# LIMITED ACCIDENT INVESTIGATION REPORT

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|---|---|---|---|---|---|---|---|
| **Reference Number** | CA18/2/3/9940 | | | | | | |
| **Classification** | Accident | **Date** | 10 January 2021 | **Time** | 0810Z | | |
| **Type of Operation** | Private (Part 91) | | | | | | |
| **Location** | | | | | | | |
| Place of Departure | Brits Aerodrome (FABS) | Place of Intended Landing | Brits Aerodrome (FABS) | | | | |
| Place of Accident | In the Crocodile River 3.5nm Southwest of FABS, Northwest Province | | | | | | |
| GPS Co-ordinates | Latitude | 25°35'37.5'' S | Longitude | 027°45'28.5''E | Elevation | 3555 ft | |
| **Aircraft Information** | | | | | | | |
| Registration | ZU-RAJ | | | | | | |
| Make/Model | Aerospatiale SE 3130-Alouette II (Serial Number. 1414) | | | | | | |
| Damage to Aircraft | Destroyed | Total Aircraft Hours | 8517 | | | | |
| **Pilot-in-command** | | | | | | | |
| Licence Valid | Yes | Gender | Male | Age | 58 | | |
| Licence Type | Private Pilot Licence (PPL) | | | | | | |
| Total Hours on Type | 429.9 | Total Flying Hours | 936.4 | | | | |
| **People On-board** | 1+2 | Injuries | 2 | Fatalities | 1 | Other (On ground) | 0 |

**What Happened**

On Sunday morning 10 January 2021, the pilot accompanied by two passengers on-board an Alouette II helicopter with registration ZU-RAJ, took off from Brits Aerodrome (FABS), in the Northwest province on a private (scenic) flight to Roodekoppies Dam, which was approximately 12.5 nautical miles (nm) from FABS. The flight was conducted under visual flight rules (VFR) by day under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot reported that during his pre-flight inspection before the first flight of the day the helicopter had approximately 881.849 Pounds (lb) of fuel on the morning of 10 January 2021 the pilot accompanied by passengers took off on a scenic flight at approximately 0700Z and landed back at FABS at approximately 0750Z with no anomalies. The pilot stated that he again took off on the second flight of the day at approximately 0800Z. After being airborne for approximately 30 minutes whilst flying along the Crocodile River at a height of approximately 300 ft above ground level

(AGL), the pilot experienced a sudden loss of lift from the main rotor and crashed into the river.

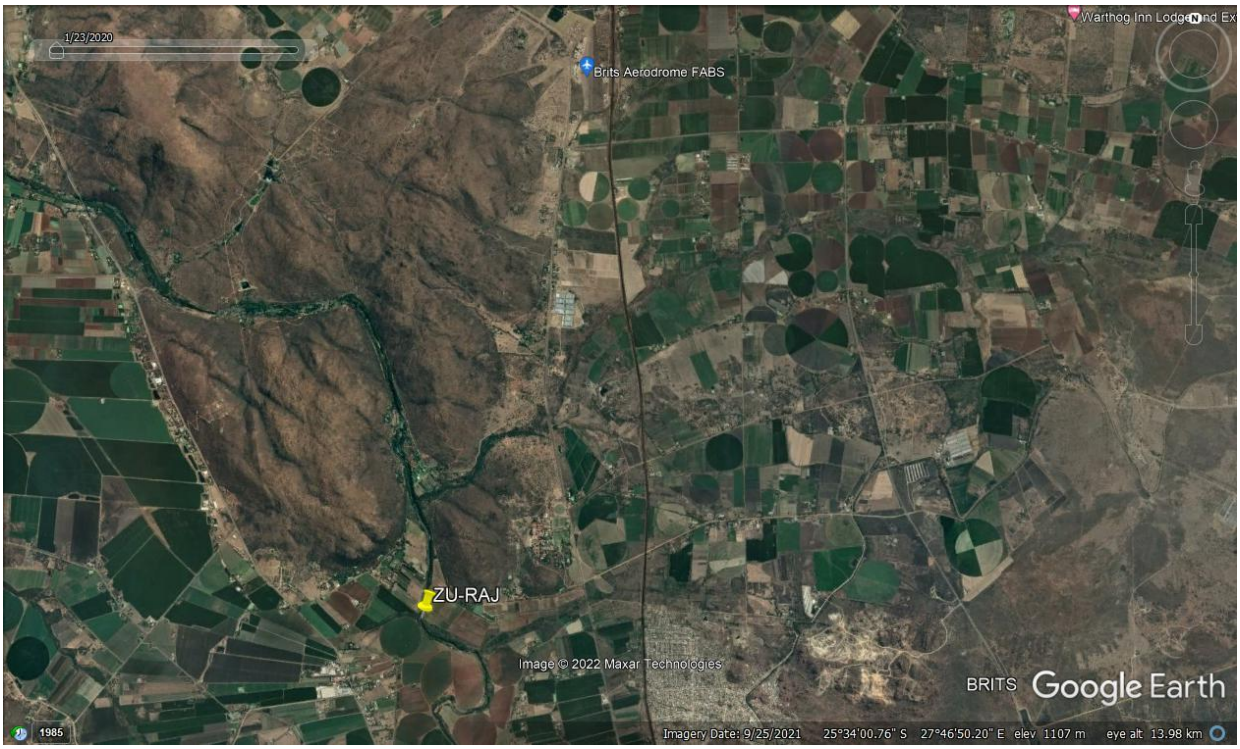


**Figure 1:** Google Earth overlay of the accident site (yellow pin) in relation to FABS

The following information is an extract from Rotorcraft Flying Handbook (FAA-H-8083-21)

Induced flow

*As the rotor blades rotate, they generate what is called rotational relative wind. This airflow is characterized as flowing parallel and opposite the rotor's plane of rotation and striking perpendicular to the rotor blade's leading edge. This rotational relative wind is used to generate lift. As rotor blade's leading edge. This rotational relative wind is used to generate lift. As rotor blades produce lift, air is accelerated over the foil and projected downward. Anytime a helicopter is producing lift, air is accelerated over the foil and projected downward. Anytime a helicopter is producing lift, it moves large masses of air vertically and downward or induced flow can significantly change the efficiency of the rotor system. Rotational relative wind combines with induced flow to form the resultant relative wind. As induced flow increases, resultant relative wind becomes less horizontal. Since angle of attack is determined by measuring the difference between the chord line and the resultant relative wind as the resultant relative wind becomes less horizontal, angle of attack decreases*.

*Straight and level flight*

*Straight and level flight is flight in which a constant altitude and heading are maintained. The attitude of helicopter determines the airspeed and is controlled by cyclic. Altitude is primarily controlled by the use of the collective.*

*Common Errors*

1. *Failure to properly trim the helicopter, tending to hold antitorque pedal pressure and opposite cyclic. This is commonly called cross-controlling.*

2. *Failure to maintain desired airspeed.*

3. *Failure to hold proper control*

After impact with the water the pilot managed to free himself and once surfaced, he swam to shore. He then walked for approximately 2 kilometres (km) looking for help. The Helicopter Emergency Medical Services (H.E.M.S) and South African Police Services (SAPS) were called to the scene. A witness who is a resident where the accident happened reported that on the morning of 10 January 2021 at approximately 11 o' clock while sitting on the porch of his house, he suddenly heard the sound of a helicopter engine that was approaching his house from the north: upstream. All of a sudden, the engine went quiet, and he heard a faint clicking sound. The witness further reported that what he found strange was the sound of seven pistols shots, followed by what sounded like a burst of automatic gun fire. He suspected that these sounds were that of shooting taking place at the Rashoop shooting range which is close to their area. Following the confirmation of the accident he also considered the possibility that the cracking sounds could have been caused by the rotors of a helicopter as it hit the water.

The pilot and one of the passengers were seriously injured in the accident while the second passenger was fatally injured, and the helicopter was destroyed. The accident took place 3.5nm Southwest of FABS at Global Positioning System determined to be 25°35'37.5'' South 027°45'28.5'' East at an elevation of 3 555ft.


**Figure 2:** Google Earth Image showing approximate flight path and accident location.


**Figure 3:** Showing rotorcraft underwater.

**What was found:**

- According to maintenance records, the last Annual Inspection (AI) on the helicopter was certified on 17 March 2020 at 8517.0 hours with an expiry date of 17 March 2021 or at 8617.0 hours or whichever comes first.

- During onsite visit at the pilot's hangar on 18 November 2021 the investigators found the wreckage of the helicopter with some of the parts missing, among other parts that were missing were the engine, some of the instruments panels and the rotor blades were found at nearby shacks, the pilot stated that the missing parts were stolen whilst the helicopter was in the river before it can be recovered on August .(See figure 3 & 4 as it was found at pilot's hangar)

**Figure 3:** Picture of the helicopter after recovery

**Figure 4:** Picture of the helicopter after recovery

- There were eleven drums of approximately 200 litres each full of Jet A-1 and they were all sealed with torques seal. The pilot further reported that he used Jet A-1 fuel on the helicopter engine and he also provided fuel receipts. The fuel was kept in the drums which were used to keep avgas 100LL fuel as they are very strong and durable. (See figure 5 & 6)

**Figure 5:** Drums were the fuel was kept.

- According to available fuel records that was obtained from the AMO at Wonderboom Aerodrome (FAWB), the helicopter was last uplifted with 200 litres (L) fuel of (Jet A-1) on 05 November 2020.

**Probable cause:**

The probable cause of this accident could not be determined.

| **Safety Action/s** |
|---|
| None |
| **Recommendations:** |
| None |
| **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****.*

**About this Report**

*Decisions regarding whether to investigate, and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, no investigation has been conducted, and the Accident and Incident Investigations Division (AIID) has relied on the information submitted by the affected person/s and organisation/s to compile this brief report. The report has been compiled using information supplied in the initial notification, as well as follow-up information to bring awareness of potential safety issues to the industry in respect of this occurrence, as well as possible safety action/s that the industry might want to consider in preventing a recurrence of a similar accident.*

*This report provides an opportunity to share safety message/s in the absence of an investigation.*

*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.*

**Disclaimer**



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