SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10494						
Classification	Accident	**Date**	14 September 2024		**Time**	1000Z	
Type of Operation	Private (Part 94)						
Location							
Place of Departure	Brits Aerodrome (FABS), North West Province	Place of Intended Landing	Brits Aerodrome (FABS), North West Province				
Place of Occurrence	Runway (RWY) 02 at Brits Aerodrome (FABS), North West Province						
GPS Co-ordinates	Latitude	25° 31' 54.59" S	Longitude	027° 46' 33.32" E	Elevation	3 758 ft	
Aircraft Information							
Registration	ZU-FBG						
Make; Model; S/N	B & F Technik Polaris; FK14 B2 (Serial Number: B2-081)						
Damage to Aircraft	Substantial	Total Aircraft Hours	755				
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL)	Gender	Male	Age	61		
Licence Valid	Yes	Total Hours	1 626.39	Total Hours on Type	13.2		
Total Hours 30 Days	4.6	Total Flying on Type Past 90 Days	13.2				
People On-board	1+1	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Saturday morning, 14 September 2024, a pilot and a passenger (his son) on-board a Polaris FK 14 B2 aircraft took off from Brits Aerodrome (FABS) in the North West province with the intention to land back at the same aerodrome. The pilot was taking part in a Speed Rally Competition. 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 conducted the pre-flight check and there were no anomalies with the aircraft. After performing runup checks, the pair took off at approximately 0900Z. The pilot was one of the private participants in a Speed Rally Competition held at FABS; the competition was organised by the South African Power Flying Association (SAPFA). The aircraft routed to the competition course without difficulties. During the return flight whilst on short final approach for Runway (RWY) 02 at an approximate speed of 56 knots (kts), the aircraft had a sudden high sink rate which was induced by the wind shear. Subsequently, the aircraft landed hard on the runway, and the pilot initiated a go-around. During the second landing as the aircraft rolled down the runway, both the main landing gear struts failed, and the aircraft veered off the runway before it stopped several metres to the right of RWY 02.

The two occupants were not injured during the accident sequence. The aircraft sustained substantial damage to the fixed main landing gear struts and the bottom of the fuselage.

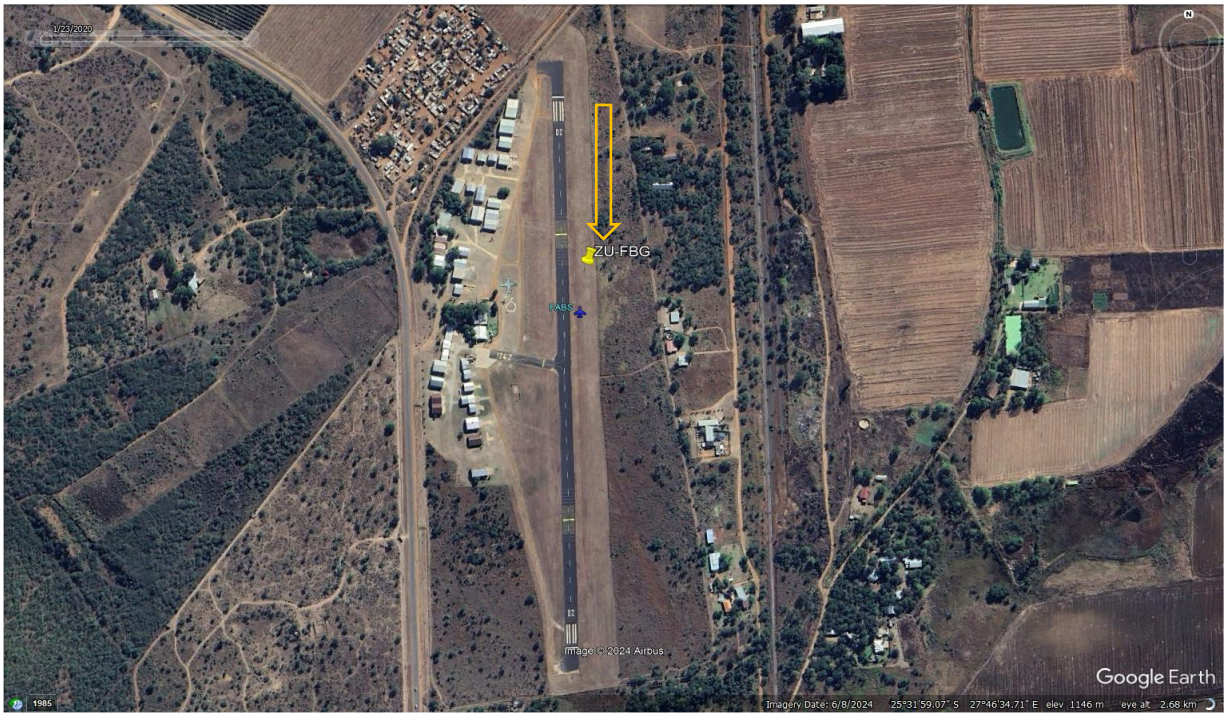


Figure 1: The accident site. The yellow arrow indicates the direction of landing. (Source: Google Earth)

Figure 2: The aircraft after the accident. (Source: Pilot)

Figures 3 and 4: Damage to the aircraft. (Source: Pilot)

The weather report below was obtained from the pilot's questionnaire for 14 September 2024. The pilot had obtained the weather information from the Windy Application.

Wind Direction	270	Wind Speed	5 knots	Visibility	9999 m
Temperature	33ºC	Cloud Cover	CAVOK	Cloud Base	CAVOK
Dew Point	04ºC	QNH	1023hPa		

The meteorological aerodrome report (METAR) below was obtained from the South African Weather Service (SAWS) report that was issued for Lanseria International Airport (FALA) on 14 September 2024 at 1000Z. FALA is located 25.7 nautical miles (nm) south-east of FABS. According to the weather report, the surface wind velocity was variable between 20 and 320 degrees which could result in wind shear.

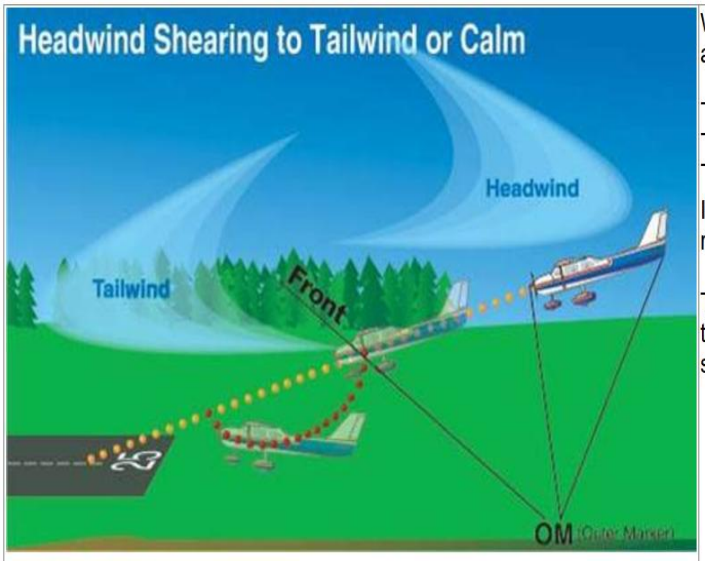
FALA 141000Z 35010KT 320V020 CAVOK 30/04 Q1023 NOSIG=.

Wind Direction	350	Wind Speed	10 knots	Visibility	9999 m
Temperature	30ºC	Cloud Cover	CAVOK	Cloud Base	CAVOK
Dew Point	04ºC	QNH	1023hPa		

The Low-level Wind Shear (Source: https://www.weather.gov/zme/safety_llws)

Low-level wind shear (LLWS) is defined as “A wind shear of 10 knots or more per 100 feet in a layer more than 200 feet thick which occurs within 2,000 feet of the surface”. So what does this mean? It means that within the lowest 2000ft, the wind speed and/or direction is changing rapidly in a 200ft layer.

Small, general aviation aircraft are much more prone to the effects of low-level wind shear than large commercial aircraft because their approach speeds are much closer to their stall speeds.



While an aircraft is on approach, a shear from a headwind to a tailwind (or calm) causes:

- The airspeed to decrease;
- The nose to pitch down;
- The aircraft to drop below the glide slope.

If the pilot pulls the nose up to compensate, airspeed will be reduced even further.

The pilot will typically compensate by increasing power, but if the engines don’t spool up fast enough, the airplane may land short, slow, and hard and could lead to a crash.

Figure 5: Illustration of wind shear. (Source: https://www.weather.gov/zme/safety_llws)

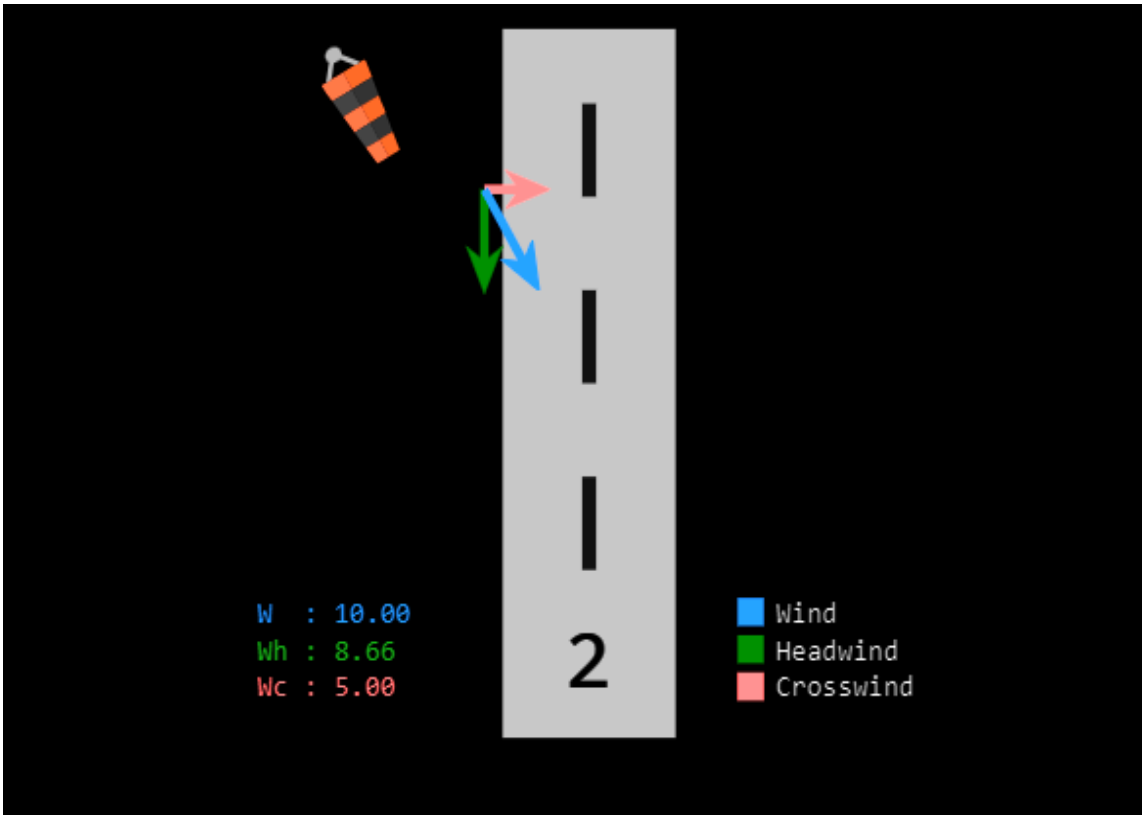


Figure 6: The average wind component of the day. (Source:e6bx.com)

The table below is an extract from the aircraft's POH which shows the required recommended data to be considered during approach for landing with different weight configurations.

POH FK 14 B Revision 23 | Normal Procedures | FK Lightplanes page 4-1

4. Normal Procedures

4.1. General

This chapter deals with the normal procedures recommended for the safe operation of the FK 14 B.

4.2. Recommended Speeds

		up to 472,5 kg	more than 472,5 kg / 1041 lbs
Best angle of climb speed:	(Flaps 1) V_X :	100 km/h / 54 kt	105 km/h / 57 kt
Best rate of climb speed:	(Flaps up) V_Y :	145 km/h / 78 kt	148 km/h / 80 kt
Approach speed	flaps 2	110 km/h / 59 kt	110 km/h / 59 kt
Approach speed	flaps 3	95 km/h / 51 kt	100 km/h / 54 kt

Figure 6: The recommended operating speeds. (Source: POH)

According to the pilot's questionnaire, the approach speed was 56 kts with full stage 3 flaps configuration.

Findings

1. Personnel Information

1.1 The pilot had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator on 14 September 2009. The licence was reissued on 20 December 2023 with an expiry date of 31 December 2024. The aircraft type was endorsed on the pilot's licence.

1.2 The pilot was issued a Class 1 aviation medical certificate on 27 May 2024 with an expiry date of 30 November 2024.

1.3 The pilot had 11.8 hours as pilot-in-command on the aircraft type with 1.4 hours attained during the conversion flight on 27 June 2024. Therefore, the pilot was adequately experienced and licensed to conduct the flight.

1.4 After the initial hard landing, the pilot decided to conduct a go-around which was an appropriate decision as he was aware of the occurrence.

2. Aircraft Information

2.1 The last annual inspection that was conducted on the aircraft before the accident flight was certified on 12 August 2024 at 749.7 airframe hours. The aircraft had accrued 5.3 hours since the last inspection.

2.2 The aircraft had a valid Authority-to-Fly (ATF) Certificate that was initially issued on 11 September 2019. The latest ATF was reissued on 20 September 2023 with an expiry date of 30 September 2024. The aircraft's 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) on 12 August 2024 at 749.7 airframe hours with an expiry date of 12 August 2025 or at 849.7 airframe hours, whichever occurs first.

3. Meteorological Information

3.1. According to the weather report, the prevailing wind conditions were susceptible to inducing wind shear and were considered a factor that contributed to the accident.

4. Conclusion

4.1. The aircraft landed hard after a possible wind shear on final approach, and the pilot initiated a go-around and landed back on RWY 02. The main landing gear failed during the landing roll. The aircraft veered off to the right of the runway before it stopped; it sustained substantial damage. The pilot and the passenger were not injured during the landing sequence. According to the weather report of the day, the surface wind velocity varied between 20 and 320 degrees which is consistent with wind shear.

Probable Cause(s)
It is probable that the aircraft experienced wind shear on final approach, followed by a hard landing that led to the subsequent collapse of the main landing gear during the landing roll.
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 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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This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa