SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

# LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

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| **Reference Number** | CA18/2/3/10328 | | | | | |
| **Classification** | Accident | **Date** | 9 June 2023 | | **Time** | 1130Z |
| **Type of Operation** | Agricultural Operations (Part 137) | | | | | |
| **Location** | | | | | | |
| **Place of Departure** | Private Airstrip in Waterval, Tzaneen, Limpopo Province | | **Place of Intended Landing** | Private Airstrip in Waterval, Tzaneen, Limpopo Province | | |
| **Place of Occurrence** | Private Airstrip in Waterval, Limpopo Province | | | | | |
| **GPS Co-ordinates** | Latitude | 23º45'8.12"S | Longitude | 030º 7'52.80"E | Elevation | 2 500 feet |
| **Aircraft Information** | | | | | | |
| **Registration** | ZS-IIN | | | | | |
| **Make; Model; S/N** | Cessna Aircraft Company; C182N (Serial Number: 182-60505) | | | | | |
| **Damage to Aircraft** | Substantial | | Total Aircraft Hours | | 5 491.5 | |
| **Pilot-in-command** | | | | | | |
| **Licence Type** | Commercial Pilot Licence (CPL) | | **Gender** | Male | **Age** | 40 |
| **Licence Valid** | Yes | **Total Hours** | 2 100 | **Total Hours on Type** | | 40 |
| **Total Hours 30 Days** | 3.3 | | **Total Flying on Type Past 90 Days** | | | 11.4 |
| **People On-board** | 1+1 | **Injuries** 0 | **Fatalities** | 0 | **Other (on ground)** | 0 |

**What Happened**

On Friday afternoon, 9 June 2023 at about 1130Z, a pilot and a passenger on-board a Cessna 182N aircraft with registration ZS-IIN were engaged in an aerial survey flight at a private farm in Waterval Airstrip in Tzaneen, Limpopo province when the accident occurred. The flight was intended for familiarisation on agricultural operations at the farm. The flight was conducted under visual meteorological conditions (VMC) by day and under the provision of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.

According to the pilot, a pre-flight inspection was conducted, and no anomalies were noted. There was a total of 60 US gallons of fuel on-board the aircraft at take-off. The aircraft was lined up on the grass-covered Runway 14, which comprised 675 metres (m) runway length and 2 500 feet (ft) field elevation. During take-off, the pilot selected 10º wing flaps and full throttle. Thereafter, the pilot rotated the aircraft at an airspeed of 60 miles per hour (MPH). However, shortly after rotation, the stall (audio) warning sounded. The pilot decided to abort the take-off and landed the aircraft back on the remainder of the runway surface. As there was insufficient runway length remaining to bring the aircraft to a stop, the aircraft careered along the overrun area and onto the road before it came to a stop on the side of the roadway that ran perpendicular to the runway.

The aircraft sustained substantial damage to the nose oleo strut, the propeller blades, and the fuselage. No person was injured during the accident sequence. According to the pilot, he lifted off prematurely due to the undulating runway.

The weather information was obtained from the pilot through the pilot questionnaire (Form CA 12-03) in which he stated that the wind was calm, and the temperature was 32ºC, with visibility greater than 10 kilometres (km).

**Figure 1:** The damaged propeller blade tips. (Source: Operator)

**Figure 2:** The damaged airframe. (Source: Operator)


**Figure 3:** The airstrip (white arrow indicating the direction of flight) and the embarkment on the runway end where the aircraft impacted the ground just before it careered onto the road. (Source: Google map)

The information below is an extract from the C182N Pilot's Operating Handbook (POH):

*Normal take-offs are accomplished with flaps Up, cowl flaps open, full throttle, and 2600 RPM (revolutions per minute). Reduce power to 23 inches (inch) of manifold pressure and 2450 RPM as soon as practical to minimize engine wear.*

*During take-off, a use of 20° (degrees) wing flaps: up will reduce the ground run total distance over the obstacle by approximately 20% (percent). Soft field take-offs are performed with 20° flaps by lifting the airplane off the ground as soon as practical in a slightly tail low attitude. However, the airplane should be levelled off immediately to accelerate to safe climb speed. If 20° flaps are used for take-off, they should be left down until all obstacles are cleared. To clear an obstacle with wing flaps 20°, an obstacle clearance speed of 63 miles per hour (MPH) should be used. If no obstructions are ahead, a best flap up rate of climb speed of 89MPH would be most efficient. These speeds vary slightly with altitudes, but they are close enough for average field elevations. Flaps deflections of 30° to 40° are not recommended at any time for take-off.*

**Findings**

1. The pilot had a Commercial Pilot Licence (CPL) which was initially issued by the Regulator on 4 March 2013. The pilot's licence was reissued on 12 August 2022 with an expiry date of 31 August 2023. The pilot had Night, Instrument and Instructor Grade 2 ratings in both single and multi-engine airplanes. The pilot accumulated a total of 2 100 hours flying experience, of which 40 hours were on the aircraft type.

2. The pilot had a Class 1 aviation medical certificate that was issued on 7 July 2022 with an expiry date of 31 July 2023. The aircraft type was endorsed on his licence.

3. The aircraft was issued a Certificate of Airworthiness (C of A) by the Regulator on 15 June 2022 with an expiry date of 30 June 2023. The last mandatory periodic inspection (MPI) conducted on the aircraft was certified on 12 May 2023 at 5 479.1 airframe hours. The Certificate of Release to Service (CRS) was issued on 12 May 2023 at 5 479.1 airframe hours with an expiry date of 11 May 2024 or at 5 579.1 airframe hours, whichever comes first.

4. The aircraft maintenance was conducted by an approved aircraft maintenance organisation (AMO) with an AMO certificate that was issued by the Regulator on 1 September 2022 with an expiry date of 31 August 2023.

5. The operator had an Air Operating Certificate (AOC) that was issued by the Regulator on 14 November 2022 with an expiry date of 30 November 2023. The aircraft was endorsed on the operator's operational specifications which was issued by the Regulator on 14 November 2022 with an expiry date of 30 November 2023 under Class 2 Aerial Work of the Air Service.

6. A review of the maintenance records revealed no anomalies on any of the aircraft systems that could have caused the accident.

7. The pilot stated that during the take-off run with the aircraft airspeed at 60 MPH and flaps set at 10º on the grass runway, he prematurely lifted off and the aircraft stalled, which led to a crash on the remaining runway and the aircraft careered along the overrun area and onto the road that ran perpendicular to the runway end before it came to a full stop. The aircraft impacted the runway embarkment and sustained substantial damage to the nose oleo strut, the propeller blades, and the fuselage. No person was injured during the accident sequence.

8. Fine weather conditions prevailed at the time of the flight.

9. There was sufficient fuel on-board the aircraft at take-off.

**Probable Course/s**

The pilot prematurely rotated the aircraft and it stalled, thereafter, he landed back on the remaining runway and the aircraft careered along the overrun area. It came to a stop on the roadway that ran perpendicular to the runway.

**Contributing Factor(s)**

The pilot used an incorrect technique for take-off with flaps set at 10º and airspeed at 60 MPH.

**Safety Action(s)**

None.

**Safety Message**

Pilots should adhere to and follow prescribed operating procedures as stipulated in the Pilot's Operating Handbook/s.

**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*** |
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| *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**