



LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/3/2/1511						
Classification	Serious Incident		Date	11 October 2025		Time	0754Z
Type of Operation	Training (Part 141)						
Location							
Place of Departure	Ultimate Heliport, Midrand, Gauteng Province		Place of Intended Landing	Grand Central Airport (FAGC), Gauteng Province			
Place of Occurrence	Approximately 1 kilometre (km) east of Ultimate Heliport, Midrand, Gauteng Province						
GPS Co-ordinates	Latitude	26°01'39" S	Longitude	28°06'40" E	Elevation	4 843ft	
Aircraft Information							
Registration	ZS-RMN						
Make; Model; S/N	Robinson, R44 Raven II (Serial Number: 0910)						
Damage to Aircraft	Minor		Total Aircraft Hours	7 290.7			
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL) H		Gender	Male		Age	49
Licence Valid	Yes	Total Hours	445.8		Total Hours on Type	328.3	
Total Hours 30 Days	31		Total Flying on Type Past 90 Days	102.9			
People On-board	2+0	Injuries	0	Fatalities	0	Other (on the ground)	0
What Happened							
<p>On Saturday morning, 11 October 2025, a flight instructor (FI) and a student pilot (SP) on-board a Robinson R44 Raven II helicopter registered ZS-RMN took off on a training flight from Ultimate Heliport in Midrand with the intention to land at Grand Central Airport (FAGC), both in Gauteng province. Visual meteorological conditions (VMC) prevailed at the time of the flight which was conducted under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011, as amended.</p> <p>The FI stated that the helicopter was parked on helipad 14 at Ultimate Heliport facility and was refuelled to full capacity (190 litres [L]) with Aviation Gasoline (Avgas) 100LL fuel. A pre-flight inspection was conducted, and no anomalies were noted. The SP started the engine and allowed it to run for a few minutes until all the parameters were within the green arch (normal operating range). Thereafter, the SP opened the throttle to 104 percent revolutions per minute (RPM) and the helicopter lifted off; it accelerated through translational lift at a forward speed of approximately 40 knots (kts), heading east. At approximately 150 metres (m) above ground, the rotor RPM warning light illuminated, and the audio warning sounded.</p>							

The helicopter rapidly lost height and the FI instantly took control and initiated an emergency landing. The FI flared the helicopter but (helicopter) it landed hard on the grass-covered area, approximately 1 kilometre (km) east Ultimate Heliport facility. The FI switched off the engine, and the pair disembarked from the helicopter; they were not injured. The FI inspected the helicopter and noticed minor damage to the skid landing gears which had stretched out slightly due to overload. Later, the FI restarted the engine and flew back to Ultimate Heli facility. The helicopter landed safely on helipad 14.

The serious incident occurred during daylight at Global Positioning System (GPS) co-ordinates 26°01'39" South 28°06'40" East, at an elevation of approximately 4 843 feet (ft).



Figure 1: Red circles indicate minor damage on the helicopter's upper portions of the landing gear skids caused by overload. (Source: Operator)

Helicopter Description (Source: Pilot's Operating Handbook [POH])

The Robinson R44 Raven I is a four-seat, single main rotor, single engine helicopter constructed primarily of metal and equipped with skid type landing gear. The primary fuselage is welded steel tubing and riveted aluminium sheet. The tail cone is a monocoque structure in which aluminium skins carry most primary loads. The helicopter was equipped with one Lycoming IO-540-FIB5 six cylinder, horizontally opposed overhead-valve, air-cooled, fuel injected, wet-sump engine with serial number L25183-40A, normally rated at 260 horsepower (hp). A direct drive, squirrel cage cooling fan mounted to the engine output shaft supplies cooling air to the cylinders and oil coolers via a fiberglass and aluminium shroud. The tail rotor had two all metal blades and a teetering hub with a fixed coning angle. The blades were constructed with aluminium skins and forged aluminium root fittings. A V-belt sheave is bolted directly to the engine output shaft. V-belts transmit power to the upper sheave which has an overrunning clutch contained in its hub. The inner shaft of the clutch transmits power

forward to the main rotor and aft to the tail rotor. Flexible couplings are located at the main gearbox input and at each end of the long tail drive shaft.

Controls

The collective stick fitted is conventional with a twist grip throttle control. When the collective is raised, the throttle is opened by an interconnecting linkage. According to the flight manual systems description, an electronic governor makes minor throttle adjustments required to maintain RPM. A twist grip throttle control located on each collective is interconnected and actuates the fuel control butterfly valve through a system of bell-cranks and push pull tubes. The linkage is designed to open throttle as the collective stick is raised. The helicopter is also fitted with a mixture control on the console face. A governor maintains engine RPM by sensing changes and applying corrective throttle inputs through a friction clutch which can be easily overridden by the pilot. The governor is only active above 80% engine RPM and can be switched on or off using a toggle switch on the end of the right seat collective. It is designed to assist in controlling RPM under normal conditions and may not prevent over or under speed conditions generated by aggressive flight manoeuvres. When operating at high density altitudes, governor response rate may be too slow to prevent overspeed during gusts, pull-ups or when lowering collective.

Meteorological Information

The weather information in the table below was obtained from the FI.

Wind Direction	270°	Wind Speed	5kts	Visibility	9 999m
Temperature	31°C	Cloud Cover	Nil	Cloud Base	Nil
Dew Point	0°C	QNH	1014hPa		

Low Rotor RPM Caution Light (Source: POH)

A horn and an illuminated caution light indicate that rotor RPM may be below 97% RPM. To restore RPM, immediately roll throttle on, lower collective and in forward flight, apply aft cyclic. The horn and caution light are disabled when collective is fully down.

Post-accident Examination of the Helicopter

Examination of the helicopter did not reveal any anomalies that would have precluded normal operation. The tail rotor components were examined and found to be in a serviceable condition with no evidence of pre-impact failures. This inspection included an engine governor system functional check and cylinder compression check. These were all assessed as serviceable at the serious incident site.

Safety Notice SN-10

Issued: Oct 1982

Revised: Feb 1989; Jun 1994

FATAL ACCIDENTS CAUSED BY LOW RPM ROTOR STALL

A primary cause of fatal accidents in light helicopters is failure to maintain rotor RPM. To avoid this, every pilot must have his reflexes conditioned so he will instantly add throttle and lower collective to maintain RPM in any emergency.

The R22 and R44 have demonstrated excellent crashworthiness as long as the pilot flies the aircraft all the way to the ground and executes a flare at the bottom to reduce his airspeed and rate of descent. Even when going down into rough terrain, trees, wires or water, he must force himself to lower the collective to maintain RPM until just before impact. The ship may roll over and be severely damaged, but the occupants have an excellent chance of walking away from it without injury.

Power available from the engine is directly proportional to RPM. If the RPM drops 10%, there is 10% less power. With less power, the helicopter will start to settle, and if the collective is raised to stop it from settling, the RPM will be pulled down even lower, causing the ship to settle even faster. If the pilot not only fails to lower collective, but instead pulls up on the collective to keep the ship from going down, the rotor will stall almost immediately. When it stalls, the blades will either "blow back" and cut off the tailcone or it will just stop flying, allowing the helicopter to fall at an extreme rate. In either case, the resulting crash is likely to be fatal.

No matter what causes the low rotor RPM, the pilot must first roll on throttle and lower the collective simultaneously to recover RPM **before** investigating the problem. It must be a conditioned reflex. In forward flight, applying aft cyclic to bleed off airspeed will also help recover lost RPM.

Findings

Flight Instructor (FI)

1. The FI had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator (SACAA) on 30 January 2025 with an expiry date of 31 January 2026. The helicopter type was endorsed on the FI's licence.
2. The FI had a Class 1 aviation medical certificate that was issued on 5 December 2024 with an expiry date of 31 December 2025.

Student Pilot (SP)

3. The SP had a Student Pilot Licence (SPL) that was initially issued by the Regulator on 19 November 2024 with an expiry date of 18 November 2025. The helicopter type was endorsed on the SP's licence.
4. The SP had a Class 4 aviation medical certificate that was issued on 23 October 2024 with an expiry date of 31 October 2029.

Aircraft

5. The aircraft's Certificate of Registration (C of R) was issued to the current owner on 27 July 2018.
6. The Certificate of Airworthiness (C of A) was initially issued on 1 July 2010. The latest C of A was issued on 18 July 2025 with an expiry date of 31 July 2026.
7. The last mandatory periodic inspection (MPI) of the aircraft was certified on 29 August 2025 at 7 230.7 total airframe hours. At the time of the serious incident, the aircraft had accrued a total of 7 290.7 airframe hours. The aircraft was flown a further 60 hours since the last MPI.
8. The aircraft Certificate of Release to Service was issued on 28 August 2025 with an expiry date of 29 August 2026 or at 7330.7 airframe hours, whichever occurs first.
9. All applicable Service Bulletins (SBs) and Airworthiness Directives (ADs) published by the engine and helicopter manufacturers were complied with.
10. The aircraft maintenance organisation (AMO) that maintained the helicopter was issued the AMO Certificate on 13 December 2024 with an expiry date of 31 December 2025.
11. The approved training organisation (ATO) was issued an ATO Certificate on 18 June 2024 with an expiry date of 30 September 2025. The Training Operations (Part 141) and the aircraft type were endorsed on the certificate.
12. A review of the aircraft technical documentation indicated no outstanding defects/deferred items. The maintenance records showed that the helicopter was certified, equipped and maintained in accordance with the approved procedures.
13. The helicopter was airworthy when it was dispatched for the flight.

Probable Cause(s)
Unsuccessful emergency landing following a decay in main rotor RPM during a low-level flight.
Contributing Factor(s)
Poor airmanship.
Safety Action(s)
None.
Safety Message and/or Safety Recommendation/s
None.
About this Report
<p><i>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 desk top 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.</i></p> <p><i>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.</i></p>
Purpose
<i>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.</i>
Disclaimer
<i>This report is produced without prejudice to the rights of the AIID, which are reserved.</i>

This report is issued by:

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