

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10246



Figure 1: The Sling 4 TSi aircraft, ZU-PPA.
(Source: <https://www.avcom.co.za/phpBB3/viewtopic.php?t=225496>)

Description:

On Monday afternoon, 2 January 2023 a Sling 4 TSi aircraft with registration ZU-PPA took off from Tedderfield Aerodrome (FATA), on board was a pilot accompanied by a passenger. The aircraft was observed descending into Bass Lake when the lower aft fuselage and main wheels contacted the water. The aircraft touched the water a second time and was then observed pitching nose up at an approximate 90° angle to the water surface to avoid impact with a mountainous ridge ahead. The aircraft was observed to climb to a height of approximately 100 feet (ft) above the water level when the right wing dropped, and the aircraft impacted with the water in a nose down attitude. The wreckage sank to the bottom of the lake. The pilot and passenger were fatally injured. The flight was conducted under the provisions of Part 94 of the Civil Aviation Regulations (CARs), 2011.

Occurrence Details

Reference number : CA18/2/3/10246
Name of the owner : GR8 Imports (Pty) Ltd
Type of operation : Operation of Non-type Certified Aircraft (Part 94)
Manufacturer : Sling Aircraft (Pty) Ltd
Model : Sling 4 TSi
Nationality : South Africa
Registration marking : ZU-PPA
Place : Bass Lake near Henley-on-Klip, Gauteng Province
Date : 2 January 2023
Time : 1615Z

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 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**.*

Any person who has information concerning this accident should contact the Accident and Investigations Division (AIID) on AIIDinbox@caa.co.za

Investigation Process

AIID was informed of the accident by the Aeronautical Rescue Coordination Centre (ARCC) on the evening of 2 January 2023 involving a Sling 4 TSi that occurred at Bass Lake. The AIID has appointed an investigator-in-charge (IIC) and will lead the investigation and issue the final report.

The information contained in this preliminary report is derived from the factual information gathered during the on-going investigation into the occurrence. Later, an interim report or the final report may contain altered information in case new evidence is found during the ongoing investigation that require changes to the information depicted in this report.

Notes:

1. Whenever the following words are mentioned in this report, they shall mean the following:
 - Accident – this investigated accident
 - Aircraft – the Sling 4 TSi 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 obtained from different sources and may be adjusted from the original for the sole purpose of improving the clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or the addition of text boxes, arrows, or lines.

Disclaimer:

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Abbreviation	Description
	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
AoA	Angle of Attack
ARCC	Aeronautical Rescue Coordination Centre
ATF	Authority to Fly
CAR	Civil Aviation Regulations
C of R	Certificate of Registration
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
ECU	Engine Control Unit
EFIS	Electronic Flight Instrument System
FATA	Tedderfield Aerodrome
FDR	Flight Data Recorder
ft	Feet
GPS	Global Positioning System
hPa	Hectopascal
kt	Knot(s)
m	Metres
METAR	Meteorological Aerodrome Report
NTCA	Non-type Certified Aircraft
PIC	Pilot-in-Command
PPL	Private Pilot Licence
QNH	Barometric Pressure adjusted to Sea Level
SACAA	South African Civil Aviation Authority
SAPS	South African Police Services
SAWS	South African Weather Service
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

- 1.1.1 The owner of the Sling 4 TSi aircraft with registration ZU-PPA resides in Zimbabwe. The aircraft was flown by the owner from Mozambique to Tedderfield Aerodrome (FATA) in South Africa on 9 September 2022 as it was due for a maintenance inspection. After completion of the maintenance inspection on 16 September 2022 the owner was not allowed to fly the aircraft back to Zimbabwe as the Civil Aviation Authority Zimbabwe had placed a moratorium on South African registered Non-type Certified Aircraft (NTCA). This was due to a fatal accident in their country on 31 May 2022, involving the aircraft XtremeAir XA-41 with registration ZU-XAX, which crashed during an air show at Charles Prince Aerodrome, near Harare. On 30 December 2022 the owner of the aircraft informed the maintenance organisation in South Africa that he had obtained permission for the aircraft to enter Zimbabwean airspace and he will collect his aircraft on 3 January 2023.
- 1.1.2 During this time the aircraft was hangered at FATA, it was flown on a regular basis by three different pilots. According to the flight folio the owner flew the aircraft from FATA to Mozambique on 29 September 2022 and returned to FATA on 7 October 2022. The aircraft was then flown again by another pilot on an excursion to Botswana over the period of 9 to 14 November 2022. This was the last entry in the aircraft flight folio. According to the initial data that was retrieved from the Garmin G3X Touch Electronic Flight Instrument System (EFIS) unit the aircraft flew another four flights, including the accident flight. The flight time for these four flights was 8.0 hours.
- 1.1.3 On Monday afternoon, 2 January 2023 at approximately 1520Z a Sling 4 TSi aircraft with registration ZU-PPA took off from Tedderfield Aerodrome (FATA), on board the aircraft was the pilot accompanied by a passenger. This was a private flight conducted under the provisions of Part 94 of the Civil Aviation Regulations (CARs) 2011. The intention was to land back at FATA.
- 1.1.4 At approximately 1615Z an aircraft was observed by several people that were at Bass Lake at the time, descending from a south-easterly direction into the quarry. The aircraft was seen in a wings level attitude with the engine at maximum revolutions per minute (RPM) and at a high angle-of-attack (AoA). Approximately halfway into the quarry the aircraft was observed to contact the water, with the main wheels and tail section touching the water. The aircraft remained at a high AoA, to such an extent that the nose wheel and propeller did not contact the water. The aircraft then struck the water a second time approximately 100 meters (m) further on, still in the same attitude (high AoA). It got airborne again and was observed to pitch up into a vertical climb (90° angle) to avoid impact with the mountainous ridge ahead. An eyewitness said he could see the two occupants in the cockpit from where he was standing at the time. With the engine still running at maximum RPM the aircraft climbed to a height just short of the ridge where it

hangs on its propeller momentarily, and then the right wing dropped, and the aircraft crashed in a nose down attitude into the water.

1.1.5 From the eyewitness accounts the aircraft sank within 30 to 40 seconds after it impacted with the water. There was a swimmer and a boat that moved closer to see if they could render assistance, but the water surface where the aircraft went down was covered in fuel that leaked out of the aircraft and nobody had any diving gear with them.

1.1.6 The accident occurred during daylight at Bass Lake at a Global Positioning System (GPS) co-ordinate determined to be: 026°30'33.66" South 028°03'58.27" East, at an elevation of 4 850 feet (ft).



Figure 2: The accident site is indicated by the yellow pin ZU-PPA. (Source: Google Earth)

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total on Board	Other
Fatal	1	-	1	2	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	1	-	1	2	-

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during impact with the water.



Figure 3: The main wreckage after it was recovered from the lake.

1.4 Other Damage

- 1.4.1. An unknown amount of fuel from the aircraft was spilled into the lake as the aircraft sank to a depth of approximately 15m.

1.5 Personnel Information

1.5.1 Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	47
Licence Type	Private Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Test Pilot (Class 2), Tug Pilot and Tow Rating				
Medical Expiry Date	31 July 2024				
Restrictions	Special restriction(s) as per specified annual Audiologist Report (Noise Protection) and Annual Lung Function				
Previous Accidents	None				

1.5.2 Aeroplane Flying Experience

Two pilot logbooks were made available to the Investigator, the one logbook only reflected his helicopter flying experience and the second logbook some of his aeroplane flying experience. The aeroplane pilot logbook started with the first entry on 25 August 2016 and ended with the last entry on 17 November 2018.

His last skills test competency check report for private pilot licence (Aeroplane) form CA 61-03.4 was signed on 10 April 2021. On the document he has entered his total flying hours (aeroplane) to be 6 873.6. Attached to these documents were several pages of his pilot logbook (copies), which reflect the first entry to be on 7 March 2021 and the last on 5 May 2021. This logbook(s) could however not be located by the time this preliminary report was concluded.

According to the aircraft flight folio the last entry was on 14 November 2022 when the aircraft returned from an excursion in Botswana. It was determined with the assistance of a friend of the deceased pilot that he flew the last four flights with the aircraft, which were on 17 and 18 November 2022, 28 December 2022 and then on 2 January 2023 (accident flight). The total flight time of these four flights where 8.0 hours. This flight information was retrieved from the Garmin G3X Touch EFIS unit that was fitted to the aircraft as the primary flight display. It should be noted that the flying hours entered in the table below were based on factual information and might change as new evidence becomes available.

Flying Experience:

Total Hours	6 881.6
Total Past 90 Days	8.0
Total on Type Past 90 Days	TBA
Total on Type	TBA

1.5.3 Helicopter Flying Experience

According to one of the pilot logbooks he started with his flying training on helicopters on 24 May 2007 and completed his private pilot licence on 12 July 2007. He then flew helicopters until 25 July 2008 and then stop. According to his logbook he renewed his helicopter pilot licence in May 2013 and again stop flying helicopters on 12 April 2014. He revalidates his licence again on 9 May 2016 and flew subsequently 4.8 hours, with the last entry on 20 August 2016. He again revalidates his helicopter licence on 6 November 2019 for the last time. According to his logbook he had flown a total of 212.2 hours on helicopters (Robinson R22 and R44).

Total Hours Aeroplane	6 881.6
Total Hours Helicopter	212.2
Grand Total	7 093.8

1.6 Aircraft Information

1.6.1 Aircraft Description

The Sling 4 TSi is a four-seat light aircraft built by Sling Aircraft (Pty) Ltd designed for flight training, air taxi and personal use. The aircraft comprises all-metal, unpressurized, single piston-powered engine 4-stroke, 4-cylinder turbocharged with low-mounted wings and fixed tricycle landing gear. The occupants (maximum of four) can enter the cabin/cockpit by stepping on the wings from either side of the fuselage.

Airframe:

Manufacturer	Sling Aircraft (Pty) Ltd	
Model	Sling 4 TSi	
Serial Number	207s	
Year of Manufacture	2020	
Total Airframe Hours (at time of the accident)	585.7	
Last Maintenance Inspection (hours & date)	533.7	16 September 2022
Hours Since Last Inspection	52.0	
ATF (issue date)	29 January 2021	
ATF (expiry date)	31 January 2023	
C of R (issue date) (Present Owner)	21 January 2021	
MTOW	950kg (2 094 lbs)	
Type of fuel used	Avgas	

Engine:

Type	Rotax 915 iS 3A
Serial Number	9132608
Hours Since New	585.7
Hours Since Overhaul	Not yet reached

Propeller:

Type	Airmaster Whirlwind AP430CTF
Serial Number	1742
Hours Since New	585.7
Hours Since Overhaul	Not yet reached

1.7 Meteorological Information

1.7.1 An official weather report was obtained from the South African Weather Services (SAWS). The weather information entered in the table below was as captured at 1600Z at the Johannesburg Botanical Gardens (FAJB) automatic weather station as it was the

nearest weather station to the accident site. The large gap between the temperature and the dew point indicates a dry atmosphere where there is not much moisture that can lead to reasonable cloud development in the lower levels closer to the ground. The weather conditions were clear and favourable for flying.

Wind Direction	030°	Wind Speed	1 knot	Visibility	9999m
Temperature	23°C	Cloud Cover	None	Cloud Base	N/A
Dew Point	11°C	QNH	1020hPa		

1.8 Navigational Aids

1.8.1 The aircraft was equipped with standard navigational aids as per the requirements of the Regulator.

1.9 Communications

1.9.1 The aircraft was equipped with standard communication equipment as per the requirements of the Regulator.

1.10 Flight Recorders

1.10.1 This aircraft was not equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required in accordance with the Regulations.

1.10.2 The aircraft was equipped with an on-board Garmin G3X Touch EFIS unit. The unit sustained impact damage; however, the memory device remained intact. The data card that was retrieved from the unit contained no data on the last four flights that were flown with the aircraft. The aircraft was also equipped with a Garmin G5 unit, but the device had no volatile memory that could be downloaded.

1.11 Aerodrome Information

1.11.1. The accident did not occur at or near an aerodrome.

1.12 Wreckage and Impact Information

- 1.12.1 The aircraft lower fuselage was seen to make contact with the water twice at a high AoA. It then pitched up at a 90° angle to a height of approximately 100ft above the water surface, when the right wing dropped and the aircraft impacted with the water in a nose down attitude. From the time the aircraft impacted with the water until it was submerged was approximately 30 to 40 seconds. According to the divers the aircraft was located at a depth of approximately 15m where it was lying in an inverted attitude. No underwater footage was available due limited visibility conditions.
- 1.12.2 The wreckage was floated with the assistance of several divers and was very slowly towed to the shore with a boat from where it was lifted out of the water with the assistance of a mobile crane. Initial observations indicate severe deformation of the engine and nose section as well as the right wing of the aircraft. The three propeller blades were severed near the spinner, which is indicative of an engine that was producing power on impact. Aircraft integrity was not compromised and all flight controls were accounted for.



Figure 4: Police boat with several divers in the water during the process to float the wreckage.



Figure 5: Police boat slowly towing the wreckage to shore.



Figure 6: Wreckage being lifted from the water by a crane.

1.13 Medical and Pathological Information

1.13.1. By the time this report was concluded no medico-legal post-mortem information, nor any toxicological information was available yet.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 This was not a survivable accident.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

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.

1.17.2 The last maintenance inspection that was carried out on this aircraft prior to the accident flight was certified on 16 September 2022 at 533.7 airframe hours by an Approved aircraft maintenance organisation (AMO). A further 52.0 hours were flown with the aircraft since the inspection.

1.18 Additional Information

1.18.1. Bass Lake (Henley-on-Klip)

Bass Lake is a flooded Dolomite quarry, with a 10-hectare surface area. It has been used for more than 30 years as an outdoor recreational facility where people engage in water sport, freshwater fishing, scuba diving and camping.



Figure 7: A view of Bass Lake taken looking in a northerly direction.

1.18.2 Civil Aviation Regulations, 2011

The pilot was in contravention of both the Regulations reference below as he flew the aircraft in a manner that endanger the safety of the aircraft and persons therein; and cause the aircraft to endanger the safety of persons and property when he made the decision to descent into Bass Lake to such a height that the aircraft contacted the water.

Please find attached to this report as Appendix A, Part 91.01.10 (Endangering Safety) as well as Part 91.06.32 (Minimum Heights) of the CAR, 2011.

1.19 Useful or Effective Investigation Techniques

1.19.1. To be discussed in the final report, if any.

2. Findings

2.1 General

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

To serve the objective of this investigation, the following sections are included in the conclusions 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.

2.2 Findings

The pilot

- 2.2.1 The pilot was in possession of a Private Pilot Licence (PPL). Not all his pilot logbooks could be obtained by the time this preliminary report was concluded.
- 2.2.2 The pilot had a Class 2 aviation medical certificate that was issued on 1 July 2022 with an expiry date of 31 July 2024.
- 2.2.3 The pilot flew the aircraft in a manner, which endangered the safety of the aircraft, the occupants therein, as well as people and property on the ground.
- 2.2.4 The pilot did not adhere to the provisions of CAR Part 91.06.32 by flying the aircraft lower than 500ft over water, which was a hazard to the people on and next to the water as well as property.

The aircraft

- 2.2.5 The aircraft was issued with an Authority to Fly (ATF) on 21 January 2021 (was renewed on 25 February 2022) with an expiry date of 31 January 2023.
- 2.2.6 The aircraft was issued a Certificate of Registration on 21 January 2021.
- 2.2.7 The last maintenance inspection carried out on the aircraft prior to the accident flight was certified on 16 September 2022 at 533.7 airframe hours. The aircraft had accumulated a further 52.0 airframe hours since the said inspection.
- 2.2.8 A certificate of release to service was issued on 16 September 2022, the certificate lapses at a total of 633.7 hours of flight time or on 15 September 2023, whichever occurs first.

Environment

- 2.2.9 According to the eyewitnesses that were interviewed fine weather conditions prevailed at the time of the accident, which is consistent with the official weather report received from the SAWS.

3. On-going Investigation

- 3.1 The AIID investigation is on-going and will investigate other aspects of this accident, which may or may not have safety implications.

4. Safety Recommendation

- 4.1 It is recommended to the Director of Civil Aviation that Bass Lake area be declared a Restricted or Prohibited area, which ever be applicable. This is a confined area where people enjoy all kinds of water sport and fishing. It also surrounded by mining activity and other quarries.

5. Appendices

- 5.1 Appendix A (Civil Aviation Regulations, 2011)

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

Appendix A

Civil Aviation Regulations, 2011

Endangering safety

Part 91.01.10

(1) No person shall, through any act or omission—

- (a) endanger the safety of an aircraft or person therein; or
- (b) cause or permit an aircraft to endanger the safety of any person or property.

Minimum Heights

Part 91.06.32

(1) Except when necessary for taking off, or landing, or except with prior written approval of the Director, no aircraft—

- (a) shall be flown over congested areas or over an obvious open-air assembly of persons at a height less than 1 000 ft above the highest obstacle, within a radius of 2 000 ft from the aircraft;
- (b) when flown elsewhere than specified in paragraph (a), shall be flown at a height less than 500 ft above the ground or water, unless the flight can be made without hazard or nuisance to persons or property on the ground or water and the PIC operates at a height and in a manner that allows safe operation in the event of an engine failure; and
- (c) shall circle over or do repeated overflights over an obvious open-air assembly of persons at a height less than 3 000 ft above the surface.

(4) The PIC of an aircraft shall, in addition to the requirements of this regulation, comply with any altitude restrictions prescribed for the area or route to be operated within or over.