SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10515								
Classification	Accident			**Date**	10 October 2024			**Time**	1417Z
Type of Operation	Private (Part 94)								
Location									
Place of Departure	Private Farm Airstrip, Vrede, Free State Province			Place of Intended Landing	Private Farm Airstrip, Vrede, Free State Province				
Place of Occurrence	On the gravel runway in the farm								
GPS Co-ordinates	Latitude	S 27°29'19.96"		Longitude	E 0 29°23'43.25"			Elevation	5548 ft
Aircraft Information									
Registration	ZU-KFJ								
Make; Model; S/N	Airplane Factory; Sling 4 High Wing (Serial Number: 016G)								
Damage to Aircraft	Substantial			Total Aircraft Hours	14.8				
Pilot-in-command									
Licence Type	Private Pilot Licence			Gender	Male			Age	52
Licence Valid	Yes	Total Hours		61	Total Hours on Type				4.3
Total Hours 30 Days	2.3			Total Flying on Type Past 90 Days	4.3				
People On-board	1+0	**Injuries**	1	**Fatalities**	0	**Other (on ground)**			0

What Happened

On Thursday, 10 October 2024, a pilot on-board a Sling 4 High Wing aircraft with registration ZU-KFJ was engaged in a private local flight from his farm's airstrip in Vrede, Free State province. He intended to land back at the same take-off farm. 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 stated that he took off from his farm's airstrip around 1400Z and headed west. Fine weather conditions with "little to no winds" prevailed at the time of the flight. Upon his return to the take-off airstrip, he conducted an unmanned runway joining procedure. As he flew over the runway to conduct the runway inspection, he noticed that the windsock indicated a light wind blowing from the south-west. During landing before touchdown, a whirlwind from the right caused the aircraft to bounce. The pilot lost directional control of the aircraft which veered off to the left of the runway. Before the pilot could take any action to correct the direction, the nose landing gear contacted an uneven surface and broke off; this caused the aircraft to nose over. The aircraft came to rest in an inverted attitude with the nose facing the direction of approach.

The aircraft sustained substantial damage. The pilot exited the aircraft unassisted; however, he sustained serious back injuries. He was taken to the nearby hospital by a family member for a thorough medical assessment.

In the pilot questionnaire form, the pilot reported the weather conditions as follows:

Wind direction: south-west; wind speed: 05 kt; visibility: 10000m

Figure 1: The view of the accident site. (Source: Google Maps)

Figure 2: The aircraft's resting position after the accident. (Source: Manufacturer)

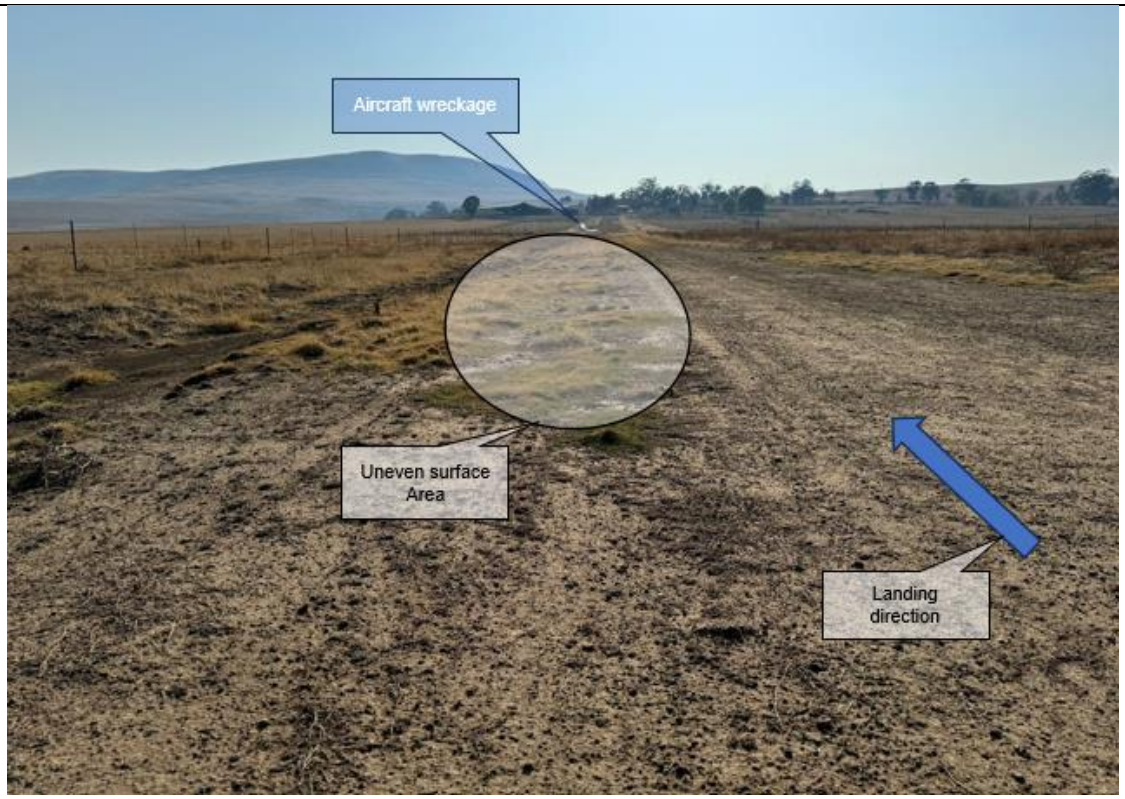

Figure 3: The runway surface condition.

Figure 4: The uneven surface on which the aircraft rolled after it had landed.

Figure 5: Damage to the tail fin due to impact with the ground.

Figures 3 and 4 illustrate the condition of the runway surface area on which the aircraft landed.

About the Aircraft (Source: Sling 4 Pilot's Operating Handbook)

The Sling 4 High Wing aircraft is an aluminium and composite four-seater (two pairs of side-by-side seats). The aircraft's fuselage is a semi-monocoque constructed with aluminium components. It has a single-engine Rotax 915iS aviation power plant with a cantilever main wing above the fuselage. The landing gear is a tricycle type with a steerable nose wheel, regardless of braking architecture. The main landing gear uses two composite spring sections.

Approach and Landing

Approach
1. Airspeed ..... 75 KIAS
2. Propeller ..... T.O. (5,800 RPM)
3. Flaps ..... FULL ON FINAL
4. Trim ..... AS REQUIRED
*5. Throttle ..... AS REQUIRED**(a)** (NOT BELOW 3000 RPM)*

The information below is an extract from the FAA-H-8083-28_Order_8083.28

Aviation Weather: Whirlwinds

Figure 6: An example of a whirlwind. (Source: https://www.worldatlas.com/articles/how-many-types-of-whirlwinds-are-there.html)

A whirlwind is a rapidly rotating column of air that can be small in diameter and last from minutes to hours. These winds are caused by turbulence and instabilities created by heating and flow gradients. A whirlwind can occur anywhere on earth irrespective of the season. They are often seen in dry, open areas.

Whirlwinds, including small tornadoes or localized strong wind events, pose unique challenges to small, light sport aircraft (LSA). These aircraft, by design, are lightweight and have lower stall speeds, making them more susceptible to turbulence, wind shear, and other atmospheric disturbances often associated with whirlwinds.

Findings

Man

1.1 The pilot had a Private Pilot Licence (PPL) that was initially issued by the Regulator (SACAA) on 1 January 2023. His licence renewal was issued on 5 July 2024 with an expiry date of 31 July 2025. The pilot had a total of 61 hours of which 4.3 hours were on the aircraft type. The pilot was licensed and was qualified to undertake the flight.

1.2 The pilot was issued a Class 2 aviation medical certificate on 5 July 2024 with an expiry date of 31 July 2025 with no restrictions.

Machine

2.1. The aircraft had a valid Authority-to-fly (ATF) Certificate that was initially issued by the Regulator on 20 August 2024 with an expiry date of 19 August 2025.

2.2. The Certificate of Registration (C of R) was issued to the present owner on 24 July 2024.

2.3. The aircraft was issued a Certificate of Release to Service (CRS) post-production on 18 July 2024 at 1.2 airframe hours with an expiry date of 17 July 2025 or at 100 hours, whichever comes first. The last maintenance inspection was conducted on the aircraft on 18 July 2024. The aircraft had a total of 14.8 airframe hours at the time of the accident flight; the aircraft was considered airworthy. The aircraft was serviceable to undertake the flight.

Environment

2.4. Whirlwinds are inherently unpredictable and could occur in open areas. Their rapid rotation and vertical air movement, including updrafts and downdrafts, are challenging for small aircraft. The pilot's lack of awareness of such a phenomenon at the time of landing contributed to the accident. The pilot lost control of the aircraft upon landing due to the encountered whirlwind which caused the aircraft to land hard and, subsequently, veer off to the left of the runway before it nosed over.

Probable Cause(s)

The aircraft encountered a whirlwind during landing which caused the pilot to lose control of the aircraft. The aircraft landed hard, bounced and veered off to the left of the runway. This caused the nose gear failure and the aircraft subsequently nosed over before it rested in an inverted position.

Contributing Factor(s)

None.

Safety Action(s)

None.

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 desktop inquiries 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