

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10221



Figure 1: A gyrocopter similar to the accident one. (Source: Pilotspost.com)

Description:

On 30 November 2022, a pilot and a passenger on-board a Gyrocopter ELA 08 with registration ZU-DYV were engaged in circuit flying on Runway (RWY) 03 at Springs Aerodrome (FASI) in Gauteng province. During a late right base leg whilst the gyrocopter was airborne for approximately 45 minutes and overhead the quarry in Brakpan, the engine stopped without warning. The pilot decided to perform a forced landing on the road adjacent to the quarry. During the landing roll, the main rotor blades struck the trees and one of the blades separated from the hub. This resulted in the gyrocopter rolling over twice along its lateral axis before coming to rest on its left side. Both occupants were injured during the accident sequence—the pilot was airlifted to the hospital whilst the passenger was transported by ambulance.

Occurrence Details

Reference Number : CA18/2/3/10221
Occurrence Category : Category 1
Type of Operation : Private (Part 94)
Name of Operator : Gregory Lightfoot
Gyrocopter Registration : ZU-DYV
Gyrocopter Make and Model : ELA 08
Nationality : South African
Place : Brakpan
Date and Time : 30 November 2022 at 0800Z
Injuries : Serious and minor injuries
Damage : Substantial damage

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 involving a Gyrocopter ELA 08, which occurred in Brakpan, Gauteng Province, on 30 November 2022 at 0800Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions.

The AIID appointed an investigator-in-charge who dispatched to the accident site to begin a full investigation. Notifications were sent to the State of Registry/Operator in accordance with CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The AIID will lead the investigation and issue the final report of this accident in accordance with CAR 2011 Part 12 and ICAO Annex 13.

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

The AIID reports are made available to the public at:

<http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx>

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*

Accident — this investigated accident

Aircraft — the ELA 08 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
AP	Approved Person
CCM	Conventionally Controlled Microlight
C of R	Certificate of Registration
CHT	Cylinder Head Temperature
CRS	Certificate of Release to Service
E	East
EMS	Emergency Medical Service
FASI	Springs Aerodrome
ft	Feet
hPa	Hectopascal
KPH	Kilometre per Hour
kt	Knots
m	Metres
METAR	Meteorological Aerodrome Report
MPH	Miles per Hour
NPL	National Pilot Licence
SACAA	South African Civil Aviation Authority
SAPS	South African Police Service
SAWS	South African Weather Service
S	South
RWY	Runway
QNH	Altitude Above Mean Sea Level
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1. On Wednesday, 30 November 2022, a pilot and a passenger on-board a Gyrocopter ELA 08 with registration ZU-DYV were engaged in circuit flying on Runway (RWY) 03 at Springs Aerodrome (FASI), Gauteng province. Fine weather conditions prevailed at the time of the flight. The flight was conducted in visual meteorological conditions by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.
- 1.1.2. According to the eyewitnesses who were at the quarry, they saw a gyrocopter overhead the quarry which banked left from where they were situated. Moments later, they decided to get up, making their way to the road that was adjacent to the quarry, and that is when they saw the same gyrocopter flying past above them and about to land on the road. At that time, there was no sound emanating from the gyrocopter. During the landing roll, they witnessed the main rotor blades strike the tree on the left-side of the road. The gyrocopter rolled over twice before it came to rest on its left side. They then ran towards the gyrocopter and found the occupants still strapped to their seats. The passenger was seated in the front seat was able to speak whilst the pilot seated in the back seat was unable to move and complained of pain; one of the eyewitnesses cut the seat belt with a sharp object to free the pilot. Thereafter, they assisted both out of the gyrocopter and sat them under a tree. The eyewitnesses stated that there was a strong smell of fuel and they identified fuel leaking out of the gyrocopter. A fire-extinguisher was sourced from a vehicle closer to the accident site to use in case a post-impact fire erupted. The Emergency Medical Services (EMS) personnel and the South African Police Service (SAPS) officials were dispatched to the scene. The EMS personnel administered first aid to the injured and the SAPS personnel secured the scene.
- 1.1.3. According to the pilot, prior to the flight, the gyrocopter was topped up with 25 litres of unleaded fuel which brought the total to 50 litres in the tank. The fuel was checked for water and sediments, and it was found to be clean. The passenger sat in the front seat as he had not flown in a while. *The passenger owned the gyrocopter, and had a gyrocopter Student Pilot Licence (SPL).* The passenger had started the engine without difficulty. Thereafter, the pilot taxied the gyrocopter and, after lining up on RWY 03, he took off and climbed as expected. The duo conducted two touch-and-go landings on RWY 03. However, they noticed that during the second touch-and-go landing, the wind direction had changed which necessitated a runway change to Runway 21. Whilst on the right downwind for Runway 21, there were three other aircraft in the circuit in front of the gyrocopter. Whilst turning to base leg overhead the quarry, the engine stopped without

warning. The pilot spotted a road on which to perform a forced landing. During approach, he leaned out to assess the road and spotted trees on the left-side of the road. He steered the gyrocopter to the right and side-slipped to avoid the trees. During touchdown, the main rotor blades struck a tree and, as a result, one of the main rotor blades separated from the hub. After impact, the pilot stated that he could not free himself from the seat belt and an eyewitness assisted him out of the gyrocopter and sat him under a tree. He further stated that one of the pilots who was flying the circuit on Runway 21 flew towards their last position after failing to hear the gyrocopter's transmissions. He spotted the gyrocopter's crash site and radioed for assistance.

1.1.4. The gyrocopter was substantially damaged. The pilot sustained serious injuries whilst the passenger had minor injuries. According to the SAPS, an EMS helicopter was dispatched to the scene and the pilot was air-lifted to a hospital in Alberton, Gauteng province. The passenger was transported by ambulance to a nearby hospital in the East Rand.

1.1.5. The accident occurred at Global Positioning System (GPS) determined to be 26°13'03.8" South and 28°23'11.5" East, at an elevation of 5 268 feet (ft).

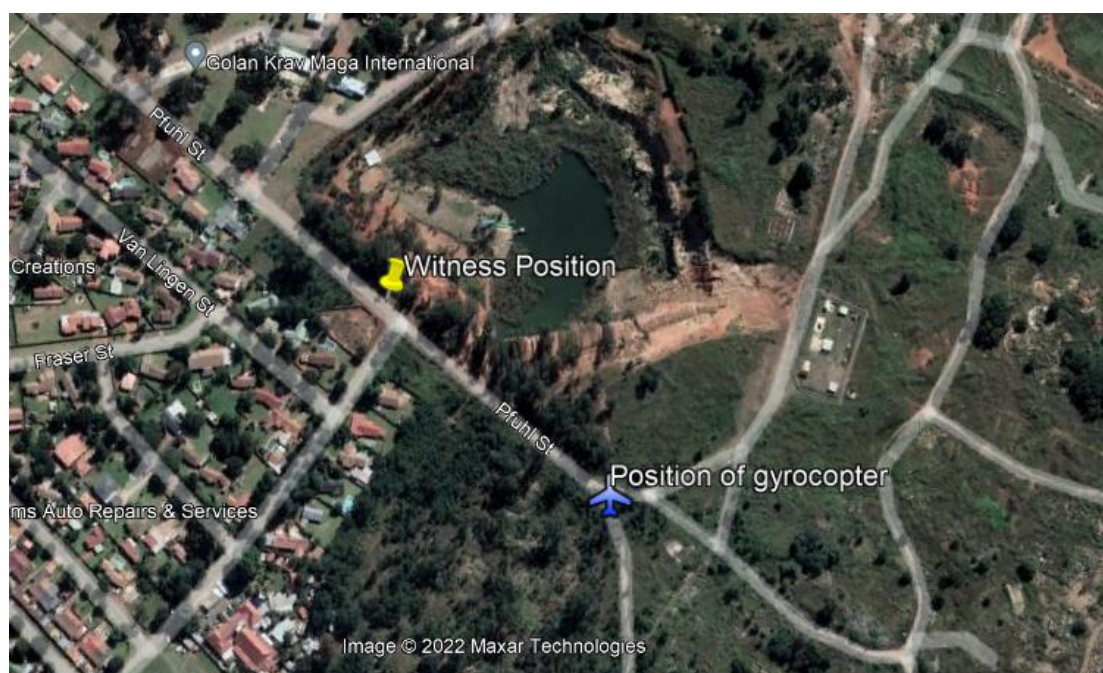


Figure 2: An overview of the accident site. (Source: Google Earth overlay)

1.2. **Injuries to Persons**

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	1	-	1	2	-
Minor	-	-	-	-	-
None	-	-	-	-	-
Total	1	-	1	2	-

Note: Other means people on the ground.

1.3. **Damage to Aircraft**

1.3.1. The gyrocopter was substantially damaged.



Figure 3: The gyrocopter post-accident.

1.4. **Other Damage**

1.4.1. None.

1.5. **Personnel Information**

Nationality	South African	Gender	Male	Age	40
Licence Type	National Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	CCM Instructor Grade C, Gyro Instructor Grade A				
Medical Expiry Date	28 February 2023				
Restrictions	Corrective lenses				
Previous Accidents	Yes				

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

Flying Experience:

Total Hours	7 054.5
Total Past 24 Hours	1.6
Total Past 7 Days	3.0
Total Past 90 Days	17.2
Total on Type Past 90 Days	13.3
Total on Type	1 606.3

1.5.1. The pilot had a National Pilot Licence (NPL) that was issued on 1 June 2022 with an expiry date of 26 June 2023. The type and rating of the gyrocopter were endorsed on his logbook. The pilot's medical certificate, which was a Class 4, was issued on 1 June 2022 with an expiry date of 28 February 2023. The medical certificate had a waiver stating that the pilot should wear corrective lenses.

1.5.2 The pilot had a Grade A instructor rating under the gyrocopter category that was issued on 27 June 2021 with an expiry date of 26 June 2023, as well as a Test Flight rating in line with Part 62.14.7 which was issued on 22 March 2021 with an expiry date of 21 March 2023.

1.5.3 Application for a Part 96 authorisation

62.14.7 An application for the issuing of a part 96 authorisation shall—

- (a) *be made to the Director or the organisation designated for the purpose in terms of part 149, as the case may be, on the appropriate form as prescribed by the Director; and*
- (b) *be accompanied by—*
- (i) *the original or certified true copy of a valid Class 2 or Class 1 medical certificate issued in terms of part 67;*
 - (ii) *original or certified proof that the applicant has passed the theoretical knowledge examination referred to in regulation [62.14.5](#);*
 - (iii) *original or certified proof that the applicant has the practical experience referred to in regulation [62.14.3](#);*
 - (iv) *the skills test report as prescribed in Document SA-CATS 62; and*
 - (vi) *the appropriate fee as prescribed in part 187.*

1.6. Aircraft Information

1.6.1. *The ELA 08 gyroplane is designed as a 2-seater, tandem-configured three axis aircraft with dual controls and single engine, ideal for flight instruction purposes. In addition to flight training and general recreational flying, the flight characteristics of this gyroplane*

make such aircraft ideally suited for tasks such as air transportation, forestry, border, livestock and traffic surveillance, electrical pylon inspection, aerial still and film photography, fumigation, crop spray, etc. Its characteristic short take-off and landing runs make it particularly suitable for operation from fields of modest dimension.

Airframe:

Manufacturer/Model	ELA Aviation, ELA 08	
Serial Number	72	
Year of Manufacture	2006	
Total Airframe Hours (At Time of Accident)	218.5	
Last Annual Inspection (Date & Hours)	31 August 2022	214.8
Hours Since Last Inspection	3.7	
CRS Issue Date	31 August 2022	
ATF (Issue Date & Expiry Date)	29 September 2022	31 August 2023
C of R (Issue Date) (Present Owner)	19 April 2021	
Type of Fuel Used	95 Unleaded fuel	
Operating Category	Private (Part 94)	
Previous Accidents	TBA	

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

Engine:

Manufacturer/Model	Rotax 914 UL
Serial Number	4418923
Hours Since New	214.8
Hours Since Overhaul	TBO not reached

Propeller:

Manufacturer/Model	Windspoon
Serial Number	3203
Hours Since New	214.8
Hours Since Overhaul	TBO not reached

1.6.2. According to the gyrocopter logbook, the last annual inspection prior to the accident flight was carried out by an approved person (AP) on 31 August 2022 at 214.8 hours. A Certificate of Release to Service (CRS) was issued on 31 August 2022 with an expiry date of 31 August 2023 or at 314.8 hours, whichever comes first. The gyrocopter accrued 3.7 hours since its last inspection prior to the accident flight.

1.6.3. The gyrocopter was registered to the current owner on 19 April 2021.

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 at Springs Aerodrome (FASI) which is located 1.7 nautical miles (nm) from the accident site on 30 November 2022 at 0800Z.

FASI 300800Z AUTO 29005KT //// // ///// 23/13 Q1026=

Wind Direction	290°	Wind Speed	5 kt	Visibility	Unknown
Temperature	23°C	Cloud Cover	Unknown	Cloud Base	Unknown
Dew Point	13°C	QNH	1026 hPa		

1.8. Aids to Navigation

- 1.8.1. The gyrocopter was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no recorded defects indicating that the navigation system was unserviceable prior to the accident.

1.9. Communication

- 1.9.1. The gyrocopter was equipped with a standard communication system as approved by the Regulator. There were no recorded defects indicating that the communication system was unserviceable prior to the accident.

1.10. Aerodrome Information

- 1.10.1. FASI is the closest aerodrome, located 2nm from the accident site.

Aerodrome Location	Springs, Gauteng Province
Aerodrome Status	Licensed
Aerodrome GPS coordinates	26°14'54" South, 028°23'51" East
Aerodrome Elevation	5 340ft
Runway Headings	03/21
Dimensions of Runway Used	03
Heading of Runway Used	030°
Surface of Runway Used	Asphalt
Approach Facilities	None
Radio Frequency	122.4

1.11. Flight Recorders

1.11.1. The gyrocopter 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 gyrocopter type.

1.12. Wreckage and Impact Information

1.12.1. The gyrocopter was found lying on its left-side with the nose pointing north. The wreckage was contained in a radius of approximately 32m. There was evidence of fuel that leaked out of the tank due to the position in which the gyro came to rest. The tanks were not ruptured, only fuel sipped out. Ten (10) litres of fuel remained in the tanks. The fuel inside the tanks was blue in colour, characterised by a strong smell of automotive fuel. The horizontal stabiliser was still intact; however, the rudder was broken and had detached from the attachment points. The rudder cables were still secured. Continuity could not be verified as one of the rudder pedals was stuck in the 'applied' position.

1.12.2. The landing gear strut was still intact; however, evidence of fracture down the middle was visible. Both main tyres were still attached to the axle. The nose gear had collapsed into the wheel well.



Figure 4: The landing gear strut.

1.12.3. The front seat was still in place and secured whereas the rear one had become loose from its attachment point; the front seat belt was still intact and the rear one was cut

using a sharp object when the occupant was helped out by the eyewitnesses. Both controls were still secured in their respective positions. The throttle arm levers were still in place; the cable was checked for functionality and it corresponded with the movement of the throttle. All instruments in the panel were still secured.



Figure 6: the instrument panel.

1.12.4. The mast was severed and was found hanging by the wire harness, indicative of impact fracture. Both the control tubes were severed at the bottom. The pre-rotating gearbox and its associated hardware were still intact. The drivebelt was still attached to the pulley. One of the main rotor blades detached from the hub and was found 7.8 metres from the other blades which were still attached to the hub. The detached main rotor blade had evidence of fracture on the tip and in the middle section.

1.12.5. The condition of the exterior of the engine was good. The engine was still attached to the cradle. There were no visible signs of oil or fuel leak. The wiring harness was still intact. All three propeller blades were still attached to the hub, however, one of the blades was damage with dirt on the washout. The exhaust muffler was still intact and there was no visible oil leak on the turbo assembly.



Figure 6: The main rotor mast and (inset) the severed blade.



Figure 7: The damaged propeller blades.

1.13. Medical and Pathological Information

1.13.1. None.

1.14. Fire

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

1.15. **Survival Aspects**

1.15.1. The accident was considered survivable because the cabin structure was still intact. The occupants had made use of the gyrocopter-fitted safety harnesses. After the accident, the eyewitnesses assisted one of the occupants out of the gyrocopter.

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 as amended.

1.17.2. The passenger was the owner of the gyrocopter, which was registered on 19 April 2021.

1.17.3. The AP who certified the last inspection was issued an AP licensed on 22 March 2022 with an expiry date of 19 May 2024.

1.17.4. The gyrocopter was issued an Authority to Fly (ATF) certificate on 29 September 2022 with an expiry date of 31 August 2022.

1.18. **Additional Information**

1.18.1. Engine failure in-flight (Source: ELA 08 Pilot's Operating Handbook [POH])

INSTRUCTIONS:

- 1. Close throttle. Engine failure may be sudden or accompanied by misfiring, typical of fuel starvation.*
- 2. Lower the nose to keep best glide speed of 105 kph (65 mph/57 kts) and look for an area for landing into the wind.*
- 3. If time allows, an engine restart can be attempted. See "Engine restart procedure".*
- 4. If the area for landing is rough or there are obstacles, make a higher flare over the obstacles to reduce forward speed.*
- 5. Once on the ground, ignition and fuel pumps OFF.*
- 6. Rotor brake ON.*
- 7. Master OFF.*

1.18.2 Engine Restart Procedure (Source: ELA 08 POH)

INSTRUCTIONS:

- 1. Check fuel pumps ON, check fuel pressure.*
- 2. Check ignition ON.*
- 3. Throttle slightly open.*
- 4. With your left hand, try to restart the engine.*
- 5. Verify engine parameters are within limits (oil temp/pressure and CHT). If not, try to land with safety.*

1.19. Useful or Effective Investigation Techniques

1.19.1. Not applicable.

2. FINDINGS

2.1. General

From the available evidence, the following preliminary findings 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 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

2.2.1 The pilot had a National Pilot Licence issued on 1 June 2022 with an expiry date of 26 June 2023. The pilot had a Class 4 aviation medical certificate issued on 1 June 2022 with an expiry date of 28 February 2023 with a medical waiver to wear corrective lenses. The pilot also had a Grade A instructor rating under gyrocopter category which was issued on 27 June 2021 with an expiry date of 26 June 2023, as well as a Test Flight rating in line with Part 62.14.7 that was issued on 22 March 2021 with an expiry date of 21 March 2023.

2.2.2 The last annual inspection prior to the accident flight was carried out by an AP on 31 August 2022 at 214.8 hours. A Certificate of Release to Service (CRS) was issued on 31 August 2022 with an expiry date of 31 August 2023 or at 314.8 hours, whichever comes first. The gyrocopter accrued 3.7 hours since its last inspection.

- 2.2.3 The AP who carried out the last annual inspection was issued an Approved Person certificate on 22 March 2022 with an expiry date of 19 May 2024.
- 2.2.4 The gyrocopter was issued an Authority to Fly (ATF) on 29 September 2022 with an expiry date of 31 August 2023.
- 2.2.5 The Certificate of Registration (C of R) was issued to the present owner on 19 April 2021.
- 2.2.6 Post-accident, the engine was recovered and is set to be subjected to a teardown examination.
- 2.2.7 The engine stopped without warning whilst overhead the quarry in Brakpan during a late right base leg. The pilot selected a road adjacent to the quarry to perform a forced landing. During the landing roll, the main rotor blades struck a tree.

3. ON-GOING INVESTIGATION

- 3.1. The AIID investigation is on-going and the investigator will look into other aspects of this occurrence which may or may not have safety implications.

This report is issued by:

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