SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10279						
Classification	Accident		**Date**	10 March 2023		**Time**	1010Z
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Lanseria International Airport (FALA), Gauteng Province		Place of Intended Landing	Lanseria International Airport (FALA), Gauteng Province			
Place of Occurrence	FALA Runway (RWY) 07						
GPS Co-ordinates	Latitude	25°55’53.50” S	Longitude	027°56’9.07” E	Elevation	4281.6 feet (ft)	
Aircraft Information							
Registration	ZS-FOH						
Make; Model; S/N	Piper PA28-140 (Serial number: 28-23935)						
Damage to Aircraft	Substantial		Total Aircraft Hours	9448.81			
Pilot-in-command							
Licence Type	Student Pilot Licence		Gender	Female	Age	19	
Licence Valid	Yes	Total Hours	35.6	Total Hours on Type	35.6		
Total Hours past 30 Days	28.3		Total Flying Hours on Type Past 90 Days	28.3			
People On-board	1 + 0	**Injuries** 0	**Fatalities**	0	**Other (on ground)**	0	

What Happened

On 10 March 2023, a student pilot (SP) on-board a Piper Cherokee PA28 with registration ZS-FOH was engaged in a training flight from Lanseria International Airport (FALA) in Gauteng province to the general flying area (GFA), with the intention to land back at FALA. 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.

Runway (RWY) 07 was in use at FALA at the time. The SP stated that she taxied the aircraft to RWY07 holding point whereafter FALA air traffic control (ATC) gave her take-off clearance. After lining up on the runway, she applied power to initiate the take-off roll. When the aircraft reached the take-off speed of approximately 65 miles per hour (mph), the SP pulled back on the yoke and the aircraft lifted off the ground. According to the SP, the aircraft stopped climbing and she could not understand the reason, thereafter, it lost lift and impacted the runway hard with the nose wheel first which separated from the aircraft. As a result, the aircraft veered off to the right of the runway and came to a stop at the edge of it.

The SP was not injured during the accident. The aircraft sustained damage to the undercarriage, propeller and the right-side wing.

Figure 1: The aircraft as it came to rest on the edge of the runway. (Source: FALA Fire Department)

Figure 2: The nose and the right main wheels that separated during the accident. (Source: FALA Fire Department)

Findings

- The SP was issued a Student Pilot Licence (SPL) on 24 November 2022 with an expiry date of 23 November 2023.

- The SP was issued a valid Class 2 aviation medical certificate on 16 November 2022 with an expiry date of 30 November 2027.

- The aircraft was issued a Certificate of Airworthiness (C of A) on 4 February 2011 with an expiry date of 28 February 2024.

- The aircraft was issued a valid Certificate of Registration (C of R) on 26 August 2021.

- The last maintenance inspection was carried out on the aircraft at 9448.81 airframe hours and certified on 28 February 2023. There were no reported or recorded defects prior to the flight.

- The aircraft's Certificate of Release to Service (CRS) was issued on 28 February 2023 with an expiry date of 27 February 2024 or at a total of 9548.81 hours of flight time, whichever occurs first.

- The approved training organisation (ATO) had a valid certificate that was issued by the Regulator (SACAA) on 15 February 2022 with an expiry date of 28 February 2027.

- The flight was authorised accordingly in the flight authorisation sheet.

- The PA28-140 Owner's Manual states the following:

  "The best speed for take-off is about 60 mph under normal conditions. Trying to pull the airplane off the ground at too low an airspeed decreases the controllability of the airplane in the event of engine failure."

- The aircraft rotated at approximately 65 miles per hour (mph) and the aircraft Owner's Manual advises 60 mph.

- An official weather report was obtained from the South African Weather Service (SAWS). The closest weather station to the accident site is FALA. The weather information entered in the table below was captured on 10 March 2023 at 1010Z at FALA.

Wind Direction	120°	Wind Speed	5 knots	Visibility	10 000m
Temperature	27°C	Cloud Cover	FEW	Cloud Base	2500ft
Dew Point	13°C	QNH	1020		

- The school arranged for the SP to have the SACAA designated flight examiner (DFE 1) assess her flight for 1.4 hours to establish her shortcomings and correct her technique on circuits, circuits in controlled airspace, and emergencies in circuits.

- Twenty-eight (28) days post-accident, the DFE assessed the SP who appeared calm, positive and eager on the day. Two take-offs out of the five circuits which the SP conducted had to be corrected by the DFE to prevent a stall because during rotation she applied excessive back pressure on the control column. The turns were not co-ordinated, and the pilot hardly adhered to the circuit pattern. The SP had a high-nose attitude during the simulated engine failure after take-off which led to the DFE intervening. It was noticed that the SP's seating posture was not correct (ideal) even though the SP had cushions on her seat.

- Fundamentals of Stall Recovery (Source: FAA Airplane Flying Handbook)

  Stall recovery could consist of as many as six steps. Even so, the pilot should remember the most important action to an impending stall or a full stall is to reduce the angle of attack (AOA). There have been numerous situations where pilots did not first reduce AOA, and instead prioritized power and maintaining altitude, which resulted in a loss of control. The following provides a generic stall recovery procedure for light general aviation aircraft adapted from a template developed by major airplane manufacturers and can be adjusted appropriately for the aircraft used. However, a pilot should always follow the aircraft-specific manufacturer's recommended procedures if published and current. The recovery actions should be made in a procedural manner. The following discussion explains each of the six steps:

  1. Disconnect the wing leveller or autopilot (if equipped). Manual control is essential to recovery in all situations. Disconnecting this equipment should be done immediately and allow the pilot to move to the next crucial step quickly. Leaving the wing leveller or autopilot connected may result in inadvertent changes or adjustments to the flight controls or trim that may not be easily recognized or appropriate, especially during high workload situations.

  2. a) Pitch nose-down control. Reducing the AOA is crucial for all stall recoveries. Push forward on the flight controls to reduce the AOA below the critical AOA until the impending stall indications are eliminated before proceeding to the next step.

  b) Trim nose-down pitch. If the elevator does not provide the needed response, pitch trim may be necessary. However, excessive use of pitch trim may aggravate the condition, or may result in loss of control or high structural loads.

  3. Roll wings level. This orients the lift vector properly for an effective recovery. It is important not to be tempted to control the bank angle prior to reducing AOA. Both roll stability and roll control will improve considerably after getting the wings flying again. It is also imperative for

the pilot to proactively cancel yaw with proper use of the rudder to prevent a stall from progressing into a spin.

4. Add thrust/power. Power should be added as needed, as stalls can occur at high power or low power settings, or at high airspeeds or low airspeeds. Advance the throttle promptly, but smoothly, as needed while using rudder and elevator controls to stop any yawing motion and prevent any undesirable pitching motion. Adding power typically reduces the loss of altitude during a stall recovery, but it does not eliminate a stall. The reduction in AOA is imperative. For propeller driven airplanes, power application increases the airflow around the wing, assisting in stall recovery.

5. Retract speed brakes/spoilers (if equipped). This will improve lift and the stall margin.

6. Return to the desired flightpath. Apply smooth and coordinated flight control movements to return the airplane to the desired flightpath being careful to avoid a secondary stall. The pilot should, however, be situationally aware of the proximity to terrain during the recovery and take the necessary flight control action to avoid contact with it.

Probable Cause

The aircraft stalled during rotation which resulted in the aircraft impacting the runway.

Contributing Factor(s)

Application of excessive back pressure during rotation.

Safety Action(s)

1. The school arranged for the SP to undergo remedial action for 1.4 hours to correct her technique on circuits, circuits in controlled airspace, and emergencies in the circuits.

2. The ATO re-emphasised the DFE's concerns with the instructors to ensure that all students' seating positions are checked.

3. The ATO carried out check flights in two folds. Firstly, random students trained by the accident SP's instructor (the instructor who trained the accident SP) were assessed to observe if there was a similar trend related to flight safety. Secondly, random students of the Grade 3 instructors were assessed for overall lapses in flight safety or any trend that could result in a potential hazard. In both cases, no major risks were identified except for minor observations which were resolved through de-briefs and additional flights.

4. The ATO employed the services of an external instructor to conduct assessments and Private Pilot Licence (PPL) tests to verify the procedural/teaching techniques.

5. A grading system has been introduced to identify the student pilot's shortcomings in the early stages of training. Depending on the level of the student pilot's skill, further remedial training would be provided prior to their initial solo.

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 desk top enquiries to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as 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