

FACTUAL ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Factual Report -
AIID Ref No: CA18/2/3/10380



Figure 1: The helicopter after impact with the ground.

Description:

On Thursday morning, 26 October 2023 at around 0330Z, a pilot and a passenger on-board a Robinson R44 Raven II helicopter with registration ZT-RBU took off on a private flight from a farm in Vaalwater in Limpopo province with the intention to land at Marataba Mountain Lodge in the same province. Clear weather conditions prevailed at the time of the flight. During approach for landing, the engine lost power and the pilot entered an autorotative flight whilst at 200 feet above ground level (AGL). The helicopter impacted the bushy terrain and came to rest on its right side. The occupants were not injured.

Occurrence Details

Reference Number : CA18/2/3/10380
Occurrence Category : Category 1
Type of Operation : Private (Part 91)
Name of Operator : West Dunes Aviation (PTY) LTD
Helicopter Registration : ZT-RBU
Helicopter Make and Model : Robinson 44 Raven II
Nationality : South African
Place : Marataba Mountain Lodge, Limpopo Province
Date and Time : 26 October 2023 at 0356Z
Injuries : None
Damage : Substantial

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 Robinson 44 Raven II which occurred on 26 October 2023 at 0356Z at Marataba Mountain Lodge, Limpopo province. The occurrence was categorised as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions.

The AIID has appointed an investigator-in-charge (IIC). Notifications were sent to the State of Design and Manufacture in accordance with the CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The State has appointed a non-travelling accredited representative and technical advisors. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and ICAO Annex 13.

The information contained in this factual 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:

<https://www.caa.co.za/industry-information/accidents-and-incidents/>

Notes:

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

Accident — this investigated accident

Aircraft — the Robinson 44 Raven II 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

This report is produced without prejudice to the rights of the SACAA, which are reserved.

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
ACCID	Accident
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
C of R	Certificate of Registration
CAA	Civil Aviation Authority
CAR	Civil Aviation Regulation
C of A	Certificate of Airworthiness
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
FASI	Springs Aerodrome
FATH	Thabazimbi Aerodrome
ft	Feet
GPS	Global Positioning Satellite
hPa	Hectopascal
kt	Knots
LZ	Landing Zone
m	Metres
METAR	Meteorological Aerodrome Report
NDT	Non-Destructive Testing
NOSIG	No Significant Weather
PIC	Pilot-in-command
QNH	Barometric Pressure Adjusted to Sea Level
RPM	Revolutions per Minute
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
TBA	To Be Advised
VLD	Correction For Defective Distant Vision
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 On Thursday morning, 26 October 2023 at around 0330Z, a pilot and a passenger on-board a Robinson R44 Raven II helicopter with registration ZT-RBU took off on a private flight from a farm in Vaalwater, Limpopo province, to Marataba Mountain Lodge in the same province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended. Clear weather conditions prevailed at the time of the flight.
- 1.1.2 The pilot stated that he conducted a pre-flight inspection, and the helicopter was refuelled to its maximum capacity of 180 litres. After the passenger boarded the helicopter, the pilot routed to Marataba Mountain Lodge. Whilst overhead the lodge after a flight of approximately 24 minutes, the pilot circled the area to identify the landing zone. He assessed the wind direction and concluded that it was blowing from the east; thereafter, he commenced with the approach into wind at an indicated airspeed of 45 knots.
- 1.1.3 During the final approach phase at a height of approximately 50 feet above ground level (AGL) (*observed from the video footage of the last 8 seconds of the flight*), the engine failed and the low rotor revolutions per minute (RPM) warning light illuminated on the instrument panel, followed by the aural warning. The pilot entered an auto rotational flight at a height he had available, and performed a forced landing. The helicopter touched down hard on the ground. During impact with the ground, the skid gear broke off and the main rotor blades severed the tail boom; the helicopter flipped over and came to rest on its right side. The helicopter was substantially damaged, and the occupants were not injured.
- 1.1.4 The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 24°20'44.51" South 027°29'41.89" East, at an elevation of 3 349 feet (ft).



Figure 2: Overview of the accident site. (Source: Google Earth)

1.2 Injuries to Persons

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

Note: Other means people on the ground.

1.3 Damage to Helicopter

1.3.1 The helicopter sustained substantial damage.



Figure 3: The helicopter as it came to rest. (Source: Pilot)

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	40
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	None				
Medical Expiry Date	31 August 2024				
Restrictions	VDL				
Previous Accidents	None				

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

Flying Experience:

Total Hours	9848.2
Total Past 24 Hours	4.0
Total Past 7 Days	6.1
Total Past 90 Days	119.7
Total on Type Past 90 Days	19.1
Total on Type	6315

1.5.1 The pilot was initially issued a Commercial Pilot Licence on 13 August 2004. The licence was renewed on 26 January 2023 with an expiry date of 31 February 2024. The pilot had flown a total of 9 848.2 hours of which 6 315 hours were on the helicopter type. The helicopter type was endorsed on his licence and on the pilot's logbook.

1.5.2 The pilot was issued a Class 1 aviation medical certificate on 25 August 2023 with an expiry date of 31 August 2024 with a medical waiver (correction for defective distant vision). The pilot was properly licensed to conduct the flight and was medically fit in accordance with Part 67 of the CAR 2011 as amended.

1.6 Helicopter Information

Airframe:

Manufacturer/Model	Robinson 44 Raven II	
Serial Number	11359	
Year of Manufacture	2006	
Total Airframe Hours (At Time of Accident)	2 151.5	
Last Inspection (Date & Hours)	30 May 2023	2 135.3
Hours Since Last Inspection	16.2	
CRS Issue Date	30 May 2023	
C of A (Issue Date & Expiry Date)	16 March 2023	31 March 2024
C of R (Issue Date) (Present Owner)	7 February 2017	
Type of Fuel Used	Avgas 100LL	
Operating Category	Part 91	
Previous Accidents	None	

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

Engine:

Manufacturer/Model	IO-540-AE1A5
Serial Number	L31394-48A
Hours Since New	2483.6
Hours Since Overhaul	330

1.6.1 According to the engine logbook, the engine was installed on ZT-RBU on 13 February 2017 at 554.9 hours. The engine was later removed from ZT-RBU on 18 April 2019 to service ZS-ROJ. On 14 October 2019, the engine was removed from ZS-ROJ at 1 662.4

hours because of a serious defect. After the defect was rectified, the engine was fitted back to ZT-RBU on 24 January 2020 at 1 662.4 hours.

- 1.6.2 On 9 December 2021, the engine was removed from ZT-RBU at 2153.4 hours and was subjected to a 2 200 time between overhaul (TBO) maintenance at the engine repair facility at Springs Aerodrome (FASI). The engine was dismantled, stripped and cleaned; also, backlash measurement was checked, visual and dimensional inspection was conducted, and the Non-Destructive Testing (NDT) inspection was carried out. The engine was reassembled using the approved parts.

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 on 26 October 2023 between 0400Z and 0600Z for Thabazimbi Aerodrome (FATH). FATH is located 14 nautical miles from the accident site.

FATH 260500Z AUTO 00000KT //// // ///// 19/09 Q1023 =

Wind Direction	Calm	Wind Speed	Calm	Visibility	9999m
Temperature	19°C	Cloud Cover	unknown	Cloud Base	unknown
Dew Point	09°C	QNH	1023 hPa		

- 1.7.2 Satellite Image

Satellite imagery for 0500Z indicates that there was no significant weather prior to the trip. The satellite image shows no clouds of significance.

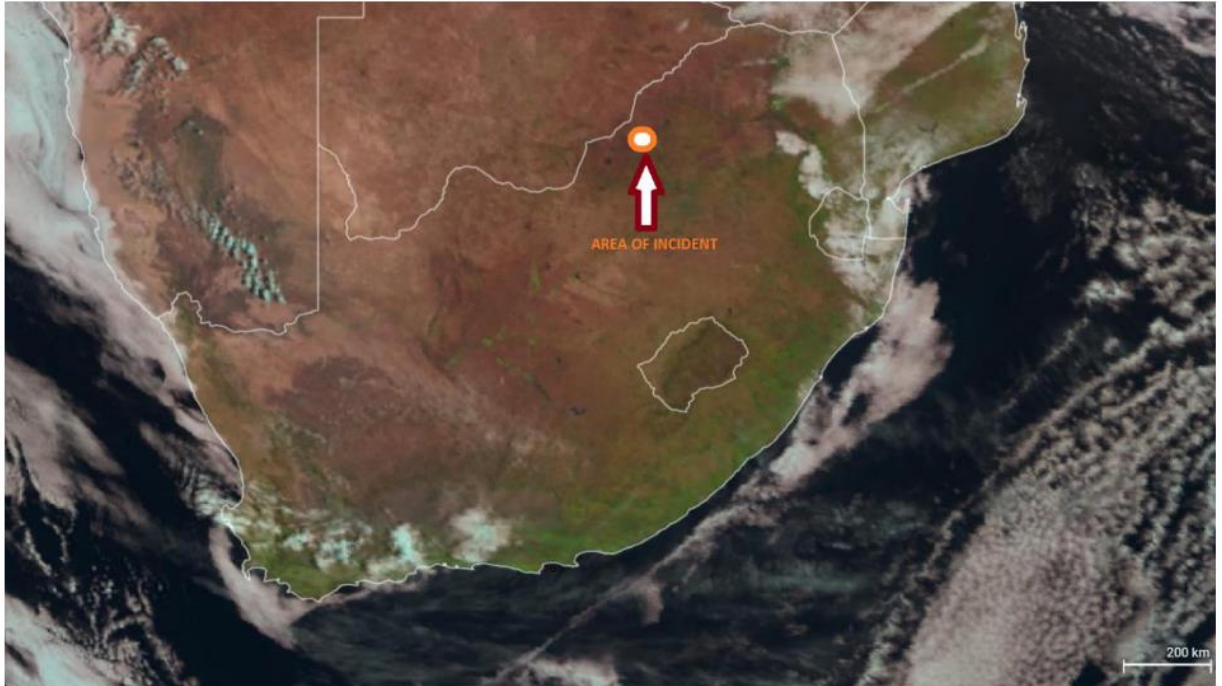


Figure 4: The day natural colours imagery. (Source: EumetSat)

1.8 Aids to Navigation

1.8.1 The helicopter 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 helicopter 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 near the aerodrome.

1.11 Flight Recorders

1.11.1 The helicopter was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the helicopter type.

1.12 Wreckage and Impact Information

1.12.1 To be discussed in the final report.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 The accident was considered survivable as the cockpit structure sustained minor damage on impact. The pilot had also made use of the helicopter's safety harnesses.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 The flight was conducted in accordance with the provisions of Part 91 of the CAR 2011 as amended.

1.17.2 The helicopter was registered to the current owner on 7 February 2017.

1.17.3 The aircraft maintenance organisation (AMO) responsible for the maintenance of the helicopter had a valid certificate of approval which was issued on 3 November 2022 with an expiry date of 30 November 2023.

1.18 Additional Information

1.18.1 To be discussed in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2 FINDINGS

2.1 General

From the available evidence, the following factual 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 was initially issued a Commercial Pilot Licence (CPL) on 13 August 2004. He renewed his CPL on 26 January 2023 with an expiry date of 31 February 2024. The pilot had flown a total of 9 848.2 hours of which 6 315 hours were on the helicopter type. The helicopter type was endorsed on his licence and on the pilot's logbook.
- 2.2.2 The pilot was issued a Class 1 aviation medical certificate on 25 August 2023 with an expiry date of 31 August 2024 with a medical waiver (correction for defective distant vision). The pilot was properly licensed to conduct the flight and was medically fit in accordance with Part 67 of the CAR 2011 as amended.
- 2.2.3 The last mandatory periodic inspection (MPI) that was conducted on the helicopter prior to the accident flight was certified on 30 May 2023 at 2 135.3 airframe hours. Since the last MPI, the helicopter accrued 16.2 hours, with a total of 2 151.5 hours since new.
- 2.2.4 The helicopter had a valid Certificate of Airworthiness (C of A) that was initially issued on 8 March 2017. The C of A was renewed on 16 March 2023 with an expiry date of 31 March 2024.
- 2.2.5 The Certificate of Release to Service (CRS) was issued on 30 May 2023 with an expiry date of 24 May 2024 or at 2 235.3 hours, whichever comes first.
- 2.2.6 The Certificate of Registration (C of R) was issued to the present owner on 7 February 2017. There were no defects reported prior to the accident flight, therefore, the helicopter was considered airworthy at the time of the flight.

2.2.7 The engine underwent an engine overhaul at the engine facility at FASI on 22 February 2022 at 2 153.6 engine hours. At the time of the accident, the engine had accumulated 330 hours since overhaul.

2.2.8 The AMO responsible for the maintenance of the helicopter had a valid certificate of approval which was issued on 3 November 2022 with an expiry date of 30 November 2023.

2.2.9 The engine was recovered, and it was removed from the helicopter to undergo an engine teardown at the engine repair facility at FASI.

3 ON-GOING INVESTIGATION

3.1 The AIID investigation is on-going and the investigator will be investigating other aspects of this accident 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**