SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10412								
Classification	Accident			**Date**	23 January 2024			**Time**	1246Z
Type of Operation	Private (Part 94)								
Location									
Place of Departure	Rhino Park Airfield, Gauteng Province			Place of Intended Landing	Rhino Park Airfield, Gauteng Province				
Place of Occurrence	Runway 09 Rhino Park Airfield								
GPS Co-ordinates	Latitude	25°49'59.64"S		Longitude	28°32'24.30E		Elevation	4649ft	
Aircraft Information									
Registration	ZU-FWN								
Make; Model; S/N	Sling 2 (Serial Number: 102)								
Damage to Aircraft	Substantial				Total Aircraft Hours			3319.25	
Pilot-in-command									
Licence Type	Private Pilot Licence (PPL)			Gender	Female		Age	23	
Licence Valid	Yes	Total Hours		77.6		Total Hours on Type		76.7	
Total Hours 30 Days	0				Total Flying on Type Past 90 Days			13.9	
People On-board	1+1	**Injuries**	0	**Fatalities**	0		**Other (on ground)**	0	

What Happened

On Tuesday, 23 January 2024 at 1051Z, a pilot and a passenger on-board a Sling 2 aircraft with registration ZU-FWN were engaged in an hour building exercise. The pair took off from Rhino Park Airfield in Gauteng province to Pretoria General Flying Area 2 (GFA 2) in the same province with the intention to return to Rhino Park Airfield. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that they took off from the airfield and conducted eight touch-and-go landings before proceeding to Pretoria GFA 2 where they practised forced landings and steep turns for approximately 1.9 hours. Thereafter, they returned to the take-off airfield, and upon arrival the pilot joined overhead. She then noticed that the windsock indicated a head wind which was favourable for landing on Runway 09. After flaring the aircraft, the pilot felt that the nose of the aircraft was pulling downward; as a result, the aircraft landed hard with the nose wheel and bounced. The pilot stated that there was pressure on the left rudder pedal when the aircraft touched down for the second time. This prompted her to enquired from the passenger if she had not accidentally stepped on the left rudder pedal, to which the passenger responded negative. Soon after, the nose gear tyre burst, and

the propeller struck the ground. As a result, the pilot lost directional control of the aircraft and it veered off to the left of the runway where it came to a stop. The pilot turned off the master switch and, together with the passenger, disembarked from the aircraft; they were unharmed. The aircraft's nose gear was bent backwards which trapped the pedals; the engine cradle was also bent and broken; the nose gear tyre and the propeller were substantially damaged.

The weather information below was obtained from the pilot questionnaire.

Wind Direction	080º	Wind Speed	10kts	Visibility	10km
Temperature	25ºC	Cloud Cover	Scattered	Cloud Base	3500ft
Dew Point	05ºC	QNH	1016hPa		

Figure 1: The yellow pin indicates the accident site at Rhino Park Airfield. (Source: Google Earth)

Figure 2: The aircraft post-accident. (Source: Operator)

Figure 3: The burst nose wheel tyre. (Source: Operator)

Figure 4: Damage on the propeller blade tip. (Source: Operator)

Post-accident:

According to the pilot, the cause of the accident was due to an unstable approach which led to a hard landing and a bounce.

Round out and Flare (Source: https://www.faa.gov/sites/faa.gov/files/regulations_policies/handbooks_manuals/aviation/airplane_handbook/10_afh_ch9.pdf)

The round out is a slow, smooth transition from a normal approach attitude to a landing attitude, gradually rounding out the flightpath to one that is parallel to and a few inches above the runway.

When the airplane approaches 10 to 20 feet above the ground in a normal descent, the round out or flare is started. Back-elevator pressure is gradually applied to slowly increase the pitch attitude and AOA. The AOA is increased at a rate that allows the airplane to continue settling slowly as forward speed decreases. This is a continuous process until the airplane touches down on the ground.

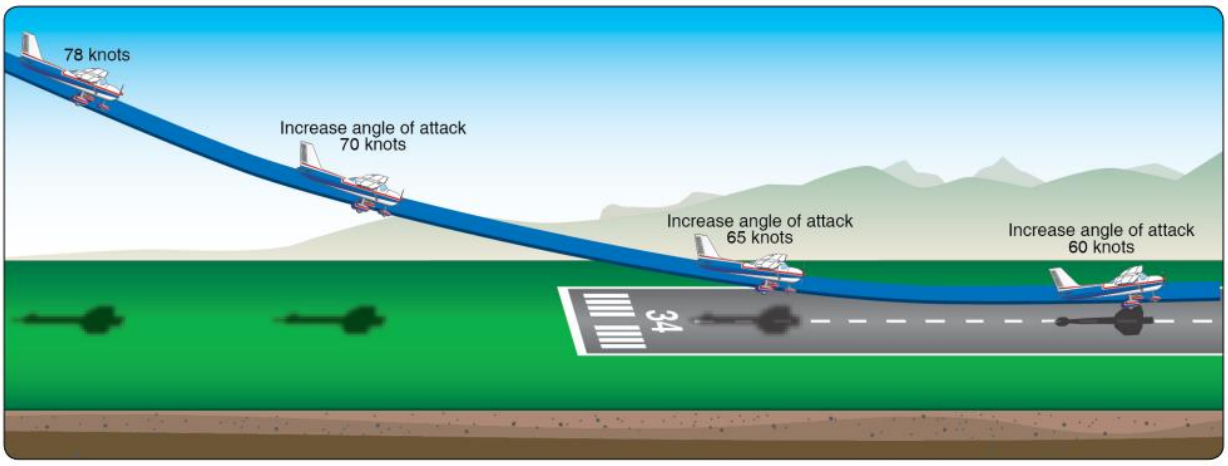

Illustration 1: Angle-of-attack during round out. (Source: FAA Airplane Flying Handbook)

Bouncing During Touchdown (Source: FAA Airplane Flying Handbook Chapter 8)

When the airplane 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 tyres 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. [Illustration 2] 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 realising 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.

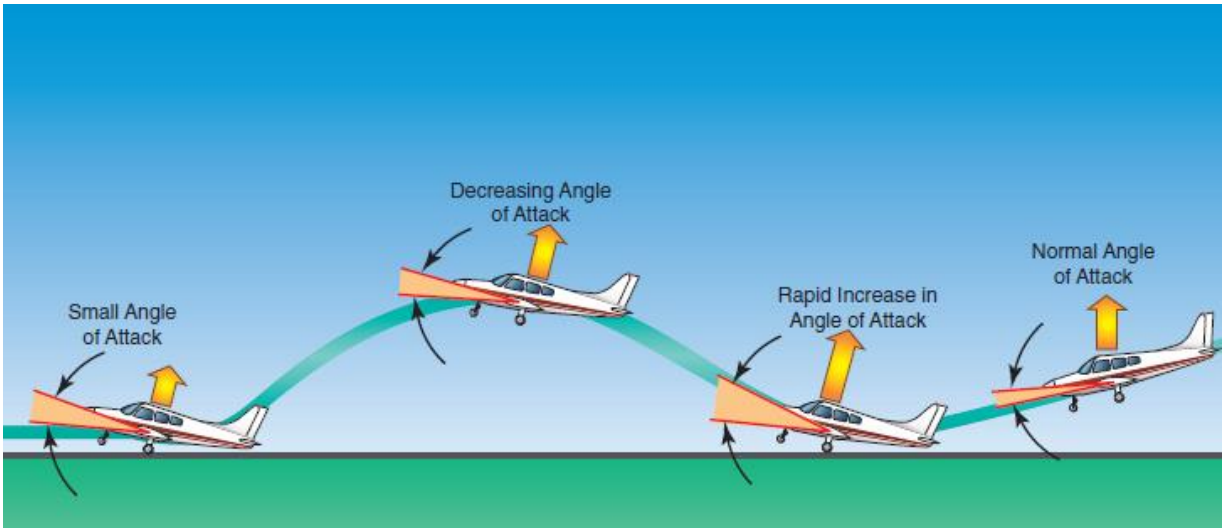

Illustration 2: A depiction of the aircraft when it bounces. (Source: FAA-airplane Flying Handbook Chapter 8)

Findings

1. The pilot was initially issued a Private Pilot Licence (PPL) on 7 December 2023 with an expiry date of 30 November 2024. The pilot's Class 2 medical certificate was issued on 4 April 2022 with an expiry date of 4 April 2027 with no restrictions.

2. The last annual inspection on the aircraft was certified on 18 May 2023 at 3293.5 airframe hours. The aircraft had accumulated 3319.25 airframe hours at the time of the accident, which meant that the aircraft accrued a further 25.75 hours after the annual inspection.

3. The Authority to Fly (ATF) was initially issued on 8 December 2023 with an expiry date of 7 December 2024.

4. The Certificate of Registration (C of R) was issued to the present owner on 8 April 2022.

5. The aircraft's airspeed was fast on approach, and the aircraft touched down hard before it bounced. As a result, the nose gear wheel burst and the propeller struck the runway.

6. The pilot lost directional control of the aircraft and it veered off to the left of the runway before it came to a stop on the grass area.

Probable Cause(s)

The aircraft's airspeed was high on approach which led to a hard landing and a bounce; followed by the nose gear tyre burst and the propeller strikes on the runway. The pilot lost directional control of the aircraft which led to the aircraft exiting the runway.

Contributing Factor(s)

None.

Safety Action(s)

None.

Safety Message

Pilots are urged to be vigilant during the critical phases of flight such as take-offs and landings to prevent injuries and damage to property.

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

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