LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/10647						
Classification	Accident	**Date**	27 March 2026		**Time**	0845Z	
Type of Operation	Private (Part 91)						
Location							
Place of Departure	Groenfontein Private Farm, West of Polokwane Airfield (FAPT), Limpopo Province	Place of Intended Landing	Cambrais Private Farm, Makhado, Limpopo Province				
Place of Occurrence	Approximately 800 metres (m) from Groenfontein Private Farm, Limpopo Province						
GPS Co-ordinates	Latitude	23°52'20.9" S	Longitude	29°14'49.0" E	Elevation	4 442 ft	
Helicopter Information							
Registration	ZS-RVU						
Make; Model; S/N	R44; Raven II (Serial Number: 10711)						
Damage to Helicopter	Substantial	Total Helicopter Hours	2 820.5				
Pilot-in-command							
Licence Type	Private Pilot Licence (PPL)	Gender	Male	Age	55		
Licence Valid	Yes	Total Hours	990.3	Total Hours on Type	634.9		
Total Hours 30 Days	4.7	Total Flying on Type Past 90 Days	21.5				
People On-board	1 + 0	**Injuries**	1	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Friday, 27 March 2026, a pilot on-board a Robinson R44 Raven II helicopter registered ZS-RVU took off on a private flight from Groenfontein Farm to Cambrais Farm, both in Limpopo 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.

The pilot stated that he conducted a pre-flight inspection according to the helicopter Pilot's Operating Handbook (POH), and no anomalies were noted. The helicopter was refuelled with Aviation Gasoline (Avgas) 100 Low Lead (100LL); after refuelling, the tanks were at full capacity with 190 litres (L). Thereafter, the pilot started the engine, and it operated within the acceptable limits. Lift-off was conducted at approximately 0840Z in a west-north-west direction. During lift-off, the engine power and rotor power were at 100 percent with an approximated 22 manifold pressure range.

After a few minutes into the flight and at an estimated distance of 800 metres (m) from Groenfontein Farm, the pilot spotted a rhinoceros calf on the left side of the helicopter. He then initiated a left turn to get a closer look; however, during the manoeuvre, the helicopter turned out of wind. As the turn progressed, the helicopter decelerated to an airspeed below 50 knots indicated airspeed (KIAS) and

descended to a height below 400 feet (ft) above ground level (AGL). The pilot stated that after turning out of wind, the rotor system decayed to approximately 90 percent rotor revolutions per minute (rpm), and the low rotor rpm warning activated. He then attempted to recover the rotor rpm by increasing power but could not achieved this in time. The helicopter subsequently impacted the ground; it sustained substantial damage.

The pilot sustained minor injuries to the forehead, back and feet.

The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 23°52'20.9" South 29°14'49.0" East, at an elevation of 4 442ft.

Figure 1: An aerial view of the approximate accident site. (Source: Google Earth)

Figure 2: The wreckage at the accident site. (Source: Pilot)

Helicopter Description and Audio Alert (Source: Pilot Operating Handbook [POH])

All Robinson R44 Raven II helicopters are equipped with a low rotor rpm warning system. The warning horn activates when rotor rpm decreases below approximately 97%. The horn is automatically muted when the collective is fully lowered. Earlier helicopter models utilised one or two speakers mounted on the instrument console to provide the warning horn. Recent helicopter models incorporate a tone generator integrated into the helicopter audio system, allowing the low rotor rpm warning to be heard through the crew headsets.

Robinson R44 Characteristics and Emergency Procedures (Source: POH)

The Robinson R44's main rotor is considered a low-inertia rotor system. This type of rotor has a tendency to deplete its stored energy quickly, leading to the decay of main rotor rpm (Nr). Engine power is transmitted to the main rotor through a belt system, with the engine and transmission engaged through progressive tensioning of the belts. When the main rotor ceases to be driven by the engine, the pilot must quickly lower the collective to compensate for the rapid decay in Nr and ultimately prevent an aerodynamic stall of the main rotor.

Power Loss

A loss of power can result from engine failure or a failure of the drive system. Normally, this would be indicated by activation of the low Nr warning horn. Indications of a drive system defect include unusual noises or vibrations, right or left yaw or a reduction in Nr concurrent with an increase in engine speed.

Meteorological Information

The weather information in the table below was obtained from the Meteorological Aerodrome Report (METAR) that was issued by the South African Weather Service (SAWS), recorded at Polokwane International Airport (FAPP) weather station on 27 March 2026 at 0900Z. The accident site was approximately 11.7 nautical miles (nm) from FAPP.

Wind Direction	50°	Wind Speed	8 kts	Visibility	9999m
Temperature	29° C	Cloud Cover	SCT	Cloud Base	2 200
Dew Point	21° C	QNH	1026 hPa		

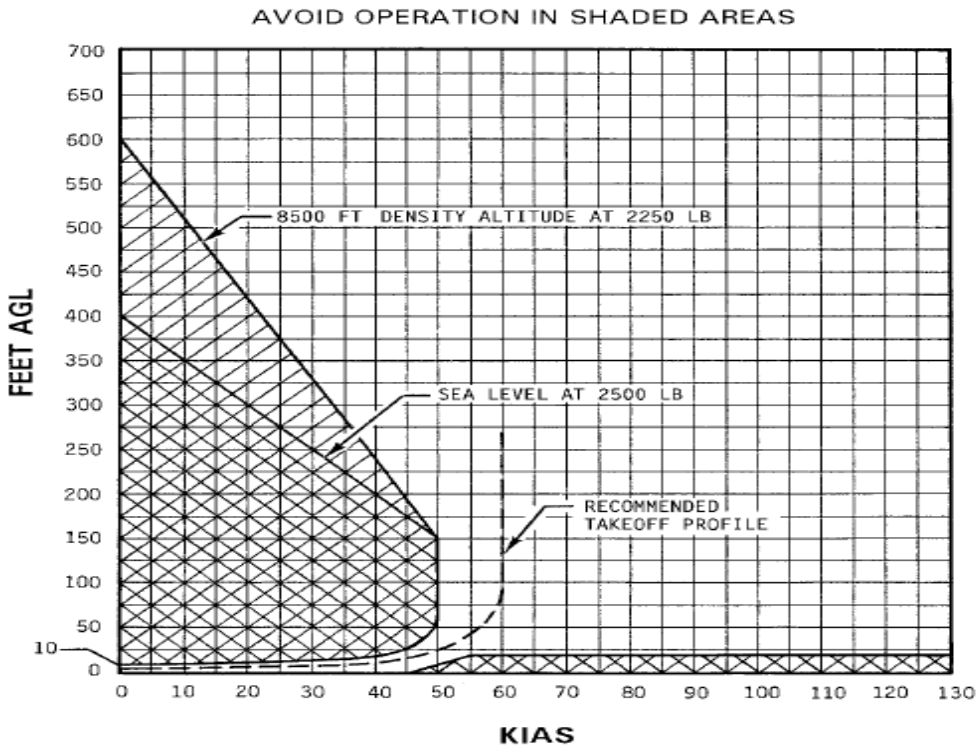

Diagram 1: Height-Velocity (H/V) Diagram. (Source: R44 POH)

The pilot stated that prior to the accident, the helicopter was operating below 400ft AGL and below 50 KIAS, which placed it within the shaded area of the Height/Velocity (H/V) Diagram, commonly

referred to as the “dead man’s curve”. This area represents a combination of low altitude and low airspeed from which safe recovery following an engine failure, rotor rpm decay, or loss of performance may be difficult or impossible due to insufficient height, airspeed and reaction time to complete a successful autorotation. In relation to this accident, the helicopter reportedly turned out of wind during a low-speed flight, which would have reduced translational lift and rotor efficiency. Operating within the area to avoid on the H/V Diagram meant that the helicopter had limited aerodynamic and energy margins available for recovery, and potential rotor rpm decay at low altitude likely contributed to the inability to recover from the developing situation.

Loss of Tail Rotor Effectiveness (LTE) (Source: Robinson Flight Manual and the International Civil Aviation Organisation [ICAO])

For helicopters such as the R44, LTE commonly occurs during low-speed, high-power operations, particularly when operating out of wind, in tailwind or left crosswind conditions, during a hover or while manoeuvring at low altitude. In these situations, disturbed airflow from the main rotor and adverse wind azimuths can interfere with the tail rotor airflow, reducing its effectiveness and causing the helicopter to yaw uncontrollably, typically to the right in helicopters with counterclockwise rotating main rotors such as the R44.

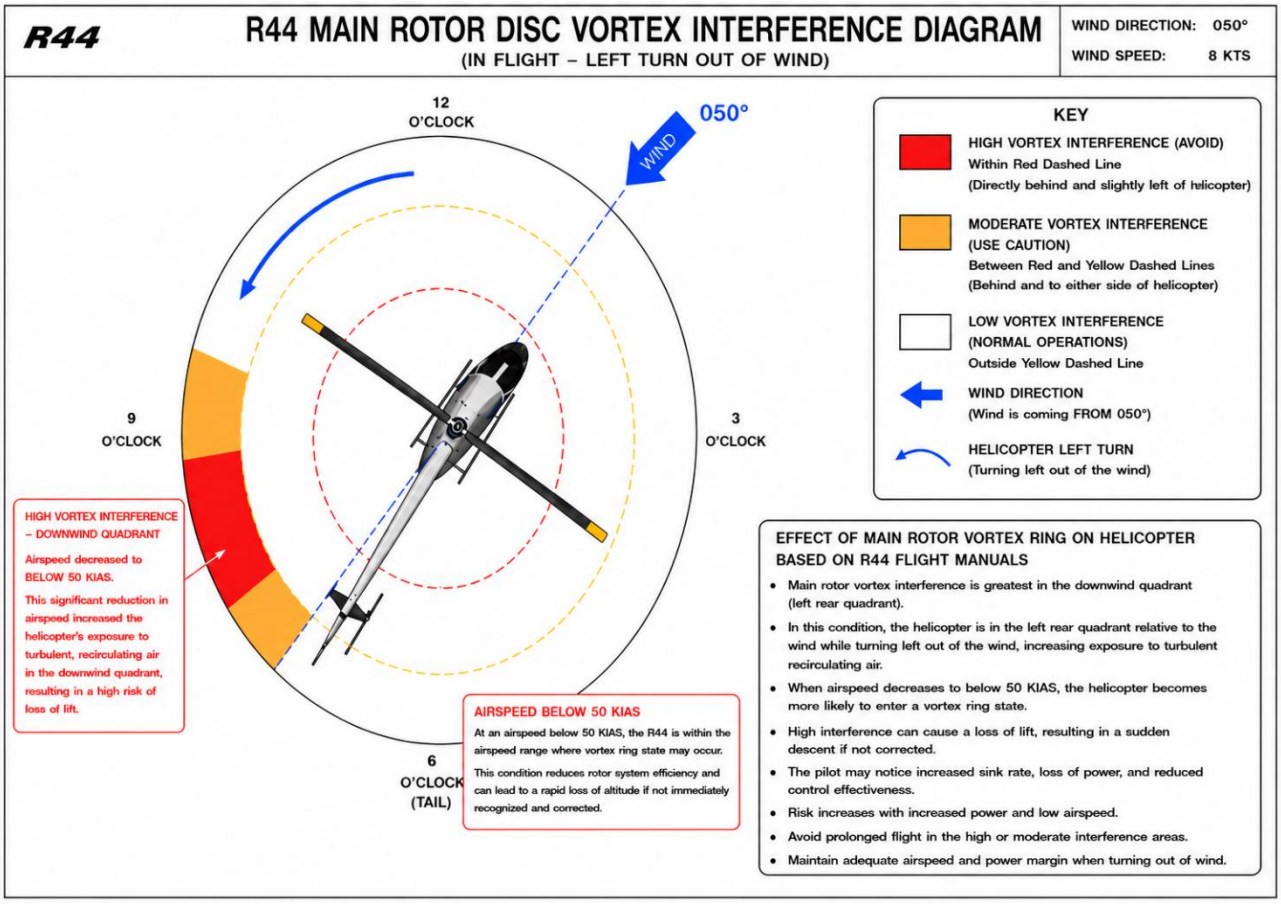

Diagram 2: An illustration of the main rotor disc aerodynamic interference at the time of the accident.

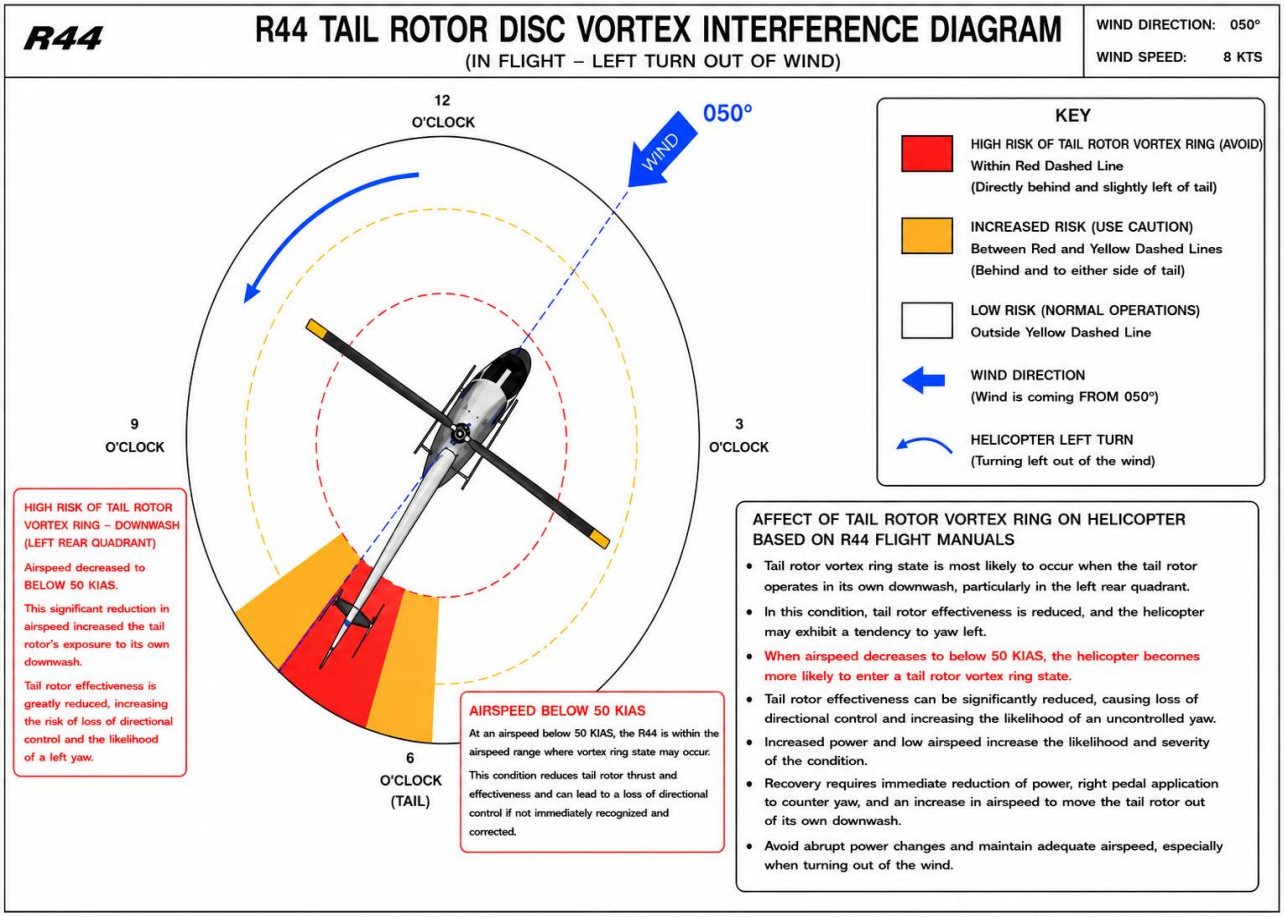

Diagram 3: An illustration of the tail rotor disc aerodynamic interference at the time of the accident.

Safety Notice SN-42

Issued: May 2013 Rev: Jul 2019

UNANTICIPATED YAW

A pilot's failure to apply proper pedal inputs in response to strong or gusty winds during hover or low-speed flight may result in an unanticipated yaw. Some pilots mistakenly attribute this yaw to loss of tail rotor effectiveness (LTE), implying that the tail rotor stalled or was unable to provide adequate thrust. Tail rotors on Robinson helicopters are designed to have more authority than many other helicopters and are unlikely to experience LTE.

To avoid unanticipated yaw, pilots should be aware of conditions (a left crosswind, for example) that may require large or rapid pedal inputs. Practicing slow, steady-rate hovering pedal turns will help maintain proficiency in controlling yaw. Hover training with a qualified instructor in varying wind conditions may also be helpful.

Note that thrust of any tail rotor decreases significantly as RPM decreases. Low RPM combined with high torque, as occurs when over-pitching, may result in an uncontrollable right yaw (see also Safety Notice SN-34).

Findings

1. Personnel Information

1.1 The pilot had a Private Pilot Licence (PPL) that was initially issued by the Regulator (SACAA) on 7 June 2013. The licence was reissued on 15 August 2024 with an expiry date of 31 July 2026. The helicopter type was endorsed in the pilot's licence. He had flown a total of 990.3 hours of which 634.9 hours were on the helicopter type.

1.2 The pilot had a Class 2 aviation medical certificate that was issued on 11 September 2025 with an expiry date of 30 September 2026.

1.3 The pilot had no restrictions on his medical certificate.

2. Helicopter Information

2.1 The last 100-hour mandatory periodic inspection (MPI) of the helicopter was conducted and certified on 26 February 2026 at 2 815.5 airframe hours. The helicopter had accrued 4.5 hours since the said MPI.

2.2 The maintenance records showed that the helicopter was equipped and maintained in accordance with the approved procedures.

2.3 The aircraft maintenance organisation (AMO) that certified the last inspection of the helicopter was issued an AMO Certificate on 26 February 2026 with an expiry date of 26 February 2027.

2.4 The helicopter had a valid Certificate of Airworthiness (C of A) that was initially issued on 23 October 2015. The latest C of A had an expiry date of 31 October 2026.

2.5 The helicopter Certificate of Registration (C of R) was issued to the present owner on 5 August 2020.

2.6 The helicopter was issued a Certificate of Release to Service (CRS) on 26 February 2026 with an expiry date of 26 February 2027 or at 2 916 airframe hours, whichever occurs first.

2.7 The helicopter's operation (400 feet above ground level [AGL] below 50 knots indicated airspeed [KIAS]) within the "dead man's curve" during a low speed turn out of wind likely

reduced rotor efficiency and recovery capability, contributing to the loss of performance and inability to recover from the developing low rotor rpm condition.

2.8 During the low speed (50 KIAS) left turn out of wind, the helicopter likely had reduced tail rotor and rotor efficiency. This led to an unanticipated yaw, loss of directional control and the uncontrolled descent (SN-42).

3. Meteorological Information

3.1 Meteorological condition did not contribute to this accident.

Probable Cause(s)

The helicopter impacted the ground after the pilot initiated a turn out of wind at low speed whilst operating within the “dead man’s curve” which reduced rotor efficiency and, subsequently, led to a loss of control and an uncontrolled descent.

Contributing Factor(s)

Poor airmanship.

Safety Action(s)

None.

Safety Message and/or Safety Recommendation/s

None.

About this Report

The decision to conduct a limited investigation is based on factors including whether the cause is known and the evidence supporting the cause is clear, the level of safety benefit likely to be obtained from an investigation and that will determine the scope of an investigation. For this occurrence, a limited 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 limited report. The report has been compiled using information supplied in the initial notification, as well as from follow-up desktop enquiries 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 occurrence.

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.

Purpose

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011 and ICAO Annex 13, 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.

Disclaimer

This report is issued by:

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