SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10250										
Classification	Accident			**Date**	16 January 2023			**Time**	0707Z		
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 06 at Wonderboom Aerodrome (FAWB) in Gauteng Province										
GPS Co-ordinates	Latitude	25°39'13" S		Longitude	028°13'27" E			Elevation	4 095 feet (ft)		
Aircraft Information											
Registration	ZS-SDA										
Make; Model; S/N	Cessna; 172P Skyhawk (Serial Number: 17276251)										
Damage to Aircraft	Substantial			Total Aircraft Hours	14 895.8						
Pilot-in-command											
Licence Type	Student Pilot Licence (SPL)			Gender	Female			Age	19		
Licence Valid	Yes	Total Hours		45.9	Total Hours on Type			42.6			
Total Hours 30 Days	0.7			Total Flying on Type Past 90 Days	12.6						
People On-board	1+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0				

What Happened

On Monday morning, 16 January 2023, a student pilot (SP) on-board a Cessna 172P Skyhawk aircraft with registration ZS-SDA was on a navigation training flight from Wonderboom Aerodrome (FAWB) with the intention to route to Middelburg Airfield (FAMB) in Mpumalanga province and Warmbaths Airfield (FAWA) in Limpopo Province, before returning to the departure aerodrome. The flight plan was filed, and the flight was conducted in 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 SP, she conducted a pre-flight inspection outside the approved training organisation's (ATO's) facility and, thereafter, started the engine. She then called the ground air traffic control (ATC) on duty on frequency 120.6-Megahertz (MHz) for taxi clearance to Runway (RWY) 06, which was granted. The SP then taxied to the holding point. Upon reaching the holding point of RWY06, she conducted the engine power checks and all the indications read normal; she then proceeded to the threshold of RWY06. After receiving the take-off clearance, she carried out the pre-take-off checks and accelerated down the RWY. Whilst at 55 knots (kts) indicated airspeed (IAS), the SP pulled back on the control column to initiate the climb. The aircraft lifted off, however, the SP felt that the aircraft was not responding (was not lifting off the ground). She then tried to get the aircraft back onto the ground, but as the nose wheel touched the ground, the stall warning horn sounded and the aircraft veered off to the left of the RWY and onto the grass. The SP followed the normal procedure to close the throttle and apply the brakes to bring the aircraft to a stop; however, during the ground roll, the nose

gear strut broke off and the aircraft skidded on its nose section before the aircraft came to a stop. The aircraft was substantially damaged; however, no person was injured.

Post-accident, the SP stated that she encountered a tailwind during the take-off run. According to the weather report, the wind direction and speed were 110° at 7 kts.

Figure 1: The aircraft after it came to a stop. (Source: Operator)

Figure 2: The nose strut and nose wheel after separating from the aircraft. The arrow shows the direction of the aircraft. (Source: Operator)

Findings

1. The SP was issued a Student Pilot Licence on 1 February 2022 with an expiry date of 31 January 2023. The SP was issued a Class 2 aviation medical certificate on 14 January 2022 with an expiry date of 14 January 2027 with no restrictions.

2. The last mandatory periodic inspection (MPI) on the aircraft was carried out on 21 November 2022 at 2 575.1 flying hours, with an expiry date of 28 November 2023 or at 2 675.1 flying hours, whichever comes first.

3. The aircraft maintenance organisation (AMO) which carried out the last MPI had the AMO certificate that was issued on 3 November 2022 with an expiry date 30 November 2023.

4. The Certificate of Airworthiness (C of A) was initially issued on 15 March 2022. The reissued C of A had an expiry date of 31 March 2023.

5. The aircraft was registered to the present owner on 9 June 2021.

6. The weather report below was obtained from the South African Weather Service (SAWS) for the day of the accident.

   Surface data

   The surface observations were taken from the automatic weather station (AWS) at FAWB.

   FAWB 160700Z 11007KT CAVOK 24/15 Q1023=

   The AWS data had the following weather variables at 0700Z:

   - Dry-bulb temperature: 24°C
   - Wind direction and speed: 11007KT
   - Weather phenomenon: none observed
   - Clouds amount and height: none observed below minimum sector altitude
   - Pressure at station: 1023 hPa
   - Rain measured: none

The Wind Component Chart

(Source: https://i.pinimg.com/736x/db/b8/7a/dbb87afe15b496da7c8960894a606838--cessna--aeronautica.jpg)

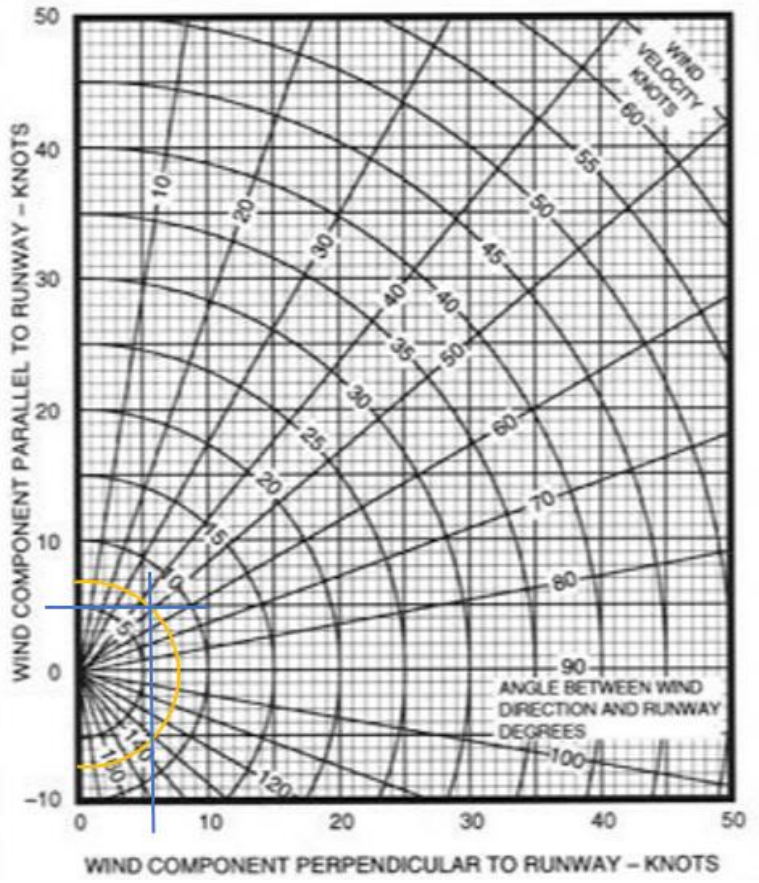

Chart 1: Wind component chart.

According to the SAWS, the reported wind direction on the day of the accident was 110° at 7 kts. The SP stated that the aircraft took off from RWY06 with a 50° angle between wind direction and runway heading. When plotted on the graph (above), the weather conditions showed the headwind component of 5 kts and the crosswind component of 6 kts; therefore, the crosswind encountered at take-off was not considered significant. According to the SAWS weather report, there was no tailwind at the time of the accident as stated by the SP.

7. Normal take-off (Source: Cessna 172P POH)
    - *Wing Flaps* *0° to 10°*
    - *Carburettor Heat* *COLD*
    - *Throttle* *FULL OPEN*
    - *Elevator Control* *LIFT NOSE WHEEL (at 55 KIAS)*
    - *Climb Speed* *70-80 KIAS*

8. Crosswind Take-off (Source: Cessna 172P Pilot's Operating Handbook)

   Takeoffs into strong crosswinds normally are performed with minimum flap setting necessary for the field length, minimize the drift angle immediately after takeoff. With the ailerons partially deflected into the wind, the airplane is accelerated to a speed slightly higher than normal, then pulled off abruptly to prevent possible settling back to the runway while drifting. When clear of the ground, make a coordinated turn into the wind to correct for drift.

9. The SP stated that she rotated at 55 kts and pulled back. The Pilot's Operating Handbook (POH) states that '*airplane must be accelerated to a speed slightly higher than normal and pulled off abruptly to prevent possible settling back to the runway*'; and this was not compensated for.

10. Lift-off (Source: FAA Airplane Flying Handbook Chapter 5)
    As the nose-wheel raises off of the runway, the pilot should hold aileron pressure into the wind. This may cause the downwind wing to rise and the downwind main wheel to lift-off the runway first, with the remainder of the take-off roll being made on that one main wheel. This is acceptable and is preferable to side-skipping.

Probable Cause

Loss of control during take-off resulted in the aircraft's failure to lift-off adequately; this caused the aircraft to settle back onto the runway before it veered off to the left and onto the grass. The cause of the aircraft settling back was due to a lack of compensation for drift which was caused by the crosswind during take-off.

Contributing Factors

- Incorrect technique was used during take-off.
- The take-off speed was not increased to above normal during take-off in crosswind conditions as stipulated in the POH.

Safety Action(s)

None.

Safety Message

Pilots operating similar aircraft type to the one in this report are urged to adhere to instructions and procedures laid out in the POH for safe operation to prevent damage to 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 produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

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