# AIRCRAFT INCIDENT SHORT REPORT

**CA18/2/3/9836:** During landing, the aircraft experienced wind shear, landed hard on Runway 27 and veered off to the left of it (Runway 27).

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| **Date and time** | : | 19 November 2019, 0830Z |
| **Aircraft registration** | : | ZU-FAT |
| **Aircraft manufacturer and model** | : | Shadow Lite CC Jabiru J160 |
| **Last point of departure** | : | Rhino Park Airfield, Gauteng Province |
| **Next point of intended landing** | : | Rhino Park Airfield, Gauteng Province |
| **Location of incident site with reference to easily defined geographical points (GPS** | : | 26°16'6,34" South 030°17'52,20" East, elevation 5 600 feet |
| **Meteorological information** | : | Wind: 310°/8kt, Temperature: 28°C, Visibility: 10km |
| **Type of operation** | : | Private (Part 94) |
| **Persons on board** | : | 1 + 0 |
| **Injuries** | : | None |
| **Damage to aircraft** | : | Substantial |

*All times given in this report is Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.*

**Purpose of the Investigation:**

*In terms of Regulation 12.03.1 of the Civil Aviation Regulations (2011), 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 South African Civil Aviation Authority (SACAA), which are reserved.*


**Figure 1**: Picture of the Jabiru J160 with registration marks ZU-FAT
(Source: https://www.jabiru.co.za/aircraft/j160.html)

## 1. SYNOPSIS

1.1 On 19 November 2019, the pilot on-board a Jabiru J160 with registrations marks ZU-FAT took off from Runway 27 at Rhino Park Airfield in the Gauteng Province to conduct circuit exercises under visual flight rules (VFR) by day at the same aerodrome. The aircraft was operated under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.2 The pilot indicated that the first circuit was without incidents and, on the second circuit whilst the aircraft was on short finals, it experienced a sudden and severe downdraft which caused the aircraft to lose height. The aircraft touched down hard on the runway surface and veered off to the left of it.

1.3 The aircraft had damage to the nose landing gear, the left main landing gear and the left wingtip; there were no reported injuries after the incident.

1.4 The investigation revealed that as the aircraft was about to flare, it experienced a wind shear which caused the aircraft to land hard near the threshold before losing directional control and veering off to the left of Runway 27.

## 2 FACTUAL INFORMATION

### 2.1 History of Flight

2.1.1 On 19 November 2019 at approximately 0854Z, the pilot on-board a Jabiru J160 with registration marks ZU-FAT took off from Runway 27 at Rhino Park airfield in the Gauteng Province to conduct circuit exercises at the same airfield under visual flight rules (VFR) by day. The aircraft was operated under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

2.1.2 The pilot reported that the first circuit was uneventful, however, during the second circuit whilst on short finals for landing on Runway 27, the aircraft experienced a sudden and severe downdraft which caused the aircraft to lose height. The pilot stated that he then applied power to go around following the change in the approach path landing conditions. The aircraft was unable to gain altitude. This resulted in the aircraft touching down hard on Runway 27.

2.1.3 During the hard landing, the left main wheel broke off from the aircraft, resulting in the aircraft veering off to the left of Runway 27 before coming to a stop after impacting a perimeter fence 50 metres from the runway. The runway length of the airfield is 800 metres. The pilot reported that the aircraft touched down on the runway 20 metres from the beginning of the threshold, and that the aircraft was serviceable.

2.1.4 The aircraft sustained damages to the nose landing gear, the left main landing gear, the propeller tips and the left wingtip. There were no injuries reported.

2.1.5 The pilot obtained the weather report from the website. The weather report for that area at the time was indicated as: Surface wind: 310°/8kts, Temperature: 28°C, Visibility: 10km.

2.1.6 Rhino Park Airfield is unlicensed. A section of it has trees, and hangars are located to the right of threshold of Runway 27 (Figure 4).

2.1.7 The incident occurred during daylight at Global Positioning System determined to be 26˚16’6.34” South 030˚17’52.20” East, at an elevation of 5600 (feet) ft above mean sea level (AMSL).

**Figure 2:** The damaged aircraft.


**Figure 3:** The aircraft as it came to rest.


**Figure 4:** The red lines indicate the direction of the prevailing wind which could be affected by the huge trees and hangars.

## 2.2 **ADDITIONAL INFORMATION**

*2.2.1 Definition of Wind shear- Source:*

*https://www.skybrary.aero/index.php/Low_Level_Wind_Shear#Wind_Shear_on_the_Approach_and_Landing*

Wind shear is defined as a sudden change of wind velocity and/or direction. Wind shear may be vertical or horizontal, or a mixture of both types. ICAO defines the vertical and horizontal components of wind shear as follows:

*•Vertical wind shear is defined as change of horizontal wind direction and/or speed with height, as would be determined by means of two or more anemometers mounted at different heights on a single mast.*

*•Horizontal wind shear is defined as change of horizontal wind direction and/or speed with horizontal distance, as would be determined by two or more anemometers mounted at the same height along a runway.*

*2.2.2 Description: Low Level Turbulence, which may be associated with a frontal surface, with thunderstorms or convective clouds, with microbursts, or with the surrounding terrain, is particularly hazardous to aircraft departing or arriving at an aerodrome.*

## 3 FINDINGS

3.1 The pilot conducted his skill test on 24 October 2019. The pilot was issued a Private Pilot Licence (aeroplane) on 24 October 2019 with an expiry date of 31 October 2020. The pilot had 124.0 total flying hours and 80.0 hours on the aircraft type. The pilot flew 30 hours in the last 90 days (before the incident) of which 29 hours were on aircraft type.

3.2 The pilot was also issued a medical certificate (class 2) on 1 December 2017 with an expiry date of 31 December 2022; his licence was type endorsed.

3.3 The aircraft had a valid certificate of registration (CoR) which was issued on 7 August 2018

3.4 The aircraft sustained damage to the nose gear, left main gear, left wingtip and propeller during the impact sequence.

3.5 The last MPI (Mandatory Periodic Inspection) was carried out on 28 October 2019 at 3032 hours and the aircraft had a total of 3032.5 hours at the time of incident. The aircraft had flown 0.5 hours since its last MPI.

3.6 The current authority to fly was issued on 20 June 2019 with an expiry date of 30 June 2020.

3.7 The pilot obtained the weather report from a website and the report for that area at the time indicated the weather as: Surface wind: 310°/8kts, Temperature: 28°C, Visibility: 10km.

3.8 The aircraft was stable on approach for Runway 27 with the wind direction reported to be 310 at 8kts. As the aircraft was getting ready to flare, there was a change in wind speed conditions due to the trees and hangars that were affecting the wind flow from the right, resulting in the aircraft losing the airflow over the wings and the aircraft landing hard 20 metres from the threshold before veering off the runway.

3.9 The investigation revealed that as the aircraft was about to flare, it experienced a wind shear which caused the aircraft to land hard near the threshold before losing directional control and veering off to the left of Runway 27.

## 4 PROBABLE CAUSE

4.1 The aircraft was about to flare when it experienced a wind shear which caused the aircraft to land hard near the threshold before losing directional control and veering off to the left of Runway 27.

### 4.2 Contributory factors

4.2.1 None.

## 5 ORGANISATION

5.1 This was a private flight operated under the provisions of Part 94 of the CAR of 2011 as amended.

## 6 REFERENCES USED IN THE REPORT

6.1 https://www.skybrary.aero/index.php/Low_Level_Wind_Shear#Wind_Shear_on_the_Approach_and_Landing.

6.2 Jabiru J160 Pilots Operating Hand book.

## 7 SAFETY RECOMMENDATION

7.1 None.

## 8. Appendices

8.1 Appendix A: Jabiru cross wind limitations.

## This Report is issued by:

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

Appendix A

**Jabiru Aircraft** **SECTION 2**

**Model J160-D** **LIMITATIONS**

### 2.7 CROSSWIND

The maximum allowable crosswind velocity is dependent on many factors including:

- Aircraft limitations
- Pilot capability.
- Ground conditions – i.e. turbulence from structures or trees
- Wind state – i.e. steady wind or gusting / thermal conditions.

With average pilot technique, steady, direct crosswinds of up to 14 knots can be handled with safety.