SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10440						
Classification	Accident	**Date**	26 March 2024		**Time**	0645Z	
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Grand Central Aerodrome (FAGC), Gauteng Province	Place of Intended Landing	Grand Central Aerodrome (FAGC), Gauteng Province				
Place of Occurrence	Runway 35 at Grand Central Aerodrome (FAGC), Gauteng Province						
GPS Co-ordinates	Latitude	25° 58´55.88" S	Longitude	028° 08´16.41" E	Elevation	5 268 ft	
Aircraft Information							
Registration	ZS-IOI						
Make; Model; S/N	Cessna 172L (Serial Number: 172-60301)						
Damage to Aircraft	Substantial	Total Aircraft Hours	15 521.80				
Pilot-in-command							
Licence Type	Student Pilot Licence (SPL)	Gender	Female	Age	18		
Licence Valid	Yes	Total Hours	21.3	Total Hours on Type	21.3		
Total Hours 30 Days	8.5	Total Flying on Type Past 90 Days	11.5				
People on-board	1+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On 26 March 2024, a student pilot on-board a Cessna C172L aircraft with registration ZS-IOI was on a solo training flight when the accident occurred. The student pilot was conducting circuit-and-landing exercises at Grand Central Aerodrome (FAGC) 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.

According to the student pilot, she conducted four uneventful circuits with the flight instructor on-board. Thereafter, the flight instructor disembarked from the aircraft. Thereafter, student pilot taxied to Runway 35 holding point and took off on a solo flight. During final approach at a speed of 80 miles per hour, she flared too high before positioning the aircraft in a nose-down attitude. This caused the aircraft to touch down with the nose gear first. The aircraft bounced three times on the runway before it settled. During taxi, the air traffic control (ATC) officer informed the student pilot via radio that the nose wheel had deflated. The student pilot brought the aircraft to a stop at the apron, switched off the master switch, disembarked from the aircraft and waited for the arrival of the fire and rescue service personnel. Upon their arrival, they towed the aircraft to the hangar.

The student pilot was not injured. The aircraft sustained damage to the nose wheel and the firewall.

Figure 1: The deflated nose wheel. (Source: Operator)

Post-accident

The following weather information was released by the South African Weather Service (SAWS) for O.R. Tambo International Airport (FAOR) on the day and time of the accident. FAOR is located 36 kilometres (km) south-east of FAGC.

Wind Direction	050°	Wind Speed	6kt	Visibility	10km
Temperature	17°C	Cloud Cover	Broken	Cloud Base	2400 feet
Dew Point	14°C	QNH	1022 hPa		

During a post-accident interview, the student pilot stated that she flared the aircraft too high which caused it to bounce. She later taxied off the runway.

The student pilot stated on the questionnaire that the landing configuration indicated airspeed (IAS) was 80 miles per hour (69 knots) with flaps setting at stage 2 (30°).

Normal Landing (Source: Cessna 172 Pilot's Operating Handbook)

- *Airspeed----------60-70 KIAS (flaps UP)*
- *Wing Flaps--------As desired (below85 KIAS)*
- *Airspeed----------55-65 KIAS (flaps DOWN)*
- *Touchdown-------Main wheels first*
- *Landing Roll-----Lower nose wheel gently*
- *Braking----------Minimum required.*

BOUNCING DURING TOUCHDOWN (Source: FAA-airplane flying handbook chapter 8)

When the aeroplane contacts the ground with a sharp impact as the result of an improper attitude or an excessive rate of sink, it tends to bounce back into the air. Though the airplane's tires and shock struts provide some springing action, the airplane does not bounce like a rubber ball. Instead, it rebounds into the air because the wing's angle of attack was abruptly increased, producing a sudden addition of lift. [Figure 4] The abrupt change in angle of attack is the result of inertia instantly forcing the airplane's tail downward when the main wheels contact the ground sharply. The severity of the bounce depends on the airspeed at the moment of contact and the degree to which the angle of attack or pitch attitude was increased. Since a bounce occurs when the airplane makes contact with the ground before the proper touchdown attitude is attained, it is almost invariably accompanied by the application of excessive back-elevator pressure.

This is usually the result of the pilot realizing too late that the airplane is not in the proper attitude and attempting to establish it just as the second touchdown occurs. The corrective action for a bounce is the same as for ballooning 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. In the event a very slight bounce is encountered while landing with a crosswind, crosswind correction must be maintained while the next touchdown is made. Remember that since the subsequent touchdown will be made at a slower airspeed, the upwind wing will have to be lowered even further to compensate for drift.

Extreme caution and alertness must be exercised any time a bounce occurs, but particularly when there is a crosswind. Inexperienced pilots will almost invariably release the crosswind correction. When one main wheel of the airplane strikes the runway, the other wheel will touch down immediately afterwards, and the wings will become level. Then, with no crosswind correction as the airplane bounces, the wind will cause the airplane to roll with the wind, thus exposing even more surface to the crosswind and drifting the airplane more rapidly. When a bounce is severe, the safest procedure

is to EXECUTE A GO-AROUND IMMEDIATELY. No attempt to salvage the landing should be made. Full power should be applied while simultaneously maintaining directional control and lowering the nose to a safe climb attitude. The go-around procedure should be continued even though the airplane may descend, and another bounce may be encountered. It would be extremely foolish to attempt a landing from a bad bounce since airspeed diminishes very rapidly in the nose-high attitude, and a stall may occur before a subsequent touchdown could be made.

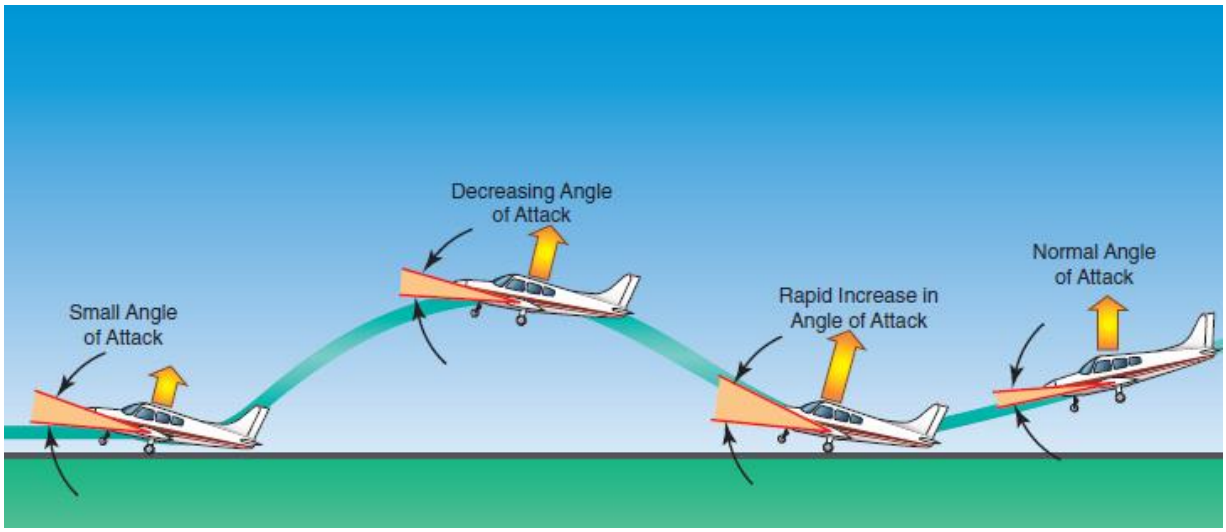

Illustration 1: A depiction of how the bounce occurs.
(Source: Source: FAA-airplane flying handbook chapter 8)

Findings

1. The student pilot was initially issued the Student Pilot Licence (SPL) on 23 February 2023 with an expiry date of 29 January 2025. Her Class II medical certificate was issued on 13 September 2022 with an expiry date of 30 September 2027 with no restrictions.

2. The last 100-hour mandatory periodic inspection (MPI) on the aircraft was certified on 13 September 2024 at 15 494.0 total airframe hours. The aircraft had accrued 15 521.80 hours at the time of the accident, which meant that it accrued 27.80 hours after the inspection.

3. Fine weather conditions prevailed at the time of the flight. The weather had no bearing on this accident.

4. The Certificate of Airworthiness (C of A) was initially issued on 15 September 1980; it was renewed on 5 September 2023 with an expiry date of 30 September 2024.

5. The Certificate of Registration (C of R) was issued to the present owner on 20 April 2009.

6. The approach with an indicated airspeed (IAS) at 80 miles per hour (69 knots) and flaps setting at stage 2 (30°) contrasted with the requirements of the Pilot's Operating Handbook's (POH) prescribed landing speed of 55 to 65 knots with flaps down, or at a speed between 60 and 70 knots with flaps up.

7. The student pilot flared too high which led to a high sink rate; thereafter, the aircraft touched down with its nose gear first before it bounced. The nose gear was damaged during the accident.

Probable Cause(s)

The aircraft was incorrectly configured for landing, which was exacerbated by the aircraft that was flared too high. As a result, the aircraft touched down hard with its nose wheel and bounced; this caused damage to the nose gear.

Contributing Factor(s)

Lack of experience.

Safety Action(s)

None.

Safety Message

Pilots should immediately initiate a go-around if they realise that their approach is unstable. This is a proven risk mitigation strategy to avoid a hard landing which could potentially cause damage to the aircraft and/or lead to injury to the people on-board the aircraft.

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 desk top enquiries 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

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