AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/2/3/10282	
Aircraft Registration	ZU-DPK	**Date of Accident**	7 April 2023			**Time of Accident**	1445Z
Type of Aircraft	TL-2000 Sting			**Type of Operation**		Private (Part 94)	
Pilot-in-command Licence Type	Commercial (A)			**Age**	55	**Licence Valid**	Yes
Pilot-in-command Flying Experience		**Total Flying Hours**	1 900	**Total Hours on Type**		7.5	
Last Point of Departure	Potchefstroom Aerodrome (FAPS), North West Province						
Next Point of Intended Landing	Potchefstroom Aerodrome (FAPS), North West Province						
Damage to Aircraft	Substantial						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Left side of Runway 03 at FAPS at GPS co-ordinates determined to be 26°40'13.16" South, 27°04'44.66" East at an elevation of 4 520 feet (ft)							
Meteorological Information	Surface Wind: 240°/01kt; Temperature: 28°C; Dew Point: 8°C; Visibility: 9999m						
Number of People On-board	1 + 0	**Number of People Injured**	0	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On Friday afternoon, 7 April 2023, a pilot on a Sting TL-2000 light sport aircraft with registration ZU-DPK took off from Runway 03 at Potchefstroom Aerodrome (FAPS) in the North West province with the intention to perform touch-and-go landings at the same aerodrome. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that after touchdown on Runway 03, the nose gear strut bent towards the right before it broke off, and the aircraft skidded on the bottom engine cowling as it veered off to the left of the runway and onto the grass where it came to a stop. The aircraft sustained substantial damage. The pilot exited the aircraft unassisted and unharmed.

Probable Cause

The pilot seemed to have landed the aircraft with the nose wheel not aligned to the direction of travel which caused the nose gear strut to bend due to overload; this contributed to loss of directional control to the left side of the runway before the nose wheel broke off.

SRP Date	11 July 2023	Publication Date	17 July 2023

Occurrence Details

Reference Number	**:** CA18/2/3/10282
Occurrence Category	**:** Accident (Category 1)
Type of Operation	**:** Private (Part 94)
Aircraft Registration	**:** ZU-DPK
Aircraft Make and Model	**:** TL Ultralight, TL-2000 Sting
Nationality	**:** South African
Place	**:** Left side of Runway 03, Potchefstroom Aerodrome (FAPS)
Date and Time	**:** 7 April 2023 at 1445Z
Injuries	**:** None
Damage	**:** Substantial

Purpose of the Investigation

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 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.

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.

Investigation Process

The Accident and Incident Investigations Division (AIID) was notified of the occurrence on 7 April 2023. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13. A notification was sent to the South African Civil Aviation Authority as the State of Registry and Operator in accordance with the CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The investigator-in-charge (IIC) did not dispatch to the accident site.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Aircraft — the TL-2000 Sting involved in this accident
   Investigation — the investigation into the circumstances of this accident
   Pilot — the pilot involved in this accident
   Report — this accident report

2. *Photos and figures used in this report were taken from different sources and may have been adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

Table of Contents

Executive Summary 1
Occurrence Details 2
Purpose of the Investigation 2
Investigation Process 2
Disclaimer 2
Contents Page 3
Abbreviations 4
1. FACTUAL INFORMATION 5
1.1. History of Flight 5
1.2. Injuries to Persons 5
1.3. Damage to Aircraft 5
1.4. Other Damage 6
1.5. Personnel Information 7
1.6. Aircraft Information 7
1.7. Meteorological Information 9
1.8. Aids to Navigation 9
1.9. Communication 9
1.10. Aerodrome Information 9
1.11. Flight Recorders 10
1.12. Wreckage and Impact Information 10
1.13. Medical and Pathological Information 10
1.14. Fire 10
1.15. Survival Aspects 10
1.16. Tests and Research 11
1.17. Organisational and Management Information 11
1.18. Additional Information 11
1.19. Useful or Effective Investigation Techniques 11
2. ANALYSIS 11
3. CONCLUSION 12
3.2. Findings 12
3.3. Probable Cause/s 13
3.4. Contributory Factor/s 13
4. SAFETY RECOMMENDATIONS 13
5. APPENDICES 13

Abbreviation	Description

AIID	Accident and Incident Investigations Division
A/C	Aircraft
ATF	Authority to Fly
ACCID	Accident
AGL	Above Ground Level
AMO	Aircraft Maintenance Organisation
AMSL	Above Mean Sea Level
°C	Degree Celsius
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulations
CVR	Cockpit Voice Recorder
C of R	Certificate of Registration
FAPS	Potchefstroom Aerodrome
FDR	Flight Data Recorder
Ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
IIC	Investigator-in-charge
KM	Kilometres(s)
Kts	Knot(s)
M	Metre
MHz	Megahertz
N/A	Not Applicable
QNH	Query: Nautical Height
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
VMC	Visual Meteorological Conditions
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Friday afternoon, 7 April 2023, a pilot on-board a Sting TL-2000 light sport aircraft with registration ZU-DPK took off on a private flight from Potchefstroom Aerodrome (FAPS) in the North West province with the intention to perform touch-and-go landings on the same aerodrome. Visual meteorological conditions (VMC) by day prevailed at the time of the flight which was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2. The pilot reported that he conducted the pre-flight inspection on the aircraft and no anomalies were noted. The aircraft had a total of 30 litres (l) of Avgas 100LL. After starting the engine, the pilot taxied the aircraft to the holding point of Runway 03 to perform the pre-departure run-up checks. After making sure that all the engine indications were within the normal operating limits, he opened the throttle to 5 400 revolutions per minute (RPM) and commenced with the take-off run. At approximately 65 knots (kts) indicated ground speed, the aircraft rotated and climbed to the circuit altitude of 1 000 feet (ft) above ground level (AGL). The pilot flew a circuit and, after touchdown on Runway 03, the nose gear strut bent to the right before it broke off. The propeller blades contacted the ground and the aircraft skidded on the bottom engine cowling as it veered off to the left of the runway. The aircraft then exited the runway and came to a stop on the grass area. The aircraft sustained substantial damage. The pilot switched off the master before exiting the aircraft unassisted and unharmed.

1.1.3. The accident occurred on Runway 03 at Global Positioning System (GPS) co-ordinates determined to be 26°40’13.16” South, 27°04’44.66” East at an elevation of 4 520ft.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	1	-	-	1	-
Total	**1**	**-**	**-**	**1**	**-**

1.3. Damage to Aircraft

1.3.1. The aircraft sustained substantial damage.

Figure 1: The aircraft post-accident. (Source: Pilot)

Figure 3: The aircraft on the left side of the runway. (Source: Pilot)

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

1.5.1 Pilot in command (PIC)

Nationality	South African	Gender	Male	Age	55
Licence Type	Commercial Pilot Licence				
Licence Issue Date	31 August 2022	Licence Expiry Date	31 August 2023		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night				
Medical Class	Class 1				
Medical Issue Date	27 February 2023	Medical Expiry Date	28 February 2024		
Limitations	None				
Previous Accidents	None				

Flying Experience:

Total Flying Hours	1 900
Total Hours Past 24 Hours	0
Total Hours Past 7 Days	7.5
Total Hours Past 90 Days	7.5
Total Hours on Type Past 90 Days	7.5
Total Hours on Type	7.5

1.6. Aircraft Information (Source: Pilot's Operating Handbook)

1.6.1. *The TL 2000 Sting is a two-seat, side-by-side, low-wing tricycle aircraft of conventional layout and composite construction manufactured by TL Ultralight of Hradec Kralove in the Czech Republic. The aircraft's landing gear comprises an elastomerically sprung oil-damped steerable nose gear of heat-treated 4130 steel and two fuselage-mounted glass fibre composite spring main landing gears. All tyres are 400 x 100. All wheels assembly have fairings, the nosewheel fairing extending to cover the leg as well. The aircraft is powered by the 100 horsepower (hp) Rotax 912-ULS engine and Woodcomp electrically actuated propellers.*

Figure 4: The file picture of the accident aircraft. (Source: www.flightzone.co.za)

Airframe:

Manufacturer/Model	TL Ultralight / Sting TL-2000	
Serial Number	04ST92	
Year of Manufacture	2004	
Total Airframe Hours (At Time of Accident)	754.9	
Last Annual Inspection (Date & Hours)	16 May 2022	750
Hours Since Last Annual Inspection	4.9	
CRS Issue Date	16 May 2022	
Authority to Fly (Issue Date & Expiry Date)	7 June 2022	30 June 2023
C of R (Issue Date) (Present Owner)	6 July 2022	
Type of Fuel Used	100LL	
Operating Category	Private (Part 94)	
Previous Accidents	Nil	

Engine:

Manufacturer/Model	Rotax 912 ULS
Serial Number	5644004
Part Number	Unknown
Hours Since New	754.9
Date of Last Overhaul	TBO Not reached
Hours Since Overhaul	Not reached

Propeller:

Manufacturer/Model	SR 2000 Woodcomp
Serial Number	E574
Part Number	Unknown
Hours Since New	754.9
Date of Last Overhaul	TBO not reached
Hours Since Overhaul	Not reached

1.7. Meteorological Information

1.7.1. The weather information below was obtained from the Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS), recorded on 7 April 2023 at 1400Z at Potchefstroom Automatic Weather Station (AWS). The weather station is located approximately 2 nautical miles (NM) from the accident site.

Wind Direction	240°	Wind Speed	01kt	Visibility	9999m
Temperature	28°C	Cloud Cover	CAVOK	Cloud Base	NIL
Dew Point	8°C	QNH	1016 hPa		

1.8. Aids to Navigation

1.8.1. The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no records indicating that the navigational equipment was unserviceable prior to the accident.

1.9. Communication

1.9.1. The aircraft was equipped with a standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the accident.

1.10. Aerodrome Information

Aerodrome Location	North West Province
Aerodrome Status	Licensed
Aerodrome GPS coordinates	26°40’13.16” South, 27°04’44.66” East
Aerodrome Elevation	4 520 feet
Runway Numbers	03/21
Dimensions of Runway Used	1765m x 30m
Heading of Runway Used	032°
Surface of Runway Used	Asphalt
Approach Facilities	None

1.11. Flight Recorders

1.11.1. The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the aircraft type.

1.12. Wreckage and Impact Information

1.12.1. The pilot completed a circuit and approached Runway 03 at 012° magnetic heading. After touchdown, the nose gear strut bent to the right before it broke off and the aircraft skidded on the bottom engine cowling as it veered off to the left of the runway and onto the grass where it came to a stop.

Figure 5: The nose gear strut. (Source: Pilot)

1.13. Medical and Pathological Information

1.13.1. Not applicable to this occurrence.

1.14. Fire

1.14.1. There was no evidence of a pre- or post-impact fire.

1.15. Survival Aspects

1.15.1 The accident was considered survivable as the cockpit and the cabin structure remained intact. The pilot had made use of the aircraft's equipped safety harnesses during the flight.

1.16. Tests and Research

1.16.1 Post-accident examination of the nose gear wheel assembly, the fork and strut were performed by the SACAA approved person (AP) at the aircraft maintenance organisation (AMO) facility; nothing abnormal was noted during this examination. The broken nose gear strut was taken to a metallurgist for visual inspection, and no evidence of fatigue-induced or inherent failures were noted.

1.17. Organisational and Management Information

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

1.17.2. The last annual inspection that was carried out on the aircraft prior to the accident flight was certified on 16 May 2022 at 750 airframe hours by an approved AMO. The accident occurred at 754.9 total airframe hours, meaning that a further 4.9 hours were flown with the aircraft since the last annual inspection.

1.17.3 The AMO was issued an approval certificate on 1 July 2022 with an expiry date of 30 June 2023.

1.18. Additional Information

1.18.1. None.

1.19. Useful or Effective Investigation Techniques

1.19.1. None.

2. ANALYSIS

2.1. General

From the available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any organisation or individual.

2.2. Analysis

<u>The Pilot</u>

2.2.1. The pilot had a Commercial Pilot Licence (CPL) that was issued on 31 August 2022 with an expiry date of 31 August 2023. According to the pilot questionnaire, the pilot had flown a total of 1 900 hours, of which 7.5 were on the aircraft type.

2.2.2. The pilot was issued a Class 1 aviation medical certificate on 27 February 2023 with an expiry date of 28 February 2024 with no restrictions.

Weather

2.2.3. The wind conditions at the time of the flight and during the subsequent landing were within limit of the aircraft.

The Aircraft

3.1.1. The aircraft was issued a Certificate of Release to Service (CRS) following the last annual inspection that was carried out on 16 May 2022 at 750 airframe hours. The aircraft accrued 4.9 airframe hours since the last annual inspection.

3.1.2. The aircraft's logbooks and maintenance history were scrutinised, and all documents were found to be in order. Post-accident examination of the failure of the nose gear strut indicated that the pilot seemed to have landed the aircraft with the nose wheel not aligned to the direction of travel. This caused it to bend from overload which led to the pilot's loss of directional control of the aircraft to the left of the runway. The aircraft departed the runway and onto the grass area; the nose gear strut broke in the process.

3. CONCLUSION

3.2. General

From the available evidence, the following findings, causes and contributing factors were made with respect to this accident. These shall not be read as apportioning blame or liability to any organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusion heading:

- **Findings —** are statements of all significant conditions, events, or circumstances in this accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions, or a combination thereof, which, if eliminated, avoided, or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability.

3.3. Findings

3.3.1. The pilot was initially issued a Commercial Pilot Licence (CPL) on 15 May 2004. His last licence validation was on 31 August 2022 with an expiry date of 31 August 2023.

3.3.2. The pilot was issued a Class 1 aviation medical certificate on 27 February 2023 with an expiry date of 28 February 2024.

3.3.3. The flight was conducted under visual flight rules (VFR) by day. The aircraft was operated under the provisions of Part 94 of the CAR 2011 as amended.

3.3.4. The aircraft was issued a Certificate of Registration (C of R) on 6 July 2022.

3.3.5. The aircraft was issued the Authority to Fly (ATF) certificate on 7 June 2022 with an expiry date of 30 June 2023.

3.3.6. The last annual inspection that was carried out on the aircraft before the accident was certified on 16 May 2022 at 750 airframe hours.

3.3.7. The aircraft was issued a Certificate of Release to Service (CRS) on 16 May 2022 with an expiry date of 16 May 2023 or at 821 airframe hours, whichever occurs first. The aircraft accrued 4.9 airframe hours since the last annual inspection.

3.3.8. The aircraft was maintained by the SACAA approved AMO. The AMO was issued an approval certificate on 1 July 2022 with an expiry date of 30 June 2023.

3.4. Probable Cause/s

3.4.1. The pilot seemed to have landed the aircraft with the nose wheel not aligned to the direction of travel which caused the nose gear strut to bend due to overload; this contributed to loss of directional control to the left of the runway before the nose wheel broke off.

4. SAFETY RECOMMENDATIONS

4.1. General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2. Safety Message

4.2.1 None.

5. APPENDICES

5.1. None.

This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa