AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/2/3/10246	
Aircraft Registration	ZU-PPA	**Date of Accident**		2 January 2023		**Time of Accident**	1615Z
Type of Aircraft	Sling 4 TSi			**Type of Operation**		Private (Part 94)	
Pilot-in-command Licence Type	Private Pilot Licence			**Age**	47	**Licence Valid**	Yes
Pilot-in-command Flying Experience		**Total Flying Hours**		6 881.6		**Hours on Type**	Unknown
Last Point of Departure	Tedderfield Aerodrome (FATA), Gauteng Province						
Next Point of Intended Landing	Tedderfield Aerodrome (FATA), Gauteng Province						
Damage to Aircraft	Destroyed						
Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Bass Lake near Henley on Klip (GPS position: 26°30'33.66" South 028°03'58.27" East, elevation 4 850 feet)							
Meteorological Information	Surface wind, 030°/1kt; temperature, 23°C; dew point, 11°C; CAVOK						
Number of People On-board	1 + 1	**Number of People Injured**	0	**Number of People Killed**	2	**Other (On Ground)**	0

Synopsis

On Monday afternoon, 2 January 2023, a pilot and a passenger on a Sling 4 TSi aircraft with registration ZU-PPA took off on a private flight from Tedderfield Aerodrome (FATA) in Gauteng province with the intention to land back at the same take-off aerodrome. 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 aircraft was observed descending from a south-easterly direction into Bass Lake before the lower aft fuselage (tail section) and main wheels contacted the water surface. After the second contact with the water, the aircraft was observed pitching its nose up in an approximate 90º angle to the water surface to avoid impacting a mountainous ridge ahead of its path. It then climbed approximately 100 feet (ft) above the water level; however, the right wing dropped, and the aircraft impacted the water in a nose-down attitude and sank to the bottom of the lake. Both occupants were fatally injured, and the aircraft was destroyed.

Probable Cause

The pilot performed a manoeuvre that led the aircraft's landing gears and the tail section to make contact with the water surface; whereafter, the pilot pitched the aircraft's nose up to avoid impact with the high ground ahead of its path, which caused the aircraft to stall and crash into the water.

SRP date	16 January 2024	Publication date	18 January 2024

Occurrence Details

Reference Number	**:** CA18/2/3/10246
Occurrence Category	**:** Accident (Category 1)
Type of Operation	**:** Private (Part 94)
Name of Operator	**:** Private Flight
Aircraft Registration	**:** ZU-PPA
Aircraft Make and Model	**:** Sling 4 TSi
Nationality	**:** South African
Place	**:** Bass Lake near Henley on Klip, Gauteng Province
Date and Time	**:** 2 January 2023, 1615Z
Injuries	**:** Two fatalities
Damage	**:** Destroyed

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) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence on 2 January 2023. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions. An investigator was dispatched to the accident site for this accident.

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 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

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
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
EFIS	Electronic Flight Information System
FATA	Tedderfield Aerodrome
FDR	Flight Data Recorder
ft	Feet
GB	Gigabytes
hPa	Hectopascal
kt	Knot(s)
m	Metres
METAR	Meteorological Aerodrome Report
NTCA	Non-type Certified Aircraft
PIC	Pilot in Command
POH	Pilot Operating Handbook
PPL	Private Pilot Licence
QNH	Barometric Pressure Adjusted to Sea Level
SACAA	South African Civil Aviation Authority
SAPS	South African Police Service
SAWS	South African Weather Service
UTC	Co-ordinated Universal Time
VFR	Visual Flight Rules
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 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 Zimbabwe on 31 May 2022 which involved the XtremeAir XA-41 aircraft with registration ZU-XAX that crashed during the 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 from the Civil Aviation Authority of Zimbabwe for the aircraft to enter Zimbabwean airspace and that he will collect his aircraft on 3 January 2023.

1.1.2 During this time, the aircraft was hangered at FATA, and 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 from 9 to 14 November 2022. This was the last entry in the aircraft's flight folio. According to 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 total flight time for these four flights was 8.0 hours.

1.1.3 On Monday afternoon, 2 January 2023 at approximately 1520Z, the aircraft took off from Tedderfield Aerodrome (FATA) with the pilot and the passenger on-board and with the intention to land back at FATA. This was a private flight conducted under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011. The intention was to land back at FATA.

1.1.4 At approximately 1615Z, the aircraft was observed by eyewitnesses at Bass Lake when it descended from a south-easterly direction on the side of the quarry. The aircraft was seen in a wings level attitude with the engine at maximum revolutions per minute (RPM) and at a steep nose-up attitude. Approximately halfway into the quarry, which had a water surface length of approximately 450 metres (m), the aircraft was observed contacting the water surface with the main wheels and with the tail section also touching the water surface. The aircraft remained in a steep nose-up attitude to an extent that the nose wheel and the propeller did not contact the water. The aircraft then struck the water surface a second time, approximately 100m further on, still in the same attitude. Thereafter, it got airborne and was observed pitching up in a vertical climb (90º angle) to avoid impact with the mountainous ridge ahead of its path. One of the eyewitnesses stated that 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 and hanged on its propeller momentarily before the right wing dropped. The aircraft continued in that trajectory until it crashed into the water in a nose-down attitude.

1.1.5 From the eyewitnesses' accounts, the aircraft sank within 30 to 40 seconds after it impacted the water. There was a swimmer and a boat with people on-board who approached the scene to render assistance, but the water surface where the aircraft went down was covered in fuel that leaked out of the aircraft's fuel tanks. None of the first responders were equipped with recovery gear.

1.1.6 The accident occurred during daylight at Bass Lake at Global Positioning System (GPS) co-ordinates determined to be 26°30'33.66" South 028°03'58.27" East, at an elevation of 4 850 feet (ft).

Figure 1: The accident site indicated by the yellow pin. (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**	**-**

Note: Other means people on the ground.

1.3 Damage to Aircraft

1.3.1 The aircraft was destroyed during impact with the water.

Figure 2: The wreckage after it was recovered from the lake.

1.4 Other Damage

1.4.1 Minor environmental damage was caused when the fuel in the aircraft's tanks leaked into the lake.

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 report				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

1.5.2 Aeroplane Flying Experience

Two pilot's logbooks were made available to the investigator; the one logbook only reflected the pilot's helicopter flying experience, and the second logbook showed the pilot's aeroplane flying experience. The pilot's 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 the Private Pilot Licence (Aeroplane) form CA 61-03.4 was signed on 10 April 2021. On the document, he had entered his total flying hours (aeroplane) as 6 873.6. Attached to these documents were several pages of the (pilot) copies of the logbook which reflected the first entry as 7 March 2021 and the last entry as 5 May 2021. This logbook(s) was not located at the time of conclusion of this report.

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 on the aircraft on 17 and 18 November 2022, 28 December 2022 and 2 January 2023 (accident flight). The total flight time of these four flights was 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 the information gathered during the initial phase of the investigation. There was no new information available by the time this report was concluded. Logging the flight time is a requirement as per Part 61.01.8(1) of the CAR.

Flying Experience:

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

1.5.3 Helicopter Flying Experience

According to one of the pilot's logbooks, he started with training on helicopters on 24 May 2007 and was issued the Private Pilot Licence (PPL) on 12 July 2007. He then flew helicopters until 25 July 2008. Thereafter, he renewed his PPL (Helicopter) in May 2013 and flew helicopters until 12 April 2014. He revalidated his licence again on 9 May 2016 and subsequently flew 4.8 hours, with the last entry recorded on 20 August 2016. Thereafter, he revalidated his PPL (Helicopter) on 6 November 2019. According to the logbook, he had flown a total of 212.2 hours on helicopters (Robinson R22 and R44).

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

1.6 Aircraft Information

1.6.1 Aircraft Description

(Source: Pilot's Operating Handbook, Section 1, General Information)

The Sling 4 TSi is a four-seat (two pairs of side-by-side seats), single-engine, fixed tricycle undercarriage (with steerable nose wheel), aluminium aircraft of semi-monocoque construction with a conventional low wing design. The aircraft is intended chiefly for recreational and cross-country flying. It is not intended for aerobatic operation.

Figure 3: The file picture of the Sling 4 TSi aircraft, ZU-PPA. (Source: https://www.avcom.co.za/phpBB3/viewtopic.php?t=225496)

Airframe:

Manufacturer/Model	Sling Aircraft (Pty) Ltd / Sling 4 TSi	
Serial Number	207s	
Year of Manufacture	2020	
Total Airframe Hours (at time of accident)	585.7	
Last Inspection (hours & date)	533.7	16 September 2022
Airframe Hours Since Last Inspection	52.0	
ATF (Issue Date & Expiry Date)	29 January 2021	31 January 2023
C of R (Issue Date) (Present Owner)	21 January 2021	
MTOW	950kg (2 094lbs)	
Type of Fuel Used	Avgas	
Previous Accidents	None	

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

Engine:

Manufacturer/Model	Rotax 915 iS 3A
Serial Number	9132608
Hours Since New	585.7
Hours Since Overhaul	TBO not yet reached

Propeller:

Manufacturer/Model	Airmaster Whirlwind AP430CTF
Serial Number	1742
Hours Since New	585.7
Hours Since Overhaul	TBO not yet reached

1.7 Meteorological Information

1.7.1 The official weather report was obtained from the South African Weather Service (SAWS). The weather information entered in the table below was 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 indicated a dry atmosphere where there was not much moisture that could have led to a reasonable cloud development in the lower levels closer to the ground. The weather conditions were clear and favourable for flying.

Wind Direction	030º	Wind Speed	1 kt	Visibility	9999 m
Temperature	23ºC	Cloud Cover	None	Cloud Base	CAVOK
Dew Point	11ºC	QNH	1020 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 flight.

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 flight.

1.10 Aerodrome Information

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

1.11 Flight Recorders

1.11.1 The aircraft was not 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.

1.11.2 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 on the aircraft. The aircraft was also equipped with a Garmin G5 unit, but the device had no volatile memory that could be downloaded. Both units were taken to an approved Garmin approved avionics facility to assist with possible data retrieval. It was possible to retrieve data of the last four flights from the memory data device of the Garmin G3X unit. The picture below was taken during the process.

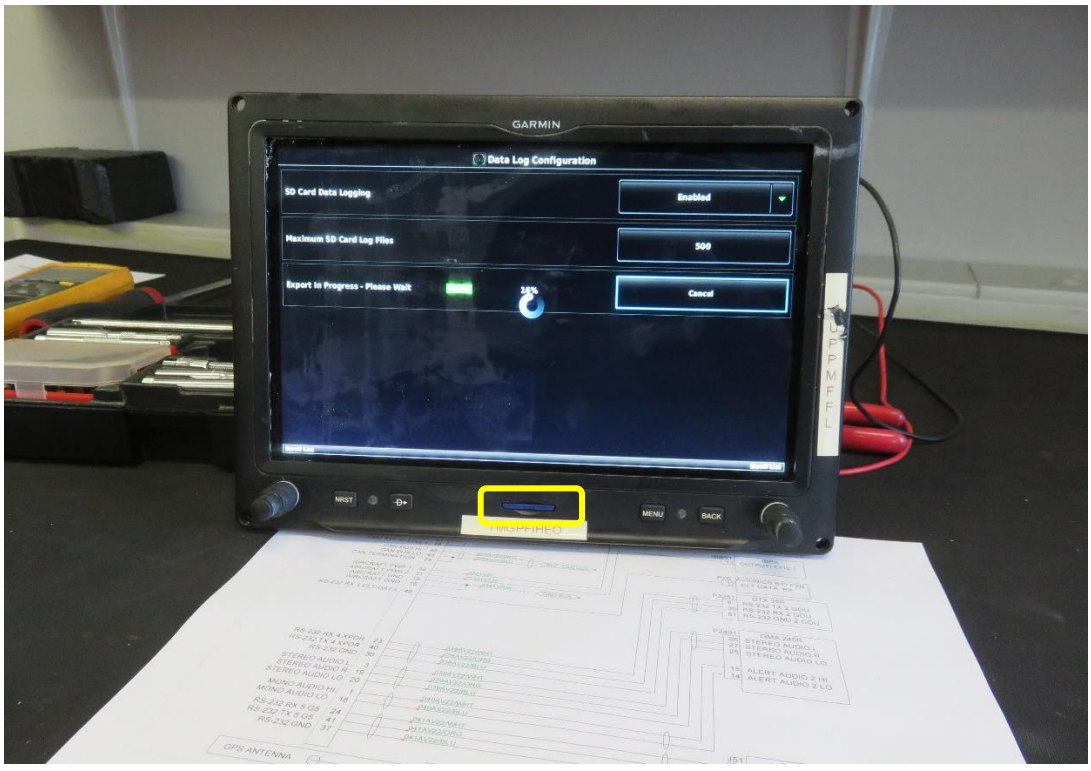

Figure 4: The Garmin G3X Touch EFIS unit with the data card installed (yellow window). This is the actual unit that was in the aircraft at the time of the accident flight.

1.11.3 The pilot was wearing a Garmin D2 Mach 1 wristwatch, unit number 3415575589. The watch, which is water-resistant, was recovered and was made available to the investigator. The watch contained 15 Gigabytes (GB) of data, which included multiple flights inclusive of the

accident flight (see Figure 6). The data from the watch provided eight (8) parameters for each flight, captured at 1 second intervals. For the accident flight, 2 756 data entries (lines) were available.

(a) (b)

Figure 5: The wristwatch (a), and the download cable attached to it (b).

1.11.4 From the flight data, it was possible to trace the track the aircraft flew. After take-off, it headed south and was abeam Riviera on the Vaal Golf Course, thereafter, it proceeded in a west / south-westerly direction along the Vaal River. During this leg, the pilot executed several aerobatic manoeuvres (i.e., Loop, wingover). In the area of Vaal Rus where the river makes a 90º turn to the north, the aircraft made a 180º turn and followed the river until abeam Loch Vaal. From there, the flight continued north-easterly heading back towards FATA (see Figure 6, yellow window). The aircraft was then seen turning right and continued with the flight in a southerly direction. The aircraft followed Klipriver for a short distance and then executed a 180º turn to the right, flying in a northerly direction. Shortly after this turn, the aircraft descended into the Bass Lake quarry where it contacted the water surface twice and, later, crashed into the lake.

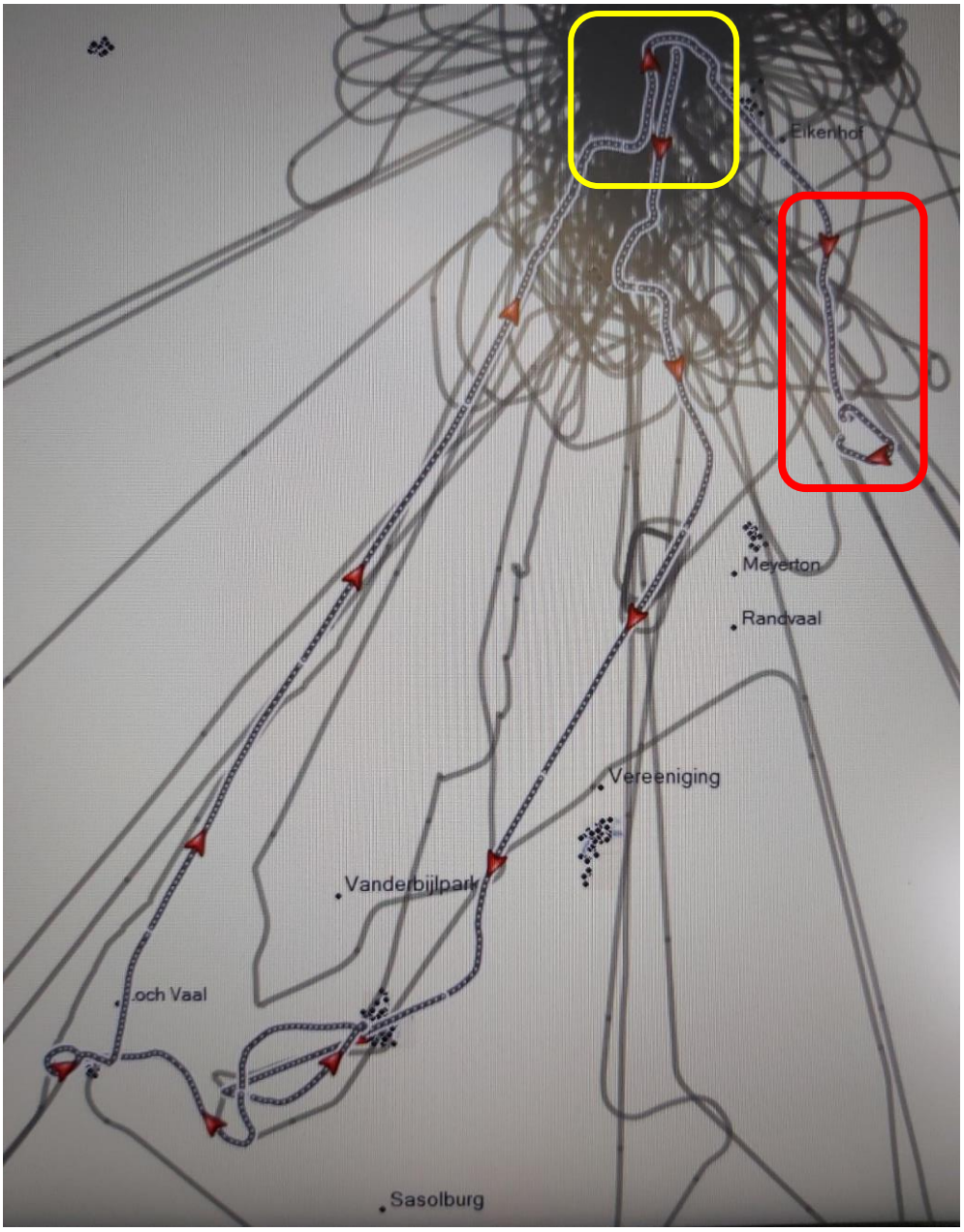

Figure 6: The dotted line with the red arrows indicates the flight route.
The last phase of the flight is captured in the red window.

1.12 Wreckage and Impact Information

1.12.1 The aircraft's lower fuselage contacted the water surface twice at a high nose-up attitude. It then pitched up in a 90º angle to approximately 100ft above the water surface, followed by the drop of the right wing before it impacted the water in a nose-down attitude. The time the aircraft impacted the water until it submerged was approximately 30 to 40 seconds. According to the divers, the aircraft was located at a depth of approximately 15m (±50 feet); it was found in an inverted attitude. No underwater footage was available due to limited visibility conditions.

1.12.2 The wreckage was floated with the assistance of several divers and was slowly towed to the shore using a boat after it was lifted out of the lake with a mobile crane. Initial observations of the wreckage indicated severe deformation of the engine and nose section, as well as the right wing. The three propeller blades were severed near the spinner, indicative of an engine that was producing power on impact. The integrity of the aircraft was not compromised, and all the flight controls were accounted for.

Figure 7: Police boat with divers in the water during the recovery process.

Figure 8: The police boat slowly tows the wreckage to shore.

Figure 9: The mobile crane lifts the wreckage out of the water.

Figure 10: The wreckage layout post-recovery with the engine removed.

Figure 11: The view of the propeller with all three blades severed near the hub assembly.

1.13 Medical and Pathological Information

1.13.1 The medico-legal postmortem reports stated the cause of death for both occupants as severe blunt force trauma (unnatural).

1.13.2 By the time this report was concluded, no toxicological reports were available for both occupants. Should the reports be made available after this investigation report has been published and new and significant evidence becomes available, the investigation will be reopened.

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 accident was not survivable due to the impact attitude of the aircraft which caused blunt force injuries to both the pilot and the passenger.

1.16 Tests and Research

1.16.1 None.

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 conducted on the 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.

The dimensions of the quarry that is covered by water is approximately 450m long and 250m wide. It is surrounded by high ground which averages 25m (80ft) higher than the water level. On the northern side of the lake, the high ground is (at some places) up to 40m (131ft) above the water level, which was the direction the aircraft was flying when it contacted the water surface. The yellow arrow in Figure 12 indicates the direction the aircraft was flying when it contacted the water surface in the Bass Lake quarry.

Figure 12: A view of the Bass Lake looking north.

1.18.2 Pilot's Operating Handbook (POH)

Section 1, General Information

Note: The second sentence in the last paragraph state: *"It is not intended for aerobatic operation".*

Part 1 of the Civil Aviation Regulations, Definitions and Abbreviations

Definition of:

"aerobatic flight" *means manoeuvres intentionally performed by the PIC of an aircraft and involving an abrupt change in attitude of the aircraft, an abnormal attitude or an abnormal variation in speed, not necessary for normal flight;*

A video posted on the social media platform YouTube depicted the pilot rolling the aircraft. *(The link: youtube.com/watch?v=zx6yNLOXVxA was removed from the social media platform in November 2023).*

From the video footage, which was 21 minutes and 34 seconds long, at 10 minutes and 20 seconds the pilot executed a roll with the aircraft with another pilot and a camera man at the back on-board. This manoeuvre falls within the definition of an aerobatic flight.

1.1 Introduction to Airplane

The Sling 4 TSi is a four-seat *(two pairs of side-by-side seats)*, single-engine, fixed tricycle undercarriage *(with steerable nose wheel)*, aluminium aircraft of semi-monocoque construction with a conventional low wing design.

The aircraft design is based upon the FAA FAR 23 certification standards and has a maximum all up weight of 950 kg (2,095 lb). Notwithstanding that the aircraft design is based upon the FAA FAR 23 certification standards, the aircraft has not been proven to comply with all the provisions of the standard.

The Sling 4 TSi is intended chiefly for recreational and cross-country flying. It is not intended for aerobatic operation. This Pilot Operating Handbook has been prepared to provide pilots with information for the safe and efficient operation of the Sling 4 TSi.

Section 2, Limitations, Prohibited Manoeuvres, Warning

2.10 Prohibited Manoeuvres

The Sling 4 TSi is approved for normal manoeuvres, including the following:

- Steep turns not exceeding 60°
- Lazy Eights
- Chandelles
- Stalls (not including whip stalls)

WARNING

Aerobatics and intentional spins are prohibited.

1.18.3 Civil Aviation Regulations, 2011

The pilot was in contravention of both the Regulations referenced below as he flew the aircraft in a manner that endangered the safety of the aircraft and the persons therein, and caused the aircraft to endanger the safety of the persons and property when he descended into Bass Lake to a height that the aircraft contacted the water.

Attached to this report is 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 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

2.2.1 Pilot

The pilot had a valid Private Pilot Licence (PPL) at the time of the flight. According to available information on social media, he was also the test pilot for the aircraft factory as he was employed by the company at the time of the accident flight. The pilot was issued a test pilot rating (Class 2) by the Regulator; however, there is no evidence of the pilot attending any formal test pilot training. The pilot was well acquainted with the aircraft type and its limitations. He performed aerobatic manoeuvres with the aircraft which was in contradiction to the limitations (of the aircraft) as prescribed in the POH; thus, he exceeded the aircraft's flight envelope and limitations that were published in the POH.

2.2.2 Aircraft

The aircraft was maintained in accordance with the required maintenance schedule and no structural failure was observed that could have contributed or have caused the accident. It was evident that the engine was delivering power during the critical phase of the flight as the pilot would not have been able to fly the aircraft out of the predicament he found himself in

after the aircraft's contact with the water surface twice. The deformation visible on the three propeller blades supports this observation.

2.2.3 Environment

Fine weather conditions prevailed at the time of the flight; the weather had no bearing to this accident. According to eyewitnesses who were at Bass Lake at the time, there was no wind, and blue skies prevailed. The video footage that was taken at the lake after the aircraft impacted the water supports these observations.

Bass Lake is an old mine quarry that filled with water over time and was used as a recreational resort for various water sports. It is surrounded by mountainous terrain. The reason the pilot elected a confined area to perform a dangerous manoeuvre could not be determined.

2.2.4 Conclusion

There is no logical explanation as to why the pilot opted to perform this dangerous manoeuvre which led to the aircraft making contact with the water. It could not be established if the pilot was testing his own abilities and/or the flight envelope of the aircraft or both. From the track that was flown (downloaded from his wristwatch) it could be seen that the pilot flew back to FATA after flying for some time along the Vaal River. When he was in proximity of the aerodrome, the pilot must have decided to extend the flight with the intent to conduct a very low fly pass or some manoeuvre at Bass Lake. Due to the limited space and the rate of descent, he most probably misjudged the distance and the aircraft made contact with the water surface. However, contact with the water surface was much more severe than he might have anticipated, and the main wheels also contacted the water the first time. The pilot was able to partially recover from the situation using the available engine power; however, this action resulted in a substantial decay in airspeed and the aircraft contacted the water surface for the second time. Again, he was able to recover the aircraft but found himself in a predicament where he had to clear a mountainous terrain straight ahead. At this stage of the flight, he had run out of options. Within a split second, he made the decision to pitch the aircraft's nose up, which resulted in a stall and the aircraft crashed nose-down into the lake. Both occupants succumbed to severe blunt force trauma during impact with the water.

3. CONCLUSION

3.1 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.

3.2 Findings

The pilot

3.2.1 The pilot had a Private Pilot Licence (PPL). Not all his pilot logbooks could be obtained by the time the final report was concluded.

3.2.2 The pilot had a Class 2 aviation medical certificate that was issued on 1 July 2022 with an expiry date of 31 July 2024.

3.2.3 The pilot flew the aircraft in a manner that endangered the safety of the aircraft, the occupants therein, as well as people and property on the ground.

3.2.4 The pilot did not adhere to the provisions of the CAR Part 91.06.32 by flying the aircraft lower than 500ft over water, which was a hazard to the people in and next to the water edge, as well as property.

3.2.5 The pilot did not adhere to the provisions of the CAR Part 61.01.8(1) by not updating his pilot logbook as per the requirements of this part.

3.2.6 The pilot displayed poor airmanship.

The aircraft

3.2.7 The aircraft was issued an Authority to Fly (ATF) on 21 January 2021. The latest renewed licence was issued on 25 February 2022 with an expiry date of 31 January 2023.

3.2.8 The aircraft was issued a Certificate of Registration on 21 January 2021.

3.2.9 The last maintenance inspection conducted 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.

3.2.10 The Certificate of Release to Service was issued on 16 September 2022 with an expiry date of 15 September 2023 or at 633.7 hours of flight time, whichever occurs first.

Environment

3.2.11 According to the eyewitnesses who were interviewed, fine weather conditions prevailed at the time of the flight, which was consistent with the official weather report received from the SAWS.

3.2.12 Bass Lake is an old mine quarry that filled with water over time, and was not a conducive area for the dangerous manoeuvre the pilot performed.

3.3 Probable Cause/s

3.3.1 The pilot performed a manoeuvre that led the aircraft's landing gears and the tail section to make contact with the water surface; whereafter, the pilot pitched the aircraft's nose up to avoid impact with the high ground ahead of its path, which caused the aircraft to stall and crash into the water.

3.4 Contributory Factor

3.4.1 The pilot displayed a total disregard for the safe operation of the aircraft.

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 Pilots are reminded to follow the minimum height as published in the AIPs and regulations. Restricted or prohibited flying area, whichever is applicable as some areas like Bass Lake are confined areas where people engage in various water sports and fishing. It is also surrounded by mining activity and other quarries and is not an area where low flying aircraft should be accommodated.

5. APPENDICES

5.1 Appendix A (Civil Aviation Regulations 2011 extract)

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.