AIRCRAFT ACCIDENT REPORT AND EXECUTIVE SUMMARY

			Reference:	CA18/2/3/10633			
Aircraft Registration	ZT-RPM	**Date of Accident**	3 February 2026		**Time of Accident**	1130Z	
Type of Aircraft	Bell 230		**Type of Operation**	Training (Part 141)			
Pilot-in-command Licence Type	Airline Transport Pilot Licence (ATPL)		**Age**	76	Licence Valid	Yes	
Pilot-in-command Flying Experience		**Total Flying Hours**	23 956.5		**Hours on Type**	208.3	
Last Point of Departure	Rand Airport (FAGM), Gauteng Province						
Next Point of Intended Landing	Rand Airport (FAGM), Gauteng Province						
Damage to Aircraft	Substantial						

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)							
Kromvlei Helicopter GFA in Alberton, Gauteng province, at Global Positioning System (GPS) co-ordinates determined as S26°21´.38.5´´ E28°04´.43.8´´ at an elevation of 4 970 feet (ft)							
Meteorological Information	Wind direction: 310°; Wind Speed: 7Kts; Visibility: >10 km; Temperature: 25°C; Due point 15°C; Cloud cover: Scattered Clouds at 3 500 ft; QNH: 1025 hPa						
Number of People On-board	2+0	**Number of People Injured**	0	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On Tuesday afternoon, 3 February 2026, a flight instructor (FI) and a pilot (in training) on-board a Bell 230 twin-engine helicopter registered ZT-RPM were conducting a type conversion training flight from Rand Airport (FAGM) in Gauteng province, with the intention to return to the same airport. The flight was conducted under visual meteorological conditions (VMC) and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011, as amended.

At approximately 0900Z, the FI and the pilot commenced the first training sortie at FAGM, which consisted of an orientation flight. During the sortie, the FI demonstrated start-up, shutdown, handling, circuits and landings, and control of the helicopter transition. The flight concluded at approximately 0950Z after which the crew took a one-hour break. At approximately 1050Z, the helicopter took off on a second training sortie to Kromvlei Helicopter General Flying Area (GFA) near Panorama Airfield in Alberton, Gauteng province. The training exercise included demonstrations of confined area operations, slope landings, emergency procedures and simulated engine failures before and after take-off decision point (TDP) and landing decision point (LDP). These exercises were conducted to demonstrate the decision speeds and heights at which a take-off could be rejected, or a forced landing initiated. The final training sortie involved a Category A (CAT A) rearward departure profile. During the manoeuvre, the FI demonstrated a CAT A rearward departure and simulated a single-engine failure at approximately 200ft. above ground level (AGL) in a rearward climb. The FI then demonstrated the appropriate recovery actions by lowering the helicopter's nose and reducing power to increase airspeed towards the intended landing area during descent. At approximately 45 knots(kts), the FI initiated a flare by raising the nose; however, the helicopter continued to descend. To prevent it from settling to the ground, the FI rapidly applied power. This resulted in a loss of main rotor revolutions per minute (rpm), followed by an un-commanded yaw to the right.

The FI applied the left anti-torque pedal and additional power to regain control, but recovery was unsuccessful. The helicopter subsequently impacted the ground hard with its landing gear and bounced. After the second touch down, it rolled to the left and the main rotor blades struck the ground and severed the tail boom. A post-impact fire ensued, and the pilot extinguished it using the cabin fire extinguisher. The helicopter sustained substantial damage; the FI and the pilot were not injured.

Probable Cause			
Low tail rotor effect during demonstration of a Category A rearward departure close to the ground. The helicopter yawed to the right, impacted the ground, and rolled over. **Contributory Factor** Excessive use of power during recovery of a Category A rearward departure exercise.			
SRP date	11 August 2026	Publication date	12 August 2026

Occurrence Details

Reference Number	**:** CA18/2/3/10633
Occurrence Category	**:** Accident (Category 2)
Type of Operation	**:** Training (Part 141)
Name of Operator	**:** Capital Air
Aircraft Registration	**:** ZT-RPM
Aircraft Make and Model	**:** Bell 230
Nationality	**:** South African
Registration Marks	**:** ZT-RPM
Place	**:** Kromvlei Helicopter General Flying Area (GFA)
Date and Time	**:** 3 February 2026 at 1130Z
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) was notified of the occurrence involving a Bell 230 helicopter which occurred at Kromvlei Helicopter General Flying Area (GFA) in Alberton, Gauteng province, on 3 February 2026 at 1130Z. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions. Notifications were sent to the States of Registry, Operator, and Design and Manufacturer in accordance with the CAR 2011 Part 12 and the ICAO Annex 13 Chapter 4. Investigators were dispatched to the accident site.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Accident — this investigated accident
   Helicopter — the Bell 230 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

Table of Contents

Synopsis 1
Occurrence Details 3
Purpose of the Investigation 3
Investigation Process 3
Disclaimer 3
Contents Page 4
Abbreviations 5
1. FACTUAL INFORMATION 6
1.1. History of Flight 6
1.2. Injuries to Persons 8
1.3. Damage to Aircraft 8
1.4. Other Damage 9
1.5. Personnel Information: 9
1.6. Aircraft Information 11
1.7. Meteorological Information 13
1.8. Aids to Navigation 13
1.9. Communication 13
1.10. Aerodrome Information 13
1.11. Flight Recorders 14
1.12. Wreckage and Impact Information 14
1.13. Medical and Pathological Information 15
1.14. Fire 15
1.15. Survival Aspects 16
1.16. Tests and Research 16
1.17. Organisational and Management Information 16
1.18. Additional Information 17
1.19. Useful or Effective Investigation Techniques 21
2. ANALYSIS 21
3. CONCLUSION 23
3.1. General 23
3.2. Findings 23
3.3. Probable Cause/s 25
3.4. Contributory Factor/s 25
4. SAFETY RECOMMENDATIONS 25
5. APPENDICES 25

Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AD	Airworthiness Directives
AGL	Above Ground Level
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
ATPL	Airline Transport Pilot Licence
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
DFE	Designated Flight Examiner
EMS	Emergency Medical Services
FAA	Federal Aviation Administration
FAGM	Rand Airport
FAOR	O.R. Tambo International Airport
FDR	Flight Data Recorder
Ft	Feet
FI	Flight Instructor
GFA	General Flying Area
GPS	Global Positioning System
hPa	Hectopascal
IAW	In Accordance With
Kt	Knots
LDP	Landing Decision Point
LTE	Low Tail Rotor Effect
M	Metres
METAR	Meteorological Aerodrome Report
MPI	Mandatory Periodic Inspection
OEI	One Engine Inoperative
POH	Pilot’s Operating Handbook
QNH	Altitude Above Mean Sea Level
RPM	Revolutions per Minute
SACAA	South African Civil Aviation Authority
SB	Service Bulletins
SL	Service Letter
TBO	Time Between Overhaul
TSI	Technical Service Instructions
USA	United States of America
VMC	Visual Meteorological Conditions

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1. On Tuesday afternoon, 3 February 2026, a flight instructor (FI) and a pilot (in training) on-board a Bell 230 helicopter registered ZT-RPM were conducting a type conversion training flight from Rand Airport (FAGM) in Gauteng province, with the intention to return to the same airport. 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.

The FI stated that the helicopter had 600 litres of Jet A1 fuel in the tanks during the pre-flight inspection. The pair conducted the first training sortie at FAGM during which the FI demonstrated start-up, shutdown, handling, circuits and landings, and control of the helicopter transition. The pair landed at approximately 0950Z and took an hour break before the second training sortie. At approximately 1050Z, the pair took off again and routed to Kromvlei Helicopter General Flying Area (GFA) near Panorama Airfield in Alberton, Gauteng province. During the second sortie, the FI demonstrated confined area operations, slope landings and emergencies, simulated engine failures before and after the take-off decision point (TDP) and landing decision point (LDP). TDP and LDP refer to speed and height at which a go-around or forced landing could be initiated.

1.1.2. The last training sortie was a Category A departure (*A Category A rearward departure profile prevents loss of the pad view during a critical engine failure. It ensures that the pilot retains a direct view of the helipad, guaranteeing that if an engine fails before the TDP, the helicopter can safely reject the take-off and land back*). The FI demonstrated a Category A rearward departure exercise and simulated single-engine failure at 200 feet (ft) above ground level (AGL) in a rearward climb. Thereafter, he demonstrated how to lower the nose and reduce the power to increase speed for the landing area on descent. At approximately 45 knots (kts), he raised the nose to flare, but the helicopter kept on descending. The FI quickly applied power to prevent the helicopter from settling to the ground. This resulted in a loss of rotor revolutions per minute (rpm), and the helicopter yawed to the right. The FI applied left anti-torque pedal and power to recover control but was unsuccessful. As a result, the helicopter impacted the ground hard with its landing gears and bounced. After the second touch down, it rolled to the left and the main rotor blades struck the ground and severed the tail boom.

1.1.3. A post-impact fire ensued at the aft section of the helicopter, and the pilot extinguished it using a cabin fire extinguisher. The pilot alerted the Emergency Medical Services (EMS) about the accident. The City of Ekurhuleni medical personnel and rescue and firefighting

team swiftly responded to the scene. The helicopter was substantially damaged. The FI was transported to a hospital for a medical check-up; he was discharged on the same day. The pilot was not injured and did not want to go to the hospital.

1.1.4. The accident occurred at Kromvlei Helicopter GFA in Alberton, Gauteng province, at Global Positioning System (GPS) co-ordinates determined as S26°21´.38.5´´ E28°04´.43.8´´ at an elevation of 4 970ft.

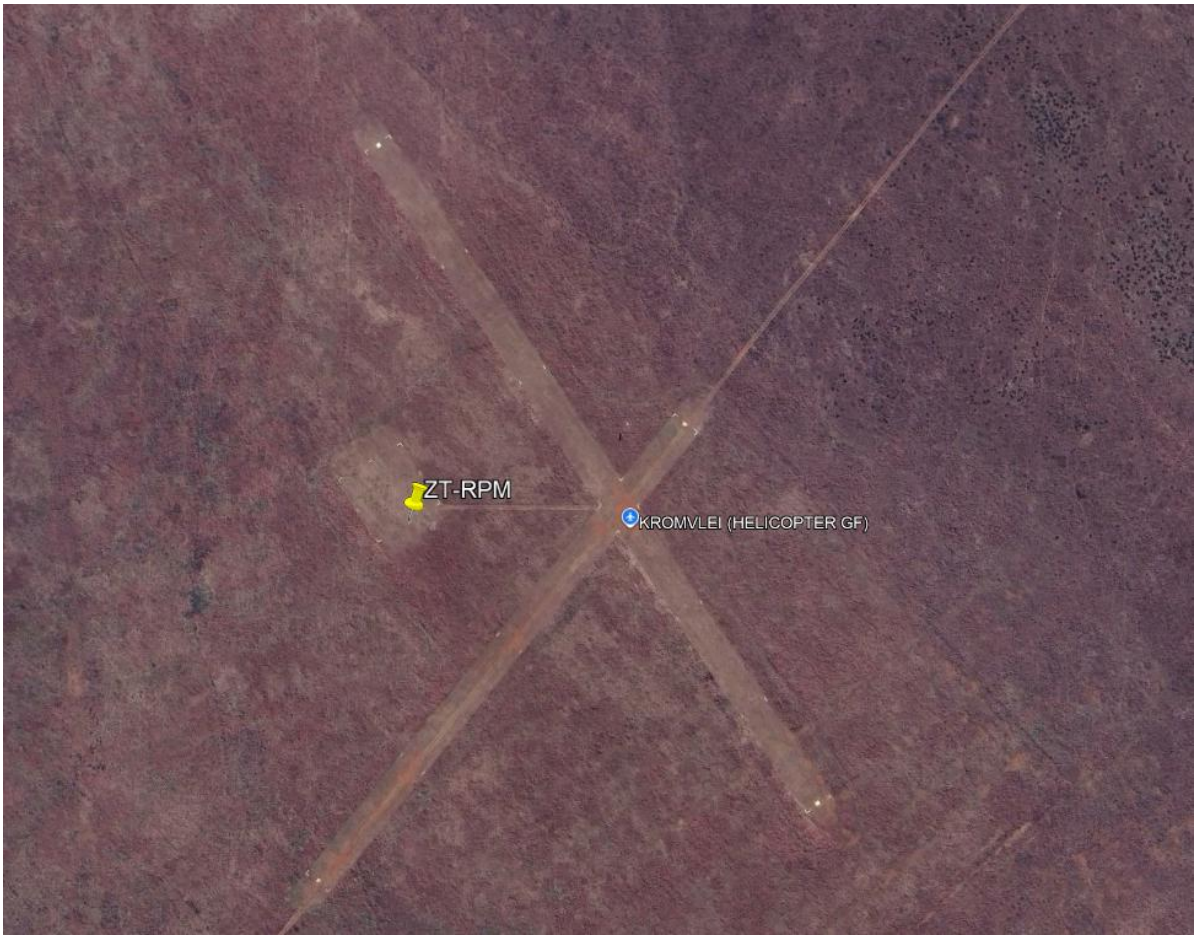


Figure 1: An aerial view of the approximate area where the accident occurred (yellow pin). (Source: Google Earth)

Figure 2: The helicopter resting on its left side after the accident.

1.2. Injuries to Persons

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

Note: Other means people on the ground.

1.3. Damage to Aircraft

1.3.1. The helicopter was substantially damaged.

Figure 3: The helicopter with the severed tail boom.

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information:

1.5.1. Flight Instructor (FI)

Nationality	South African	Gender	Male	Age	76
Licence Type	Airline Transport Pilot Licence (ATPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument Rating and Designated Flight Examiner (DFE)				
Medical Expiry Date	28 February 2026				
Restrictions	None				
Previous Accidents	None				

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

Flight Experience:

Total Hours	23956.5
Total Past 24 Hours	1.0
Total Past 7 Days	7.6
Total Past 90 Days	41.8
Total on Type Past 90 Days	2.7
Total on Type	208.3

1.5.2. The FI had an Airline Transport Pilot Licence (ATPL) endorsed with both fixed wing aircraft and helicopter. The FI was also a designated flight examiner (DFE) on helicopters. He completed his conversion to the Bell 230 model in March 2017 and, later, acquired the instructor rating on the helicopter type.

Pilot (in Training)

Nationality	South African	Gender	Male	Age	33
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	No		
Ratings	Instrument Rating (H)				
Medical Expiry Date	31 May 2026				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

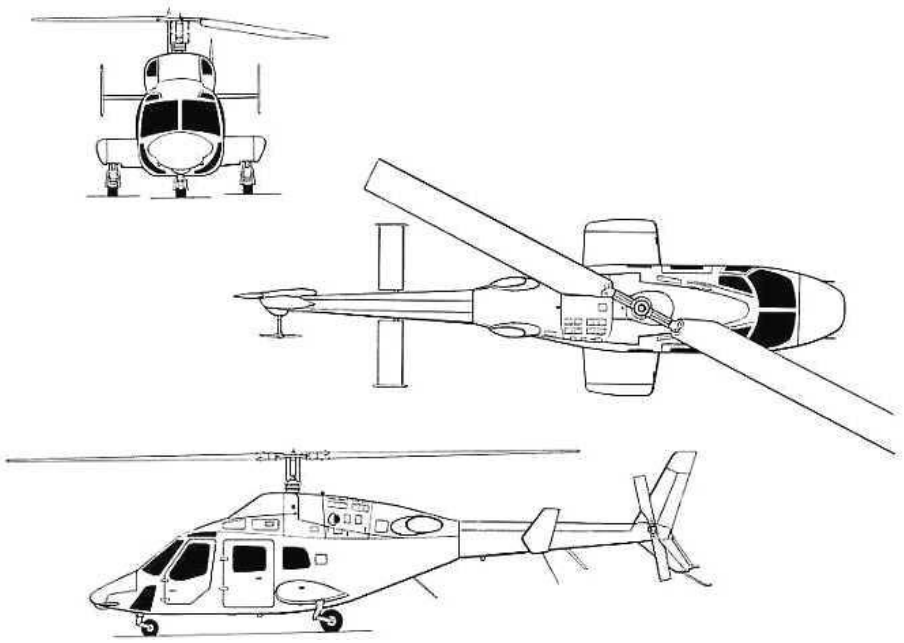
Total Hours	2 399.4
Total Past 24 Hours	1.8
Total Past 7 Days	1.8
Total Past 90 Days	1.8
Total on Type Past 90 Days	1.8
Total on Type	1.8

1.5.3. The pilot had a Commercial Pilot Licence (CPL) Helicopters (H) that was initially issued by the Regulator on 13 July 2023. The licence was reissued on 12 December 2025 with an expiry date of 30 November 2026. He had experience in several helicopter types (Robinson R66, R44 and R22, and Bell B206 and B105) which were endorsed in his licence. The pilot was conducting conversion training to Bell 230 model helicopter at the time of the accident.

1.6. **Aircraft Information**

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

The Bell 230 helicopter is a twin-engine helicopter with retractable landing gears manufactured by Bell Helicopter Textron, based in the United States of America (USA). The helicopter is powered by two 700 shaft horsepower (hp) Allison 250-C30-G2 turboshaft engines driving advanced two-blade rotors. The helicopter is also certified for Category A operations, meaning that if one engine were to fail during take-off, the helicopter would continue to fly with the remaining engine.



Airframe:

Manufacturer/Model	Bell Helicopters Textron/Bell 230	
Serial Number	23033	
Year of Manufacture	1995	
Total Airframe Hours (At Time of Accident)	1 945.1	
Last Inspection (Date & Hours)	2 October 2025	1 929.7
Airframe Hours Since Last Inspection	15.4	
CRS Issue Date	19 November 2025	
C of A (Issue Date & Expiry Date)	19 December 2025	18 December 2026
C of R (Issue Date) (Present Owner)	21 February 2018	
Operating Category	Training (Part 141)	
Type of Fuel Used	Jet A1	
Previous Accidents	None	

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

Engine 1:

Manufacturer/Model	Allison / 250-C30S
Serial Number	CAE-898270
Part Number	250-C30G/2
Hours Since New	1 945.2
Hours Since Overhaul	Time between Overhaul (TBO) is 2 000 hours / TBO not reached

Engine 2:

Manufacturer/Model	Allison / 250-C30S
Serial Number	CAE-898271
Part Number	250-C30G/2
Hours Since New	1 945.2
Hours Since Overhaul	Time between Overhaul (TBO) is 2 000 hours / TBO not reached

Main Rotor

Manufacturer/Model	Bell Helicopters
Serial Number	A-352 / A-350
Part Number	222-015-600-111
Hours Since New	1810 / 1810
Hours Since Overhaul	N/A

Tail Rotor

Manufacturer/Model	Bell Helicopters
Serial Number	A-2040 / A-2045
Part Number	222-016-001-139M
Hours Since New	4303 / 4306
Hours Since Overhaul	N/A

1.6.2. The helicopter had a Certificate of Release to Service (CRS) that was issued on 19 November 2025 with an expiry date of 19 November 2026 or at 2 080.5 hours, whichever occurs first.

1.6.3. The engine was within its prescribed time between overhaul (TBO) of 2 000 hours.

1.6.4. Examination of the helicopter maintenance records at the operator's facility indicated that all applicable Service Letters (SLs), Airworthiness Directives (ADs), Service Bulletins (SBs), Technical Service Instructions (TSIs) and Supplementary Inspection Documents (SIDs) were complied with during maintenance activities.

1.7. Meteorological Information

1.7.1. The official weather report was obtained from the South African Weather Service (SAWS). The weather information entered in the table below was recorded at 1000Z at O.R. Tambo International Airport (FAOR) Automatic Weather Station (AWS) on 3 February 2026. The accident site is 16 nautical miles (nm) from FAOR.

Wind Direction	320°	Wind Speed	07kts	Visibility	9999m
Temperature	25°C	Cloud Cover	SCT	Cloud Base	3 500ft
Dew Point	15°C	QNH	1025 hPa		

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 occurred at Kromvlei Helicopter GFA near Panorama Airfield in Alberton, Gauteng province, at GPS co-ordinates determined as S26°21´.38.5´´ E28°04´.43.8´´, at an elevation of 4 970ft.

Aerodrome Location	Panorama Airfield
Aerodrome Status	Unlicensed
Aerodrome GPS coordinates	26°19’31.03” South 28°04’03.03” East
Aerodrome Elevation	5 024ft
Runway Headings	02/20
Dimensions of Runway Used	1000m x 30m
Heading of Runway Used	N/A
Surface of Runway Used	Grass

Approach Facilities	None
Radio Frequency	124.4 MHz

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 aircraft type.

1.12. Wreckage and Impact Information

1.12.1. The accident occurred at the Kromvlei Helicopter GFA near Alberton, approximately 1.3 kilometres from Panorama Airfield. All major components were accounted for at the accident site. There were no signs of pre-impact damage that could have caused the accident. The helicopter impacted the ground hard with the main landing gears, bounced and subsequently rolled to the left. The left main landing gear was substantially damaged, and the main rotor blades struck the ground and severed the tail boom. The cabin area and the windshield remained intact. All doors remained attached to the airframe. The bladder fuel tanks did not sustain damage during the accident sequence; they were found with sufficient Jet A1 fuel after the accident.

Figure 4: The damaged left main landing gear.

1.12.2. The main rotor blade severed the tail boom during the accident sequence; it was found in proximity to the wreckage which indicated that there was low forward or rear kinetic energy. A ground mark associated with the main rotor impact was visible at the scene.

Figures 5: Ground scar made by the main rotor blades.

1.13. Medical and Pathological Information

1.13.1. Not applicable.

1.14. Fire

1.14.1. A post-impact fire ensued after the accident. The pilot used the helicopter's portable fire extinguisher to extinguish it.

Figures 6: Burnt grass due to post-impact fire.

1.15. Survival Aspects

1.15.1. The accident was survivable as the cockpit cabin area had remained intact during the accident.

1.16. Tests and Research

1.16.1. None.

1.17. Organisational and Management Information

1.17.1. This was a training flight conducted under the provisions of Part 141 of the CAR 2011, as amended.

1.17.2. The approved training organisation (ATO) had an ATO Certificate that was issued by the Regulator on 21 January 2026 with an expiry date of 28 February 2027.

1.17.3. The ATO had an operations specifications certificate that was issued by the Regulator on 28 January 2026 with an expiry of 28 February 2026. The helicopter (ZT-RPM) was listed on the operations specifications certificate.

1.18. Additional Information

1.18.1. During an interview conducted by the investigators, the FI stated that the LTE occurred after a demonstration of a Category A rearward departure during recovery close to the ground. The helicopter spun to the right, impacted the ground with the landing gear, bounced and rolled over. This was because the helicopter was underpowered, and there was a lack of left anti-torque control during recovery.

Loss of Tail Rotor Effectiveness (Source: FAA (Federal Aviation Administration) Aviation Advisory Circular 95-90; April 2009)

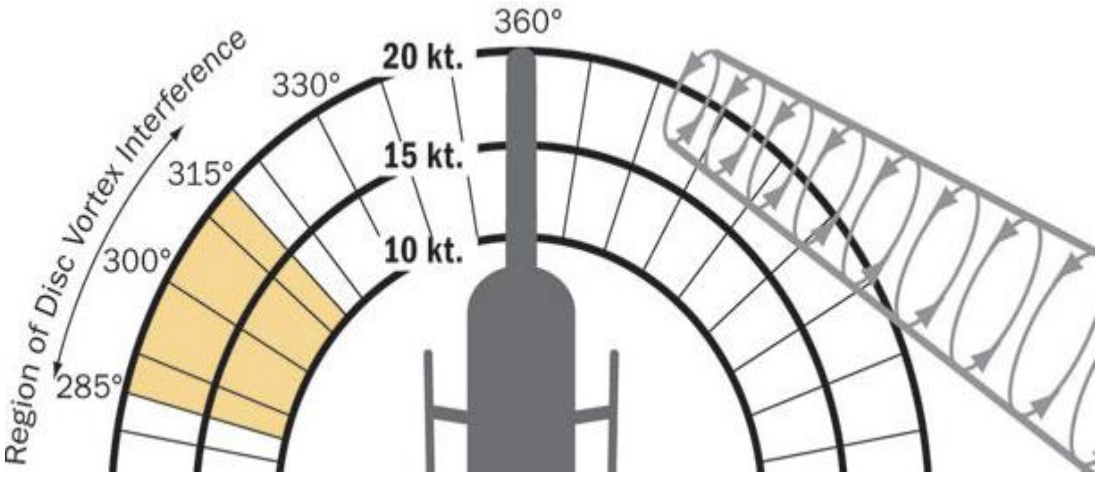


Figure 7: Illustration of LTE. (Source: FAA Aviation Advisory Circular 95-90)

Loss of Tail Rotor Effectiveness (LTE) is a critical, low-speed aerodynamic flight characteristic which can result in an un-commanded rapid yaw rate which does not subside of its own accord and, if not corrected, can result in the loss of aircraft control. LTE is not related to a maintenance malfunction and may occur in varying degrees in all single main rotor helicopters at airspeeds less than 30 knots. LTE is not necessarily the result of a control margin deficiency. The anti-torque control margin established during Federal Aviation Administration (FAA) testing is accurate and has been determined to adequately provide for the approved sideward/ rearwards flight velocities plus counteraction of gusts of reasonable magnitudes. This testing is predicated on the assumption that the pilot is knowledgeable of the critical wind azimuth for the helicopter operated and maintains control of the helicopter by not allowing excessive yaw rates to develop. LTE has been identified as a contributing factor in several helicopter accidents involving loss of control. Flight operations at low

altitude and low airspeed in which the pilot is distracted from the dynamic conditions affecting control of the helicopter are particularly susceptible to this phenomenon.

The following are three examples of this type of accident:

- *A helicopter collided with the ground following a loss of control during a landing approach. The pilot reported that he was on approach to a ridge line landing zone when, at 70 feet above ground level (AGL) and at an airspeed of 20 knots, a gust of wind induced loss of directional control. The helicopter began to rotate rapidly to the right about the mast. The pilot was unable to regain directional control before ground contact.*

- *A helicopter impacted the top of Pike's Peak at 14,100 feet mean sea level (MSL). The pilot said he had made a low pass over the summit into a 40-knot headwind before losing tail rotor effectiveness. He then lost directional control and struck the ground.*

- *A helicopter entered an uncommanded right turn and collided with the ground. The pilot was manoeuvring at approximately 300 feet AGL when the aircraft entered an uncommanded right turn. Unable to regain control, he closed the throttle and attempted an emergency landing into a city park.*

Understanding LTE Phenomena

To understand LTE, the pilot must first understand the function of the anti-torque system. On U.S. manufactured single rotor helicopters, the main rotor rotates counterclockwise as viewed from above. The torque produced by the main rotor causes the fuselage of the aircraft to rotate in the opposite direction (nose right). The anti-torque system provides thrust which counteracts this torque and provides directional control while hovering.

On some European and Russian manufactured helicopters, the main rotor rotates clockwise as viewed from above. In this case, the torque produced by the main rotor causes the fuselage of the aircraft to rotate in the opposite direction (nose left). The tail rotor thrust counteracts this torque and provides directional control while hovering. (NOTE: We will focus on U.S. manufactured helicopters.)

Tail rotor thrust is the result of the application of anti-torque pedal by the pilot. If the tail rotor generates more thrust than is required to counter the main rotor torque, the helicopter will yaw or turn to the left about the vertical axis. If less tail rotor thrust is generated, the helicopter will yaw or turn to the right. By varying the thrust generated by the tail rotor, the pilot controls the heading when hovering.

In a no-wind condition, for a given main rotor torque setting, there is an exact amount of tail rotor thrust required to prevent the helicopter from yawing either left or right. This is known as tail rotor trim thrust. In order to maintain a constant heading while hovering, the pilot should maintain tail rotor thrust equal to trim thrust. The environment in which helicopters fly, however, is not controlled. Helicopters are subjected to constantly changing wind direction and velocity. The required tail rotor thrust in actual flight is modified by the effects of the wind. If an un-commanded right yaw occurs in flight, it may be because the wind reduced the tail rotor's effective thrust.

The wind can also add to the anti-torque system thrust. In this case, the helicopter will react with an uncommanded. Left yaw. The wind can and will cause anti-torque system thrust variations to occur. Certain relative wind directions are more likely to cause tail rotor thrust variations than others. These relative wind directions or regions form an LTE conducive environment.

Conditions Under Which LTE May Occur

Any manoeuvre which requires the pilot to operate in a high-power, low-airspeed environment with a left crosswind or tailwind creates an environment where unanticipated right yaw may occur. There is a greater susceptibility to LTE in Right Turns. This is especially true during flight at low airspeed, since the pilot may not be able to stop rotation. The helicopter will attempt to yaw to the right. Correct and timely pilot response to an uncommanded right yaw is critical. The yaw is usually correctable if additional left pedal is applied immediately. If the response is incorrect or slow, the yaw rate may rapidly increase to a point where recovery is not possible.

Computer simulation has shown that if the pilot delays in reversing the pedal control position when proceeding from a left crosswind situation (where a lot of right pedal is required due to the sideslip) to downwind, control would be lost, and the aircraft would rotate more than 360° before stopping.

The pilot must anticipate these variations, concentrate on flying the aircraft, and not allow a yaw rate to build. Caution should be exercised when executing right turns under conditions conducive to LTE.

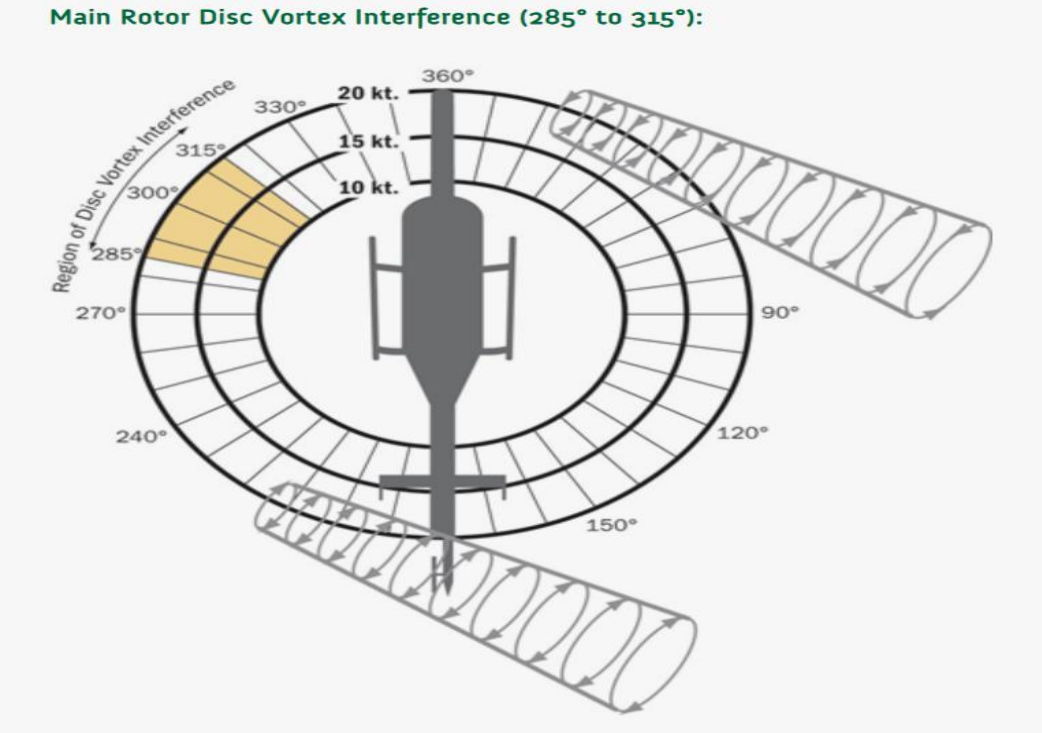


Figure 8: Main Rotor Disc Vortex Interference. (Source: Source: FAA Aviation Advisory Circular 95-90)

CATEGORY A

With respect to helicopters, Category A means a multi-engine helicopter designed with engine and system isolation features specified in ICAO Annex 8 – Airworthiness of Aircraft, Part iv B, and **capable** of operations using take-off and landing data scheduled under a critical engine failure concept which assures adequate designated surface area and adequate **performance capability for continued safe flight or safe rejected take-off.**

Note: A rejected take-off should result in no damage to the helicopter or occupants.

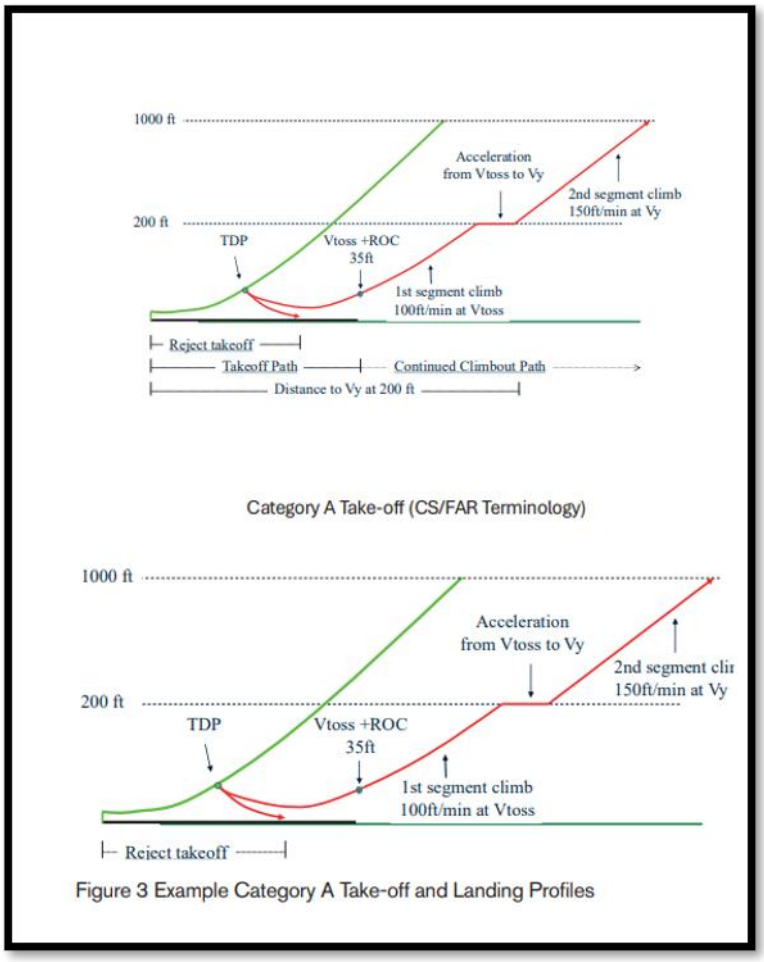


Figure 3 Example Category A Take-off and Landing Profiles

1.19. Useful or Effective Investigation Techniques

1.19.1. None.

2. ANALYSIS

2.1. General

From the available evidence, the following analysis was made with respect to this accident. This shall not be read as apportioning blame or liability to any organisation or individual.

2.2. Analysis

2.2.1. The flight instructor (FI) was initially issued an Airline Transport Pilot Licence (ATPL) on 29 May 1980. The latest licence revalidation was on 19 December 2025 with an expiry date of 31 July 2027. The pilot had the helicopter type (Bell 230) endorsed in his licence. The FI had

a Class 1 aviation medical certificate that was issued on 21 August 2025 with an expiry date of 28 February 2026. The FI had a restriction to wear suitable corrective lenses for defective distant and near vision.

2.2.2. The pilot was initially issued a Commercial Pilot Licence (CPL) on 13 July 2023. The latest licence revalidation was on 12 December 2025 with an expiry date of 30 November 2026. The helicopter type was not endorsed in his licence as he was in training. The pilot had a Class 1 aviation medical certificate that was issued on 14 May 2025 with an expiry date of 31 May 2026. The pilot had no medical restrictions.

2.2.3. The helicopter was licensed and serviceable with no defects noted on any of the maintenance logbooks at the time of the flight, and it was operated within the required regulatory framework. The aircraft had 1 945.1 total hours before the flight.

2.2.4. The FI demonstrated a Category A rearward departure exercise which included a simulated single-engine failure initiated approximately 200 feet (ft) above ground level (AGL). As part of the demonstration, the FI lowered the nose and reduced engine power to accelerate the helicopter whilst descending towards the selected landing area. As the helicopter approached the landing area at approximately 45 knots (kts), the FI raised the nose to initiate the landing flare. Although the flare reduced the forward rate of descent, the helicopter continued to descend. To prevent a hard landing, the FI rapidly increased the collective and applied power to arrest the descent.

The rapid collective application increased the power required from the engine and rotor system, resulting in a decay of the main rotor revolutions per minutes (rpm). As the tail rotor thrust is directly dependent on main rotor rpm, the reduction in rotor speed also reduced the tail rotor's ability to counter the torque produced by the main rotor. Subsequently, the helicopter yawed to the right, and the rate of yaw increased despite the FI's corrective control inputs. The loss of directional control was consistent with reduced tail rotor effectiveness (LTE) caused by rotor rpm decay following the rapid application of the collective. Although the resulting right yaw resembled the characteristics of LTE as described in FAA Aviation Advisory Circular 90-95, the available evidence indicated that the yaw developed after the decay of the rotor rpm. This suggested that the loss of directional control was associated with reduced tail rotor thrust resulting from low rotor rpm and increased power demand, rather than the aerodynamic LTE phenomenon described in the advisory circular.

The FI applied left anti-torque pedal and adjusted engine power to regain directional control. However, the helicopter was at a height that did not provide sufficient altitude (or time) for

recovery. Subsequently, the helicopter struck the ground and bounced briefly before impacting the ground for the second time and rolling onto its left side. During the accident sequence, the main rotor blades severed the tail boom before contacting the ground, resulting in substantial damage to the helicopter.

2.2.5. The on-site wreckage examination did not find any helicopter defects or anomalies that might have contributed to or caused the accident.

3. CONCLUSION

3.1. General

From the available evidence, the following findings, causes and contributing factors 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 conclusion 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.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, which led to this accident.
- **Contributing factors —** are actions, omissions, events, conditions or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident occurring, or would have mitigated the severity of the consequences of the accident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil, or criminal liability.

3.2. Findings

Personnel

3.2.1. The flight instructor (FI) was initially issued an Airline Transport Pilot Licence (ATPL) by the Regulator (SACAA) on 29 May 1980. The licence was reissued on 19 December 2025 with an expiry date of 31 July 2026.

3.2.2. The FI had a Class 1 aviation medical certificate that was issued on 21 August 2025 with an expiry date of 28 February 2026. The FI had a restriction to wear suitable corrective lenses for distant and near vision. The FI had the helicopter type endorsement in his licence.

3.2.3. The FI had accumulated a total of 23 956.5 flying hours of which 208.3 hours were accrued on the helicopter type.

3.2.4. The pilot had a Commercial Pilot Licence (CPL) that was initially issued by the Regulator on 13 July 2023. The licence was reissued on 12 December 2025 with an expiry date of 30 November 2026.

3.2.5. The pilot had a Class 1 aviation medical certificate that was issued on 14 May 2025 with an expiry date of 31 May 2026. The pilot had no restrictions listed in his medical certificate.

3.2.6. The pilot had accumulated a total of 2 399.4 flying hours of which 1.8 hours were on the helicopter type; the hours were logged during the training sorties conducted on the day of the accident.

Aircraft

3.2.7. The last 100-hour mandatory periodic inspection (MPI) of the helicopter was certified on 18 December 2024 at 3 704.7 total airframe hours. The Certificate of Release to Service (CRS) was issued on 18 December 2024 at 3 704.7 airframe hours with an expiry date of 17 December 2025 or at 3 804.7 airframe hours, whichever comes first.

3.2.8. The aircraft maintenance organisation (AMO) which performed the last MPI was issued an AMO Certificate on 22 May 2025 with an expiry date of 31 May 2026.

3.2.9. The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued by the Regulator on 6 October 2020. The latest C of A had an expiry date of 18 December 2026.

3.2.10. The Certificate of Registration (C of R) was issued to the present owner on 28 July 2025.

3.2.11. Examination of the helicopter maintenance records at the operator's facility indicated that all applicable Service Letters (SLs), Airworthiness Directives (ADs), Service Bulletins (SBs), Technical Service Instructions (TSIs) and Supplementary Inspection Documents (SIDs) were complied with during maintenance activities.

3.2.12. The operator had an operations specifications certificate which was issued by the Regulator on 31 October 2024. The helicopter (ZT-RPM) was listed in the operations specifications certificate.

3.2.13. During a demonstration of the Category A rearward departure, the FI tried to recover the helicopter close to the ground. Due to excessive throttle input and minimal anti-torque thrust, the helicopter yawed to the right, lost height rapidly and impacted the ground hard.

3.3. **Probable Cause/s**

3.3.1. Low tail rotor effect during demonstration of a Category A rearward departure close to the ground. The helicopter yawed to the right, impacted the ground, and rolled over.

3.4. **Contributory Factor/s**

3.4.1. Excessive use of power during recovery of a Category A rearward departure exercise.

4. SAFETY RECOMMENDATIONS

4.1. General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report. The AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2. Safety Recommendation/s

4.2.1. None.

5. APPENDICES

5.1. None.

This report is issued by:

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