

LIMITED OCCURRENCE INVESTIGATION

Reference Number	CA18/2/3/9940						
Classification	Accident	Date	10 January 2021	Time	0745Z		
Type of Operation	Private (Part 94)						
Location							
Place	Crocodile River, Brits, North West Province			Elevation	3 555 feet		
GPS Co-ordinates	Latitude	S 25°35'37.5"	Longitude	E 027°45'28.5"			
Aircraft Information							
Registration	ZU-RAJ						
Model/Make	Aerospatiale						
Damage to Aircraft	Destroyed		Total Aircraft Hours	8517			
Pilot-in-command							
Licence Type	Private Pilot Licence (PPL)	Gender	Male		Age	56	
Licence Valid	Yes						
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							
<p>On Sunday 10 January 2021, the pilot and two passengers on-board a SE 3130-Aloutte II single-engine helicopter with registration ZU-RAJ took off on a scenic flight from Brits Aerodrome (FABS) in the North West province to Roodekoppies Dam, which is approximately 12.5 nautical miles (nm) from FABS. The flight duration was approximately 20 minutes. The flight was conducted under visual flight rules (VFR) by day and under the provisions of Part 94 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The pilot stated that during pre-flight inspections, the fuel gauge was showing 400 litres in the tank after uplifting fuel at Wonderboom Aerodrome (FAWB). The pilot clarified that the fuel quantity would have been about 300 litres in the tank as the helicopter's fuel gauge was over reading by about 100 litres. He also stated that after refuelling on the morning of 10 January 2021, he flew to FABS. During the on-site investigation, investigators could not find any records to confirm the upliftment of fuel at FAWB. Part 127.04.9 of the Civil Aviation Regulations (CAR) 2011 as amended states the following: <i>An operator shall maintain records of the fuel taken on-board for</i></p>							

flight and used during flight time and shall keep such records for a period of at least 90 days following each flight or series of flights.

The pilot stated that on the day of the accident he was flying along the Crocodile River from FABS to Roodekoppies Dam and had already completed two scenic flights and was on his third scenic flight with passengers on-board. The first flight was approximately 1 hour; the second flight was about 30 minutes; and the third flight (accident flight) lasted approximately 20 minutes. He stated that while at approximately 200 feet (ft) above ground level (AGL) the engine stopped and all he saw were red warning lights on the cockpit glareshield. He then auto-rotated the helicopter, but the helicopter got submerged in water (river) as everything happened very quickly.



Figure 1: Accident helicopter in the river.

The pilot swam out of the river and walked approximately 2 kilometres (km) to seek help. The Helicopter Emergency Medical Services (HEMS) and the South African Police Service (SAPS) were called to the scene. On their arrival, they found one passenger who had succumbed to his injuries while the other passenger was clinging to one of the main rotor blades which was sticking out of the submerged helicopter.

The Aircraft Maintenance Organisation (AMO) was interviewed following the accident and they indicated that there was no evidence that the aircraft was uplifted with fuel from their fuel bowser on 10 January 2020.

A Brits Club member stated that on 9 January 2021 the day before the accident, he saw the owner of ZU-RAJ opening his hangar at FABS at approximately 10h00 and that he performed two local flights. At around 14h30, he saw him pushing the helicopter back into his hangar, locking it and leaving FABS by car.

A witness who is a resident where the accident happened reported that on the morning of 10 January 2021 while sitting on the porch of his house, he heard the sound of a helicopter engine that was approaching from the north (upstream). But all of a sudden, the engine went quiet. Later, he heard a faint “click” sound. He asked his wife, who was with him whether she had heard the sound; she responded that she had not heard anything. The time was approximately 10 o’ clock (morning). Following the confirmation of the accident, the witness considered the possibility that the “click” sound could have been caused by the rotors of a helicopter as it hit the water surface.

The amount of fuel in the helicopter on departure from FABS to Roodekoppies Dam were computed. A Flight Manual indicated that the fuel burn rate for the helicopter was about 175 litres per hour. Using the 175-litre fuel burn rate, the 20-minute flight would have consumed 80 litres of fuel. The 30-minute flight would have consumed about 87 litres of fuel, the 1-hour flight would have consumed 175 litres of fuel, the two 30-minute flights would result in 175 litres of fuel being consumed. Not accounting for fuel consumed during aircraft start and taxi sequence, the helicopter had about 300 litres of fuel when it started with scenic flights and, as reported by the pilot, it would have required 345 litres of fuel for all three scenic flights.

Engine failure procedures (Source: SUD AVIA TIOH SE II30 4LOUETTE n FLIGHT MANUAL)

2.5.a Engine failure.

2.5.8.1. Symptoms and remedies.

Engine failure is evidenced by

1. A tendency of the aircraft to swing to the right.
2. A drop in rotor RPM, Generally, light up of the max. fuel flow red warning light. Take the following steps immediately:
 - A. If aircraft is not near the ground (above 160 ft)
 1. Apply full low collective-pitch as quickly as possible.
 2. Close fuel flow control lever and move engine selector switch to the OFF position to discontinue delivery from the fuel pump.
 3. Close the fuel shut-off cock.
 4. Switch OFF the fuel booster pump.
 5. Select a landing area and maintain a suitable approach speed (airspeed corresponding to best gliding angle (65 kt).

The pilot stated that the accident happened so quickly and this likely caused him not to follow the procedures stated above due to low altitude during a scenic flight along the Crocodile River.

The requirements as set out in Part 91.07.12 of the CARs were not adhered to, which are stated under the following sub-headings; (i) *taxi fuel*, (ii) *trip fuel*, (iii) *contingency fuel that equates to 5% of the planned trip but not less than 5 minutes*, (iv) *destination alternate - 15 minutes*, (v) and *final reserve fuel of 45 minutes*.

The pilot had operated commercially without an Aircraft Operating Certificate (AOC) and without an Air Service Licence as required by CAR 2011 Part 127.06.1 which states the following: “No operator shall operate a helicopter in terms of this Part unless the operator is the holder of, and complies with the conditions of, a valid air operator certificate including the operations specifications attached thereto, and the relevant air services licence issued in terms of the Air Services Licensing Act, No. 115 of 1990, or the International Air Services Act, No. 60 of 1993.”

The probable cause of this engine failure could be attributed to the helicopter having had inadequate amount of fuel on-board to complete the three scenic flights. It is likely that the helicopter was being flown at a low altitude to enable the passengers to have a better aerial view of the Crocodile River. When the engine failed, the pilot did not have time to follow the engine failure procedures, which led to a crash.

Safety Action/s

None.

Safety Message and/or Safety Recommendation/s

Safety messages 1: Pilots are advised to ensure the correct amount of fuel for every flight they undertake (double check with a fuel dipstick where possible).

Safety messages 2: When engaged in a scenic flight, pilots should ensure a safe altitude to enable a better chance of a safe forced landing should an emergency or engine failure occur.

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 produced without prejudice to the rights of the AIID, which are reserved.

This report is issued by:

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