SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10504										
Classification	Accident		**Date**	30 September 2024			**Time**	0544Z			
Type of Operation	Training (Part 141)										
Location											
Place of Departure	Wonderboom Aerodrome (FAWB), Gauteng Province		Place of Intended Landing			Wonderboom Aerodrome (FAWB), Gauteng Province					
Place of Occurrence	Runway 11 at Wonderboom Aerodrome (FAWB)										
GPS Co-ordinates	Latitude	25°39'12.23" S	Longitude	028°13'05.55" E		Elevation	4 095 feet				
Aircraft Information											
Registration	ZS-FPX										
Make; Model; S/N	Cessna Aircraft Company; 172E (Serial number: 172-51388)										
Damage to Aircraft	Substantial			Total Aircraft Hours		7 651.7					
Pilot-in-command											
Licence Type	Student Pilot Licence (SPL)			Gender	Male		Age	21			
Licence Valid	Yes	Total Hours		37.8	Total Hours on Type		14.5				
Total Hours Past 30 Days	8.0			Total Hours on Type Past 90 Days			8.0				
People On-board	1 + 0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0				

What Happened

On Monday morning, 30 September 2024, a student pilot on-board a Cessna 172 aircraft with registration ZS-FPX was engaged in a solo training flight from Wonderboom Aerodrome (FAWB) in Gauteng province with the intention to land back at FAWB. 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 student pilot took off at approximately 0500Z from FAWB to the general flying area (GFA). Upon his return to FAWB, he was instructed by the air traffic control (ATC) officer to join left downwind for Runway 11 at 5 100 feet (ft) above mean sea level (AMSL). The student pilot was number two in the circuit as there was traffic ahead of him. After turning left base, he commenced the descent to 4 700ft; he also selected the wing flaps to stage two and activated the carburettor heat (ON position). As he was about to turn final approach, he noticed that the aircraft's height was 4 400ft. He then applied power and raised the nose, but the aircraft failed to gain height. Later in an interview, the student pilot would state: *"I started to feel a bit uneasy, and started to panic a little, leading me to assume that there was something wrong with the engine."* As the student pilot was on final approach, the ATC cleared him for a touch-and-go landing on Runway 11; the wind was 120° at 10 knots (kts). During the student pilot's readback, he declared a MAYDAY stating that he was losing height and that he would like to land. The ATC cleared him to land on Runway 11.

Thereafter, the ATC officer informed the Aerodrome Rescue and Firefighting (ARFF) personnel to be on standby. Meanwhile, the aircraft approached and landed on Runway 11; however, the nose gear strut collapsed during landing. As a result, the propeller struck the runway, and the aircraft came

to a stop in a nosed-down attitude. The ATC officer activated the crash alarm and the ARFF team responded swiftly to the scene. The student pilot was not injured. The aircraft sustained damage to the propeller, lower engine cowlings and the nose landing gear which had collapsed.

The student pilot later stated: *"In my anxiety trying to get to the ground I neglected to monitor my airspeed, resulting in me crossing the threshold at a very high speed and I touched down in a very flat attitude, which resulted in a porpoise developing, and after the sixth oscillation the nose gear oleo collapsed."*

During the post-accident debrief with the chief flight instructor (CFI), the student pilot mentioned that the aircraft's speed over the threshold was approximately 100 kts.

The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 25°39'12.23" South 028°13'05.55" East, at an elevation of 4 096 feet (ft).

Figure 1: The aircraft as it came to rest on Runway 11. (Source: ATO)

Figure 2: A side view of the aircraft after the occurrence. (Source: ATO)

Figure 3: The deformed propeller blades indicate that the engine was delivering power during landing. (Source: ATO)

Meteorological Information

The weather information in the table below was obtained from the pilot questionnaire.

Wind Direction	170ºC	Wind Speed	7 knots	Visibility	9999 m
Temperature	15ºC	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	-2ºC	QNH	1017hPa		

The meteorological aerodrome report (METAR) was obtained from the South African Weather Service (SAWS) website, issued for FAWB on 30 September 2024 at 0500Z and 0600Z.

FAWB 300500Z AUTO 16009KT //// // ////// 12/M02 Q1017=

Wind Direction	160º	Wind Speed	9 knots	Visibility	9999 m
Temperature	12ºC	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	-2ºC	QNH	1017hPa		

FAWB 300600Z AUTO 17008KT //// // ////// 13/M02 Q1018=

Wind Direction	170º	Wind Speed	8 knots	Visibility	9999 m
Temperature	13ºC	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	-2ºC	QNH	1018hPa		

Porpoising (Source: Airplane Flying Handbook FAA-H-8083-3C, Page 9-34)

"In a bounced landing that is improperly recovered, the airplane comes in nose first, initiating a series of motions imitating the jumps and dives of a porpoise. [Figure 4] The improper airplane attitude at touchdown may be caused by inattention, not knowing where the ground is, miss-trimming, or forcing the airplane onto the runway.

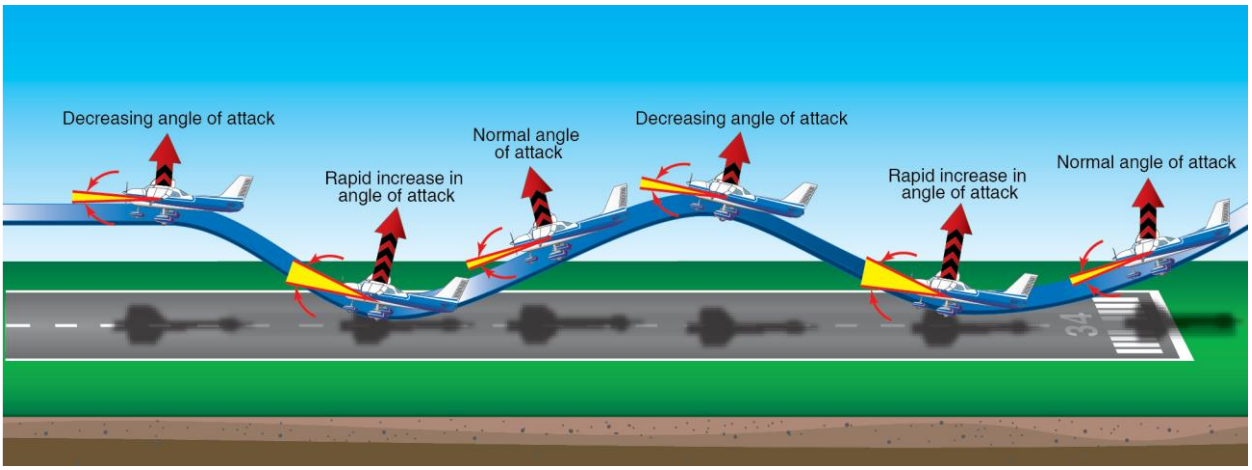

Figure 4: Illustration of an aircraft when it is porpoising.

Ground effect decreases elevator control effectiveness and increases the effort required to raise the nose. Not enough elevator or stabilator trim can result in a nose low contact with the runway and a porpoise develops.
Porpoising can also be caused by improper airspeed control. Usually, if an approach is too fast, the airplane floats and the pilot would try to force it on the runway when the airplane still wants to fly. A gust of wind, a bump in the runway, or even a slight tug on the control wheel sends the airplane aloft again.

The corrective action for a porpoise is the same as for a bounce and similarly depends on its severity. When it is very slight and there is no extreme change in the airplane's pitch attitude, a follow-up

landing may be executed by applying sufficient power to cushion the subsequent touchdown and smoothly adjusting the pitch to the proper touchdown attitude.

When pilots attempt to correct a severe porpoise with flight control and power inputs, the inputs are often untimely may increase the severity of each successive contact with the surface. These unintentional and increasing pilot-induced oscillations may lead to damage or collapse of the nose gear. When porpoising is severe or seems to be getting worse, the safest procedure is to execute a go-around immediately by applying full power while simultaneously maintaining directional control and lowering the nose to a safe climb attitude."

Checklist Procedures: (Source: Pilot's Operating Handbook, Cessna 172, Section 4, Normal Procedures)

DESCENT

1.	*Mixture*	*ADJUST for smooth operation (full rich for idle power)*
2.	*Power*	*AS DESIRED*
3.	*Carburettor Heat*	*AS REQUIRED (to prevent carburettor icing)*

BEFORE LANDING

1.	*Seats, Belts, Harnesses*	*SECURED*
2.	*Fuel Selector Valve*	*BOTH*
3.	*Mixture*	*RICH*
4.	*Carburettor Heat*	*ON (apply full heat before closing throttle)*
5.	*Auto Pilot (if installed)*	*OFF*
6.	*Air Conditioning (if installed)*	*OFF*

NORMAL LANDING

1.	*Airspeed*	*60 – 70 KIAS (flaps UP)*
2.	*Wing Flaps*	*AS DESIRED (below 85 KIAS)*
3.	*Airspeed*	*55 – 65 KIAS (flaps DOWN)*
4.	*Touchdown*	*MAIN WHEELS FIRST*
5.	*Landing Roll*	*LOWER NOSE WHEEL GENTLY*
6.	*Braking*	*MINIMUM REQUIRED*

Findings

1. Personnel Information

1.1 The pilot had a Student Pilot Licence (SPL) that was issued by the Regulator (SACAA) on 22 February 2021 with an expiry date of 1 November 2024. The student pilot had flown a total of 37.8 hours, with 14.5 hours flown on the aircraft type.

1.2 The student pilot was issued a Class 2 aviation medical certificate on 18 January 2021 with an expiry date of 31 January 2026 with no restrictions.

1.3 The student pilot's logbook revealed that he did not fly regularly. His first training flight was on 13 February 2021 which was followed by two more flights in that year. He then started

flying again on 4 October 2022 and logged 10 flights for that year until 6 December 2022. He flew again on 4 February 2023 with his last flight being on 14 June 2023 for that year. He then started flying again on 2 July 2024; the accident flight was his eighth flight in 2024.

1.4 This was the student pilot's first solo flight to the general flying area.

1.5 The student pilot became anxious during the approach phase of the flight and declared a MAYDAY in which he stated he was losing height.

2. Aircraft Information

2.1 The last maintenance inspection of the aircraft was certified on 10 September 2024 at 7 623.0 airframe hours. The aircraft accrued 28.7 hours since the said inspection.

2.2 The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 16 May 2015. The latest C of A had an expiry date of 31 May 2025.

2.3 The aircraft's Certificate of Registration (C of R) was issued to the present owner on 26 April 2021.

2.4 The aircraft was issued a Certificate of Release to Service (CRS) on 10 September 2024 with an expiry date of 9 September 2025 or at 7 723.0 airframe hours, whichever occurs first.

3. Meteorological Information

3.1 Based on the weather information provided by the pilot as well as the two METARs that were issued for FAWB at 0500Z and 0600Z, fine weather conditions prevailed at the time of the flight. The weather had no bearing on this accident.

4. Approved Training Organisation (ATO) Certificate

4.1 The flight school was issued an Approved Training Organisation (ATO) certificate by the Regulator on 22 January 2021 with an expiry date of 31 January 2026.

4.2 The flight was authorised as per the flight authorisation sheet entry No. 2024090892.

5. Air Traffic Control

5.1 FAWB is a licenced aerodrome and has a manned control tower and an ARFF emergency response team. The pilot declared a MAYDAY to the ATC officer who alerted the ARFF team. Once the aircraft came to rest in a nose-down attitude on the runway, the ATC officer activated the crash alarm, and the emergency team responded swiftly. The ATC officer stated that the student pilot reported possible engine failure whilst on final approach and that he would not make the runway.

Probable Cause

The student pilot omitted to monitor the aircraft's approach speed on final approach and crossed the threshold of Runway 11 at approximately 100 kts. The aircraft touched down hard and in a flat

attitude, and porpoised. Subsequently, the nose landing gear collapsed after six oscillations and the propeller struck the runway.

Contributing Factors

1. Lack of experience.
2. Anxious state of the student pilot contributed to him omitting to check the aircraft's speed which was high on final approach.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation, and that will determine the scope of an investigation. For this occurrence, a limited investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desktop inquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar occurrence.

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and not to apportion blame or liability.

Disclaimer

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