings	31°/13°
Dimensions of Runway Used	1 120mX10m
Heading of Runway Used	31°
Surface of Runway Used	Asphalt
Approach Facilities	None
Radio Frequency	122.35 Megahertz (MHz)

1.11. Flight Recorders

1.11.1. The aircraft was neither 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 aircraft impacted the edge of a gravel road that ran from east to west before it came to rest facing north. The FI was ejected out of the aircraft and the SP remained trapped in the aircraft. Jaws of life were used to free the SP.

1.12.2. The witness marks on the ground revealed that the nose wheel was the first to impact the ground, and the nose gear strut broke off. The main landing gears sustained serious damage. The propeller broke off from the flange. The engine cowlings (top and bottom) and the engine as well as one of the doors separated from the airframe; they were found a few metres from the main wreckage. The oil sump or reservoir separated from the bottom of the engine and all the oil spilled out from the first point of impact; the oil covered the main wreckage. Examination of the propeller indicated that the engine was producing a substantial amount of power at the time of the accident.

Figure 3: The engine separated from the airframe; the engine mount is still attached.

Figure 4: First point of impact (inset: oil reservoir). **Figure 5**: The twisted propeller indicates a substantial amount of power at impact.

Figure 6: One of the railings that had detached from the airframe with forward bent signature beyond 90°.

1.12.3. The right-side wing was severed from the mainframe and fuel spillage of unspecified amount was observed. The main cabin was destroyed with most of the instruments. The

left- and right-side wings exhibited compression loads and buckling on the leading edges. Flight control continuity could not be established due to impact-related damage.

Figure 7: The damage to the top and left side of the right wing.

1.13. Medical and Pathological Information

1.13.1. The post-mortem examinations of the FI and the SP were performed. At the time of release of this report, the results of the post-mortem and the toxicology tests were not available. Should the results have a substantive impact on the outcome of this investigation, which will be considered new evidence, the Accident and Incident Investigations Division (AIID) will reopen the investigation.

1.14. Fire

1.14.1. There was no pre- or post-impact fire.

1.15. Survival Aspects

1.15.1. The accident was considered not survivable due to the high impact forces with the ground and the destruction of the cabin area.

1.16. Tests and Research

1.16.1. Examination of the wreckage by the investigation team at the accident site indicated that the aircraft was intact prior to the flight. No evidence of pre-existing system faults was identified during the on-site examination of the wreckage. A pre-flight inspection conducted by the pair indicated no faults, and the aircraft was assessed by the FI as airworthy.

1.16.2. The propeller was found to have separated from the hub. The engine also separated from its mountings. Examination of the propeller indicated that the engine was producing a substantial amount of power on impact (Figure 5). The amount of power produced could not be determined.

1.17. Organisational and Management Information

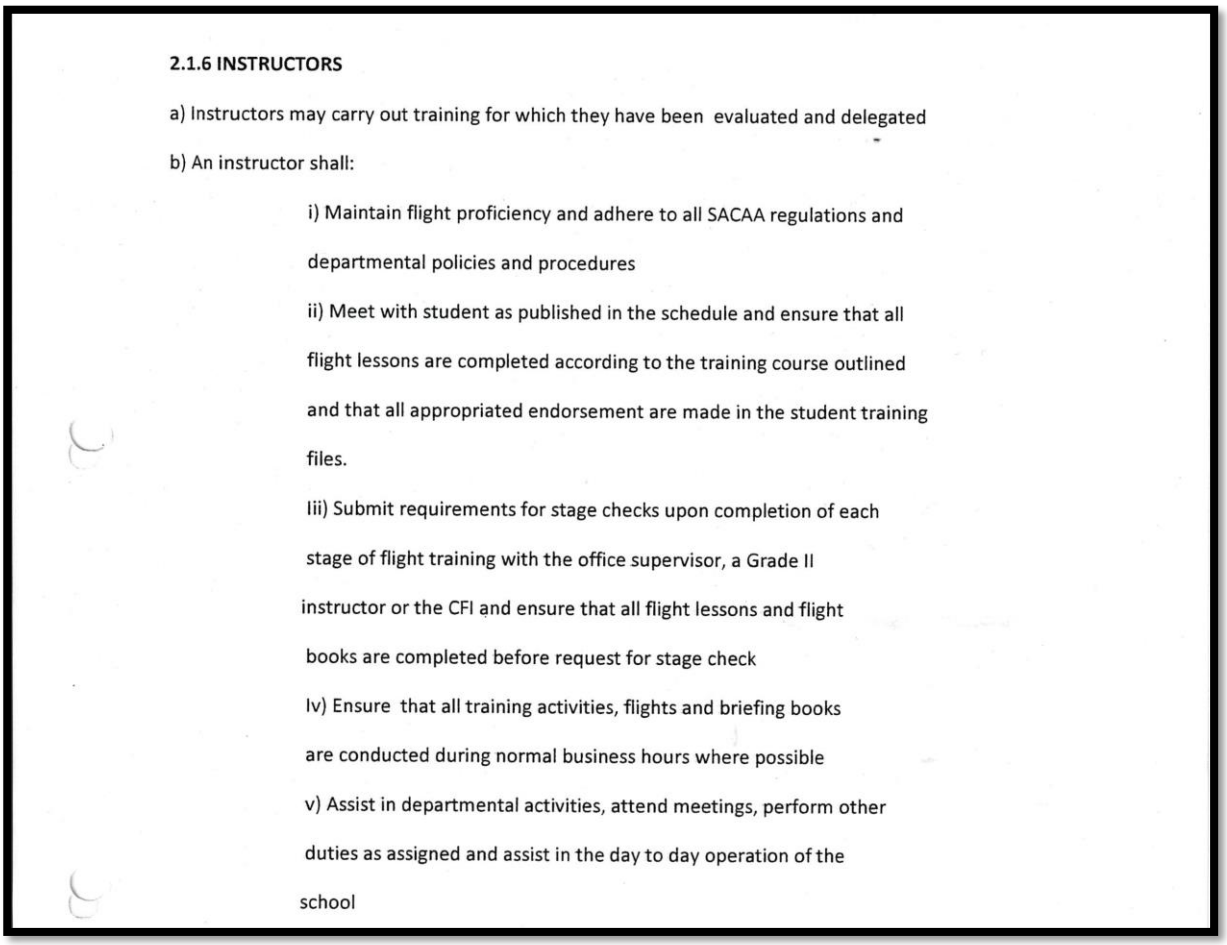
1.17.1. This was a training flight conducted under the provisions of Part 141 (training operations) of the CAR 2011 as amended.

1.17.2. The Approved Training Organisation (ATO) Certificate was issued to the ATO on 4 August 2022 with an expiry date of 3 August 2027; the ATO had the privilege to provide and conduct various flight training courses.

1.17.3. The aircraft was maintained by the SACAA-approved AMO. The AMO was issued an AMO Certificate on 19 June 2023 with an expiry date of 30 June 2024.

1.18. Additional Information

1.18.1. Flight School Training Procedure Manual (TPM)



2.1.6 INSTRUCTORS

a) Instructors may carry out training for which they have been evaluated and delegated

b) An instructor shall:

i) Maintain flight proficiency and adhere to all SACAA regulations and departmental policies and procedures

ii) Meet with student as published in the schedule and ensure that all flight lessons are completed according to the training course outlined and that all appropriated endorsement are made in the student training files.

Iii) Submit requirements for stage checks upon completion of each stage of flight training with the office supervisor, a Grade II instructor or the CFI and ensure that all flight lessons and flight books are completed before request for stage check

Iv) Ensure that all training activities, flights and briefing books are conducted during normal business hours where possible

v) Assist in departmental activities, attend meetings, perform other duties as assigned and assist in the day to day operation of the school

Figure 8: Extract from TPM. (Source: ATO)

1.18.2 The exercises below are for a student pilot who is being prepared for a first solo flight. (Source: ATO)

Exercise 13 & 13E:

Circuit, Approach, Landing and Advanced Circuit Procedures (Emergencies)

Objective:

For the student pilot to be able to fly an accurate and safe circuit pattern, complete the necessary checklist, and to execute a safe calculated approach and landing onto various surfaces in varying weather conditions.

How the exercise applies to flying:
First solo flight, landing the aircraft safely after each flight, landing with varying flap settings, short field landings, forced precautionary landings.

Briefing:

- *Revise appropriate checks and radio calls*
- *Recap legs of the circuit pattern*
- *Downwind*
    - *o Flap extension and applicable checks*

- *o Use of reference points and maintaining a neat pattern (drift correction)*

· *Base leg*

- *o Establishing a descent*
- *o Attitude/power relationship*
- *o Different approach profiles*
- *o Drift considerations*

· *Final approach*

- *o Varying speeds, flap settings, ATC liaison, approach perspectives*

· *Normal landing, touch & go*

· *Advanced Procedures*

- *o Glide approach*
- *o Go-around*
- *o Crosswind techniques*
- *o Short field approach*
- *o Unmanned joining procedures*

Air exercise:

· ***Downwind leg***

· ***Base leg***

· ***Standard approach- full flap final approach with touch and go***

· ***Flapless landing***

· ***Crosswind landing***

· ***Glide approach***

· ***Short field landing***

· ***Unmanned joining procedure***

· ***Go-around***

Airmanship:

· ***Lookout & radio procedures***

· ***Approach planning and circuit spacing***

· ***Bank angles***

· ***Slow flight considerations***

· ***Wind shear***

Exercise 15: Advanced Turning (45-60 Angle of Bank)
Objective:

To teach the student to turn the aircraft at high rates as well as providing valuable practice in the coordination of the controls and developing confidence in the handling of the aircraft at sustained high loading.

How the exercise applies to flying:
To teach coordination of controls in the event of an evasive manoeuvre i.e. collision avoidance and to practice stalling and recovering in turns.

Briefing:

- *Forces acting on an aircraft*
- *Recap further effect on ailerons, adverse aileron yaw, use of rudder*
- *Load factor/Increase in stall speed*
- *Recap turning performance*
- *Effect of weight, flap, density altitude, slipstream, power*

Air Exercise:

- *Entry, maintain, roll out*
- *45 & 60 turns*
- *High speed stall demonstration*
- *Steep descending turn*
- *Max rate turns at various power setting*

Airmanship:

- *Lookout*
- *Maintaining orientation*
- *Coordinating of controls*
- *HASELLL checks*
- *Engine considerations*

Exercise 16:

Exercise 16: Forced Landing without power

Objective:

To provide the student with a complete understanding of the theoretical and practical knowledge that in the event of an engine failure he/she must choose the best available landing area, and execute a safe approach and landing with minimum damage to the aircraft and injury occupants. However, in the case of a simulated forced landing, a go-around must be executed from a safe attitude.

Air Exercise:

- *Demonstration forced landing from at least 3000 feet AGL*
- *Speed, Field selection and approach planning*
- *Glide from key point to field*
- *Fault finding, corrective actions and checklists*
- *Flap and undercarriage usage*
- *Final approach procedures*
- *Go-around, or touchdown and landing at a suitable airfield*
- *After landing procedures*

1.18.3. How to Fly a Chandelle or Wing-Over (Source: //britishaerobaticacademy.com)

Figure 9: Picture taken from a still video illustrating a chandelle or wing over.

MANEUVER LIMITS

NORMAL CATEGORY

This airplane is certificated in both the normal and utility category. The normal category is applicable to aircraft intended for non-aerobatic operations. These include any maneuvers incidental to normal flying, stalls (except whip stalls), lazy eights, chandelles, and turns in which the angle of bank is not more than 60°. Aerobatic maneuvers, including spins, are not approved.

Figure 10: The aircraft is not permitted 60° turns. (Source: Cessna 172 POH)

Height – sufficient to be sure of recovery by the base height which is normally 1,000 ft

Airframe – correctly configured for the maneouvre, e.g. flaps up, windows closed, correct fuel tank selected perhaps booster pump on

Security – straps tight and locked, no loose articles

Engine – T's and P's good, mixture appropriately set for lowest anticipated height

Location – Not in or near controlled airspace, not above built up areas, a suitable location

Lookout – a proper lookout to ensure no collision risk will occur. This normally involves a minimum of a 180 degree turn or 2x 90 degree turns.

Figure 11: HASELL checks before emergency exercise. (Source: https://britishaerobaticacademy.com)

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

Pilots

2.2.1 The flight instructor was a Togolese national and had a South African Commercial Pilot Licence (CPL) that was issued by the Regulator on 17 August 2023 with an expiry date of 31 August 2024. He had accumulated approximately 266 flying hours on the aircraft type.

2.2.2 His Class 1 medical certificate was issued on 4 August 2023 with an expiry date of 30 August 2024 with no restrictions.

2.2.3 The student pilot was a Tanzanian national and had a South African Student Pilot Licence (SPL) that was issued by the Regulator on 12 October 2023 with an expiry date of 11 October 2024. He had accumulated approximately 17.6 flying hours on the aircraft type. The pilot had not flown solo.

2.2.4 His Class 2 medical certificate was issued on 8 October 2023 with an expiry date of 31 October 2028 with no restrictions.

Environment

2.2.5 The weather report that was issued by the South African Weather Service (SAWS) indicated that the weather conditions at the closest station (O.R. Tambo International Airport 29.08nm) to the accident site were favourable with clear skies and a visibility of 10km. The surface wind of 290° at 09 knots was favourable to Runway 31, which the pair had used on their arrival to the aerodrome.

Machine

2.2.6 The aircraft was in a serviceable condition before the accident flight. The aircraft was listed under training operations specifications of the ATO that was approved and issued by the Regulator. The certificates of airworthiness and registration were valid.

Discussion

2.2.7 According to the training procedure manual (TPM), this flight or exercise is conducted before the solo flight, which means that the flight instructor is expected to give as little as possible instructions to the student pilot but observe and satisfy himself/herself that the student is ready for a solo flight. The flight instructor started by engaging in-flight manoeuvres that are ahead of the syllabus (for the student pilot) but approved for the aircraft type. Both the ATO and the manufacturer allow for certain manoeuvres such as Lazy Eight and Chandelles (wingover) but not turns exceeding 60°.

2.2.8 On the third circuit, the eyewitness saw the aircraft fly a metre above the runway and at the end of the runway, the aircraft climbed steeply and made a right-side turn at the top of the climb towards the runway; this is similar to a wingover. It is not clear what was the maximum speed of the aircraft at descent before it (tried) levelled out. The pilot pulled out of the descent too late, and the downward momentum was too great that the aircraft could not level out in time. The aircraft impacted the side of the gravel road and skidded for 30m before it came to a stop. The flight instructor was flung out of the aircraft and the student pilot remained strapped to his seat. Both were fatally injured.

2.2.9 The above sequence of events is similar to a wingover depicted in Figure 9 which portrays how the wingover is executed (the smoke trail shows the manoeuvre). The accident aircraft engaged the manoeuvre a metre above ground level and climbed to an unspecified height to perform a wingover. The point of impact is 210m from the edge of the runway which makes the flight path similar to Figure 9, except that the aircraft in Figure 9 is high, and the pilot was able to recover.

2.2.10 The damage sustained by the aircraft indicate that the impact forces were too great for their survival. The engine separated from the airframe and the propeller hub also separated from the engine. Examination of the propeller indicated that the engine was producing a substantial amount of power on impact. The amount of power produced could not be determined.

2.2.11 The cockpit area and instrument panel were destroyed; many instrument parts were found broken in the airframe. Two of the seat railings were bent more than 90° towards the front; this meant that during impact, the airframe folded onto itself, thus, destroying the cabin area.

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

3.2.1. The instructor's renewed Commercial Pilot Licence (CPL) Aeroplane was issued on 17 August 2023 with an expiry date of 31 August 2024. At the time of the accident, the flight instructor had flown a total of 365 hours. He obtained his Grade III Instructor Licence on 20 August 2023 with an expiry date of 31 August 2024.

3.2.2. The student pilot was issued a Student Pilot Licence (SPL) on 12 October 2023 with an expiry date of 11 October 2024. At the time of the accident, the student pilot had flown a total of 17 hours.

3.2.3. The flight instructor had a valid Class 1 aviation medical certificate that was issued on 4 August 2023 with an expiry date of 31 August 2024 with no medical restrictions.

3.2.4. The student pilot had a valid Class 2 aviation medical certificate that was issued on 8 October 2023 with an expiry date of 31 October 2028 with no medical restrictions.

3.2.5. This flight was conducted under the provisions of Part 141 of the CAR 2011 as amended. The training school had a valid Approved Training Organisation (ATO) Certificate that was issued on 4 August 2022 with the expiry date of 3 August 2027.

3.2.6. The aircraft had a valid Certificate of Airworthiness (C of A) that was issued on 26 January 2009 with an expiry date of 31 January 2025.

3.2.7. The aircraft had a valid Certificate of Registration (C of R) that was issued on 10 October 2016.

3.2.8. The latest MPI on the aircraft was conducted on 7 February 2024. The AMO that conducted the inspection had issued the aircraft's Certificate of Release to Service (CRS) on 7 February 2024 at 17855.81 airframe hours with an expiry date of 6 February 2025 or at 17955.81 airframe hours, whichever comes first.

3.2.9. The flight instructor and the student pilot were performing an exercise that was still ahead of schedule; they were expected to follow the HASELL checklist as stipulated in the exercise to ensure that the procedure could be performed safely and accurately.

3.3. Probable Cause/s

3.3.1. The flight instructor and the student pilot lost control of the aircraft after executing a wingover manoeuvre during circuit training.

3.4. Contributory Factor/s

3.4.1. Disregard of HASELL checklist.

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. None.

5. APPENDICES

5.1. None.

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