SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/1043										
Classification	Accident			**Date**	19 June 2023			**Time**	1122Z		
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	On Runway 35 at FAGC, Gauteng Province										
GPS Co-ordinates	Latitude	25°59'.35" S		Longitude	028°08'.39" E			Elevation	5 331 feet		
Aircraft Information											
Registration	ZS-LXE										
Make; Model; S/N	Cessna Aircraft Company; 172K Skyhawk (Serial Number: 172-58473)										
Damage to Aircraft	Substantial				Total Aircraft Hours			23 860.5			
Pilot-in-command											
Licence Type	Student Pilot Licence (SPL)			Gender	Male			Age	19		
Licence Valid	Yes	Total Hours		26.9		Total Hours on Type			26.9		
Total Hours 90 Days	26.9			Total Flying on Type Past 30 Days				26.9			
People On-board	1 + 0	**Injuries**	0	**Fatalities**	0			**Other (on ground)**	0		

What Happened

On Monday, 19 June 2023, a student pilot and a Grade II flight instructor reported at an Approved Training Organisation (ATO) facility at Grand Central Aerodrome (FAGC) in Gauteng province in preparation for a pre-solo check flight. The instructor stated that they had a short briefing before the flight in which they discussed the intended flight exercise which comprised touch-and-go landings at FAGC. Thereafter, a pre-flight inspection on a Cessna 172K Skyhawk aircraft with registration ZS-LXE was conducted; no anomalies were detected on the aircraft. The aircraft had 25 US gallons (133 litres [l]) of Avgas LL100 fuel in the tanks. Visual meteorological conditions (VMC) by day prevailed at the time of the flight. The flight was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.

The instructor reported that after boarding the aircraft, the student pilot communicated his intentions to the FAGC air traffic control (ATC) on the very high frequency (VHF) 122.80 Megahertz (MHz). The student pilot later started the engine and waited for it to warm up until all the indications were within the green arch as stipulated in the Pilot's Operating Handbook (POH). After a few minutes, the student pilot taxied the aircraft to the threshold of Runway 35 to perform the pre-take-off run-up checks. The engine indications remained within the green arch.

Later, the student pilot taxied the aircraft to the threshold of Runway 35. After obtaining the take-off clearance from the control tower, the student pilot opened the throttle to 2 300 revolutions per minutes (RPM) and commenced with the take-off run. The aircraft rotated and climbed to 6 300 feet (ft), travelling at 90 miles per hour (mph).

The instructor reported that the weather conditions were favourable for the flight. The student pilot performed three touch-and-go landing exercises, followed by a full stop landing on Runway 35. After landing, the student pilot taxied the aircraft to the apron in the terminal building. The instructor disembarked from the aircraft to allow the student pilot to conduct his initial solo flight; he made his way to the FAGC ATC tower to view, assess and monitor the student pilot's performance. The student pilot later communicated his intention to FAGC ATC on VHF 122.80 MHz and taxied the aircraft to the holding point of Runway 35.

The student pilot later opened the throttle to 2 300 RPM and commenced with the take-off run. The aircraft rotated and climbed to the circuit altitude of 1000 feet AGL. After reaching the circuit height, the student pilot conducted the pre-landing checklist, thus, selected the flaps to 30 degrees (°) with the aircraft's speed of approximately 65 knots. The aircraft's nose pitched down abruptly and it contacted the runway surface with the nose gear wheel first. The nose gear fork and strut broke off and the propeller struck the runway surface. Thereafter, the nose gear strut folded rearward and the aircraft skidded on the runway on its nose and came to a halt on the grass-covered area on the right side of the runway.

The ATC officer activated the crash alarm and the FAGC Aircraft Rescue and Firefighting (ARFF) team swiftly responded to the accident scene. The aircraft sustained substantial damage. The student pilot turned off the fuel selector and master switch and disembarked from the aircraft unassisted and unharmed. The flight had a duration of 0.3 hours.

The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 25°59'.35" South 028°08'.39" East, at an elevation of about 5 331 feet.

Figure 1: The aircraft next to Runway 35 with the flaps extended to 30°. (Source: Operator)

Figure 2: Skid marks on Runway 35. (Source: Operator)

Figure 3: The rear of the aircraft showing a broken nose landing gear strut (yellow window). (Source: Pilot)

Aircraft information (Source: POH)

The Cessna 172K is a six-seat high-wing all metal aircraft of monocoque construction. It comprises a fixed tricycle landing gear. It is powered by a four-cylinder, horizontally opposed, air-cooled Lycoming O-320-E2D engine bearing serial number L-31684-27A rated at 150 horsepower (hp) at 2 700RPM, driving a two-blade McCauley propeller, model 1C160/DTM7553 bearing serial number OH026.

Weather Information for FAGC

The weather information entered below was obtained from the South African Weather Service (SAWS):

Wind Direction	350°	Wind Speed	10 knots	Visibility	> 10km
Temperature	10°C	Cloud Cover	N/a	Cloud Base	Nil
Dew Point	3°C	QNH	1021		

Findings

1. The pilot was initially issued a Student Pilot Licence (PPL) by the SACAA on 25 May 2023 with an expiry date of 24 May 2024. The student pilot had flown a total of 26.9 hours on the aircraft type.

2. The student pilot had a Class 2 aviation medical certificate that was issued on 9 May 2023 with an expiry date of 31 May 2024. The student pilot was properly licensed and medically fit to conduct the flight in accordance with (IAW) the existing regulations.

3. The student pilot reported no previous medical problems that could have affected his fitness to fly, which was confirmed by an examination of his medical records.

4. The ATO was issued an ATO certificate by the South African Civil Aviation Authority (SACAA) on 1 February 2023 with an expiry date of 31 January 2028.

5. The aircraft was endorsed on the Training Operations Specifications certificate which was issued by the SACAA with an effective date of 1 February 2023 and an expiry date of 31 January 2024.

6. The instructor who oversaw the student pilot's check flight before the accident had a Commercial Pilot Licence (CPL) that was reissued on 16 January 2023 with an expiry date of 31 January 2024. The instructor had a Grade II rating endorsed on his licence, which was issued on 24 January 2023 with an expiry date of 31 January 2024.

7. The instructor had a valid Class 1 aviation medical certificate which was issued on 25 July 2022 with an expiry date of 31 July 2023 with no restrictions.

8. This flight was conducted under the provisions of Part 141 of the CAR 2011 as amended.

9. Based on the weather report from the ATC, no significant weather was present at the time of the accident.

10. The last 100-hour Mandatory Periodic Inspection (MPI) that was carried out on the aircraft prior to the accident flight was certified on 10 June 2023 at 23 813.3 airframe hours by the CAA approved aircraft maintenance organisation (AMO). The aircraft had logged 23 860.5 total hours at the time of the flight, which meant that it had been flown a further 47.2 hours since the last inspection.

11. The aircraft was issued a Certificate of Release to Service (CRS) on 10 June 2023 with an expiry date of 9 June 2024 or at 23 913.3 airframe hours, whichever occurs first.

12. The aircraft maintenance organisation (AMO) which performed the last 100-hour annual inspection had a valid approval certified that was issued on 13 June 2023 by the South African Civil Aviation Authority (SACAA) IAW Part 145 of the CAR 2011 as amended. The AMO approval certificate had an expiry date of 31 July 2024.

13. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 28 February 2006. The latest C of A had an expiry date of 30 November 2023. The aircraft was airworthy when it dispatched for the flight.

14. The aircraft Certificate of Registration (C of R) was issued on 22 January 2007.

15. Post-accident examination of the aircraft by the engineers at the AMO revealed nothing abnormal. The throttle lever moved freely when tested and the aircraft flight controls responded as expected. The elevator trim tab and the adjustable stabiliser were correctly trimmed to the neutral positions for a normal and safe flight.

Probable Cause
The student pilot misjudged the flaring and released the back pressure prematurely before the main wheels settled on the runway surface, whereafter the nose wheel contacted the runway first which resulted in the nose gear fork and strut breaking off due to overload.
Contributing Factors
None.
Safety Action
None.
Safety Recommendation/Message
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 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.

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