

PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10419



Figure 1: File picture of the ZS-RLS helicopter.

(Source: http://www.surfacezero.com/g503/data/576/IMG_2356m_8002.jpg)

Description:

On 15 February 2024, an instructor and a student pilot on-board a Bell 407 helicopter registered ZS-RLS took off from Ultimate Heliport in Gauteng province to Grand Central Aerodrome (FAGC) in the same province. The crew's intention was to reposition to Grand Central Aerodrome (FAGC) to conduct training exercises on simulated engine failure autorotation with power on recovery. Clear weather conditions prevailed at the time of the flight, which was at night time.

Before the crew headed to FAGC, the instructor conducted two successful demonstrations of autorotation at the heliport. Upon arrival at FAGC, the instructor demonstrated the procedures whilst the student pilot observed. After the demonstration, the student pilot was briefed and, thereafter, allowed to practise the exercises. During the final approach for Runway (RWY) 35 at an altitude of 6 000 feet (ft), the student pilot prepared to conduct an autorotation by lowering the collective; the instructor smoothly rolled the throttle to idle position to initiate autorotation. However, an audio warning alerted the instructor that the engine had stopped. The instructor took control of the helicopter and executed a forced landing. The helicopter landed with significant force, which resulted in the main rotor blades severing the tail boom. The helicopter sustained substantial damage; no injuries were reported during this accident.

Occurrence Details

Reference Number	: CA18/2/3/10419
Occurrence Category	: Accident (Category 1)
Type of Operation	: Training (Part 141)
Name of Operator	: National Airways Corporation (NAC)
Aircraft Registration	: ZS-RLS
Aircraft Make and Model	: Bell 407
Nationality	: South African
Place	: Runway 35, at Grand Central Aerodrome (FAGC)
Date and Time	: 15 February 2024 at 1820Z
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 which involved a Bell 407 helicopter at FAGC, Gauteng province, on 15 February 2024 at 1820Z. 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.

The AIID appointed an investigator-in-charge who dispatched to the site to commence with the full investigation. Notifications were sent to the State of Registry, Operator, Design and Manufacturer in accordance with the CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The States of Manufacturer and Engine Design appointed two accredited representatives (airframe and engine). The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and the ICAO Annex 13.

The information contained in this preliminary 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 investigation that requires changes to the information depicted in this report.

The AIID reports are made available to the public at:

<http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx>

Notes:

- Whenever the following words are mentioned in this report, they shall mean the following:
Accident — this investigation accident
Helicopter — the Bell 407 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 the clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; 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.

Table of Contents

Executive Summary	1
Ocurrence Details	2
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. Helicopter Information.....	11
1.7. Meteorological Information.....	12
1.8. Aids to Navigation	13
1.9. Communication	13
1.10. Aerodrome Information	13
1.11. Flight Recorders.....	13
1.12. Wreckage and Impact Information	13
1.13. Medical and Pathological Information	20
1.14. Fire	20
1.15. Survival Aspects.....	20
1.16. Tests and Research	20
1.17. Organisational and Management Information.....	20
1.18. Additional Information	20
1.19. Useful or Effective Investigation Techniques	20
2. FINDINGS	21
3. ON-GOING INVESTIGATION.....	22

Abbreviation	Description
°	Degrees
°C	Degrees Celsius
AIID	Accident and Incident Investigations Division
ARCC	Aeronautical and Rescue Coordination Centre
ARFS	Airport Rescue and Firefighting Service
ATO	Approved Training Organisation
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CPL	Commercial Pilot Licence
CRS	Certificate of Release to Service
DAME	Designated Aviation Medical Examiner
ECU	Electronic Control Unit
FADEC	Full Authority Digital Engine Control
FAGC	Grand Central Airport
FM	Flight Manual
ft	Feet
GW	Gross Weight
HMU	Hydromechanical Unit
hPa	Hectopascal
KIAS	Indicated Airspeed in Knots
kt	Knots
m	Metres
METAR	Meteorological Aerodrome Report
MGT	Measured Gas Temperature
NG	Gas Producer RPM
NP	Power Turbine RPM
NR	Rotor RPM
OAT	Outside Air Temperature
PAPI	Precision Approach Path Indicator
QNH	Altitude Above Mean Sea Level
RPM	Revolutions per Minute
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1 On Thursday evening, 15 February 2024, a flight instructor and a student pilot on-board a Bell 407 helicopter registered ZS-RLS took off from Ultimate Heliport in Gauteng province to Grand Central Aerodrome (FAGC) in the same province. The intention was to conduct training exercises on simulated engine failure autorotation with power on recovery at the heliport, thereafter, reposition to FAGC before flying back to Ultimate Heliport. Clear weather conditions prevailed at the time of the flight. The flight was conducted under visual meteorological conditions (VMC) at night and under the provisions of Part 141 of the Civil Aviation Regulations (CAR) 2011 as amended.
- 1.1.2 The flight instructor reported that they conducted a simulated engine failure autorotation with power on recovery at the heliport before repositioning to FAGC to continue with the training exercise. Upon arrival at FAGC, the flight instructor demonstrated the emergency exercise and, thereafter, the student pilot flew a circuit and climbed to 6 000 feet (ft) (approximately 700ft above the runway level). Whilst on final approach for Runway 35 and before the student pilot commenced with the simulated forward flight engine failure exercise, the flight instructor enquired if the student pilot was comfortable with the exercise. After receiving confirmation, the student pilot lowered the collective pitch lever and entered an autorotative flight whilst the instructor rolled the throttle to idle position to split the needles between the engine revolutions per minute (RPM) and the rotor RPM on the dual gauge (*the rotor RPM pointed to the green (100%) arch on the dual gauge*). Thereafter, the crew heard an engine out aural warning (beeping sound) which meant that the engine had stopped operating. The flight instructor attempted to roll the throttle so as to auto-relight the engine but was unsuccessful. He then took control of the helicopter and performed a forced landing. He further stated that due to lack of reference (in the surroundings) and darkness, he initiated the flare at approximately 80ft above ground (AGL), which was higher than normal. This resulted in a hard landing in which the main rotor blades flapped down and severed the tail boom. The helicopter skidded on the runway for a few metres before it stopped on the centreline with the nose facing north.
- 1.1.3 In an interview with the student pilot, he stated that he arrived at the approved training organisation (ATO) Ultimate Heliport facility in Midrand at approximately 0600Z with two other student pilots. They were all briefed by the flight instructor who later conducted flights with them in the training area for about 1 hour and 20 minutes. After completing the flights, all three student pilots returned to the hotel at which they were staying. In the

evening, they returned to the ATO for night training exercises. The evening training flight exercises were conducted by a different flight instructor. Before the flight, the flight instructor briefed the student pilots on the exercises they had planned to perform, which involved forward flight engine failure. One of the other two student pilots' flight was uneventful; he disembarked from the helicopter after the flight. Thereafter, the student pilot (accident flight) took off with the flight instructor. The flight instructor demonstrated the engine failure autorotation with power recovery exercise at the heliport before he repositioned to FAGC to conduct more engine failure simulations. The student pilot maintained a "light feel" on the helicopter controls whilst the flight instructor demonstrated the exercise. The flight instructor landed the helicopter, and the student pilot took over the controls. He flew a circuit and climbed to 6 000ft. During autorotation, the engine shut down and the flight instructor took back the control of the helicopter and performed a forced landing. Both occupants disembarked from the helicopter unassisted. The flight instructor disconnected the battery as a safety precaution.

- 1.1.4 At the time of the accident, the tower was unmanned. The flight instructor notified the ATO personnel about the accident via his cellular phone who, in turn, notified the Aeronautical and Rescue Coordination Centre (ARCC). The ARCC contacted the Aerodrome Rescue and Firefighting Service (ARFFS) personnel who responded to the site.
- 1.1.5 The accident occurred at night time on Runway 35 at FAGC at Global Positioning System (GPS) co-ordinates determined to be 25°59'19.96" South 28°08'40.20" East at an elevation of 5 307 feet (ft).



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

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 sustained substantial damage.



Figure 3: The damaged helicopter after the accident.

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

Pilot-in-Command / Flight Instructor

Nationality	South African	Gender	Male	Age	39
License Type	Commercial Pilot Licence				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Multi-engine helicopter (MEH), Single-engine helicopter (SEH) Turbine, Grade 2 instructor rating				
Medical Expiry Date	31 August 2024				
Restrictions	Special Restriction as Specified (SSL)				
Previous Accidents	None				

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

Flying Experience:

Total Hours	2 609.4
Total Past 24 Hours	2.3
Total Past 7 Days	4.6
Total Past 90 Days	49.4
Total on Type Past 90 Days	20.9
Total on Type	157.2

- 1.5.1. The flight instructor was initially issued a Commercial Pilot Licence on 2 August 2023 with an expiry date of 31 August 2024 under Part 61 of the South African Civil Aviation Regulations (CAR) 2011 as amended. The flight instructor was issued a Grade 2 rating on 2 August 2023 with an expiry date of 31 August 2024.
- 1.5.2. The flight instructor was issued a valid Class 1 aviation medical certificate on 14 August 2023 with an expiry date of 31 August 2024 and with medical restrictions (Special Restrictions as Specified [SSL]).

Student pilot

Nationality	Indian	Gender	Male	Age	38
License Type	Authority to Fly (Military approval)				
Licence Valid	Yes	Type Endorsed	No		
Ratings	None				
Medical Expiry Date	28 February 2029				
Restrictions	None				
Previous Accidents	None				

Flying Experience

Total Hours	1 901.4
Total Past 24 Hours	0.4
Total Past 7 Days	2.4
Total Past 90 Days	5.0
Total on Type Past 90 Days	5.0
Total on Type	5.0

- 1.5.3. The student pilot had a Military Pilot Licence which was issued by India Defence Force on 8 May 2009. The Military Pilot Licence was validated by the Directorate General of Civil Aviation of India on 8 February 2024. The validation permitted the student pilot to undertake a type rating course and recency flights on a Bell 407 helicopter at an ATO in South Africa.
- 1.5.4. The student pilot was issued a Class 2 medical certificate on 12 February 2024 with an expiry date of 28 February 2029 and with no restrictions. The student pilot also had a medical certificate that was issued by India on 8 August 2023 with an expiry date of 7 August 2024.
- 1.5.5. The student pilot had a student file and a valid medical certificate as required by the Regulator (SACAA). On 12 February 2024, the flight instructor conducted comprehensive ground school lessons which included all aspects of the helicopter such as the systems, components, operation and emergency techniques. The following day, on 13 February 2024, the student pilot was quizzed on the technical aspects of the

helicopter. The quiz was conducted by the same flight instructor who presented the session. The student pilot showed a high level of proficiency in the quiz, which demonstrated his understanding of the helicopter.

1.5.6. At the time of the accident, the student pilot was undergoing a conversion training to the Bell 407 helicopter.

1.6. Helicopter Information (Source: Aircraft Flight Manual)

1.6.1. *The Bell 407 is a single-engine, seven-place light helicopter. The standard configuration provides for one pilot and six passengers. The fuselage consists of three main sections: the forward section, the intermediate section, and the tail boom section. The forward section utilises an aluminium honeycomb and carbon graphite structure and provides the major load-carrying elements of the forward cabin. The intermediate section is a semi-monocoque structure that uses bulkheads, longerons, and carbon fiber composite side skins. The tail boom is an aluminium monocoque construction that transmits all stresses through its external skins. The helicopter is powered by a Rolls-Royce, Model 250-C47B engine. The main rotor is a four-bladed, soft-in-plane design with a composite hub and individually interchangeable blades. The tail rotor is a two-bladed teetering rotor that provides directional control. The basic helicopter landing gear is the low skid type. Optional pop-out emergency flotation gear or high skid gear is also available.*

The full authority digital engine control (FADEC) uses a single-channel control with one microprocessor and one electronic lane. There is also a manual mode hydro-mechanical backup. The FADEC system has two main components: the airframe-mounted Electronic Control Unit (ECU) and the engine-mounted Hydro Mechanical Unit (HMU). The ENGINE OUT light and (pulsing) warning horn circuit will activate when the FADEC detects an engine flameout (by sensing Ng deceleration) or when the gas producer (Ng) speed is 55 ±1% or less.

Airframe:

Manufacturer/Model	Bell Helicopter Textron Inc / 407	
Serial Number	53009	
Year of Manufacture	1996	
Total Airframe Hours (At Time of Accident)	3 949.2	
Last Inspection (Hours & Date)	3 882.4	9 June 2023
Hours Since Last Inspection	66.8	
CRS Issue Date	9 June 2023	
C of A (Issue Date & Expiry Date)	6 June 1999	30 June 2024
C of R (Issue Date) (Present Owner)	9 June 2023	

Type of Fuel Used	Jet A1
Operating Category	Part 141
Previous Accidents	The helicopter was involved in an accident on 3 March 2004 (AIID reference number CA18/3/2/0327) in which the tail rotor blades contacted the tail boom during engine shutdown.

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

Engine:

Manufacturer/Model	Rolls-Royce
Serial Number	CAE-847010
Part Number	250-C47B
Hours Since New	Modular Assembly
Hours Since Overhaul	Modular Assembly

- 1.6.2. According to the airframe logbook, the last maintenance inspection that was conducted on the helicopter was certified on 9 June 2023 at 3882.4 airframe hours.
- 1.6.3. The Certificate of Release to Service (CRS) was issued on 9 June 2023 at 3 882.4 hours, with an expiry date of 8 June 2024 or at 3 982.4 hours, whichever comes first.
- 1.6.4. Based on the last maintenance inspection work pack, there were no previous faults detected during the Electronic Control Unit (ECU) download.
- 1.6.5. According to the airframe logbook, the rotor blades struck the tail boom on 3 March 2004. The accident was investigated by the AIID and was assigned reference number CA18/3/2/0237.
- 1.6.6. The weight and balance were within the maximum allowable take-off weight for the helicopter, according to the Aircraft Flight Manual (AFM).

1.7. Meteorological Information

- 1.7.1. The weather information below was obtained from the flight instructor through the pilot questionnaire.

Wind Direction	300°	Wind Speed	10kt	Visibility	9999m
Temperature	24°C	Cloud Cover	FEW	Cloud Base	TBA
Dew Point	17°C	QNH	TBA		

METAR for FAOR 151830Z 34009KT CAVOK 25/15 Q1017 NOSIG=

1.7.2. The official weather report was not yet made available to the investigator at the time of publication of this preliminary report.

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 before the accident.

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 before the accident.

1.10. Aerodrome Information

1.10.1. The accident occurred on Runway 35 at FAGC.

Aerodrome Location	Midrand, Gauteng province
Aerodrome Status	Licensed
Aerodrome GPS coordinates	25°59'21.75" South, 028°08'22.99" East
Aerodrome Elevation	5 307ft
Runway Headings	17/35
Dimensions of Runway Used	1 828 x 23m
Heading of Runway Used	35
Surface of Runway Used	Asphalt
Approach Facilities	Runway lights, PAPI
Radio Frequency	122.80 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 helicopter type.

1.12. Wreckage and Impact Information

1.12.1. The helicopter came to rest 475 metres (m) from the threshold of Runway 35, facing north. The cabin and the cockpit structures were intact. The skid gear showed signs of deformation, but it was still attached to the fuselage. The tail boom separated from the

airframe; it was severed at two points which meant that there were three structural pieces of the tail boom on site, namely: the tail cone, horizontal stabiliser and the front section of the tail boom. The severed structural pieces of the tail boom were located on the edge of the runway and on the right side of the main wreckage. There were scrape marks on the runway that spanned 45m from the point of impact.

There was no fuel or oil leakage on the upper deck of the helicopter and on the ground. The instrument panel was intact. The helicopter had dual flight controls installed. It was confirmed that the collective pitch lever was fully down, and the twist grip/throttle lever was at the maximum open position. The position of the throttle lever on the Hydro Mechanical Unit (HMU), which is located on the right side of the engine, confirmed the position of the throttle lever at maximum open position. The fuel valve and the master switch were turned off whilst the booster pumps were turned on. The cockpit had two doors; the right door Perspex glass had a crack. The battery terminal was disconnected.



Figure 4: The helicopter post-accident.

1.12.2. Main Rotor blades

All four main rotor blades exhibited signs of impact damage on the mid-sections and on the tips. The main rotor head had fractured. The attachment points of the white pitch change link had fractured and separated; the white pitch change link was located approximately 3m forward of the nose section. Three of the pitch change control tubes were still attached to the main rotor head; one of the pitch change control tubes near the clevis attachment had failed. The rotating and non-rotating swashplates were still secured.



Figure 5: Damage to the main rotor head.



Figure 6: The damaged pitch change link attachment.



Figure 7: Damage sustained to one of the main rotor blades.

1.12.3. Main and Tail Rotor Gearbox

The main rotor gearbox was in good condition and with no signs of damage. The oil level in the side glass indicated a quarter-full, and no signs of oil leaks were observed. The oil level was confirmed after the cone was placed upright. The attachment points did not show any signs of damage. The main drive shaft was still secured and there were no signs of deformation or misalignment. The tail rotor drive shaft was severed at different places after the main rotor blades severed the tail boom. The tail rotor blades' leading edges and surface were intact with no damage. The tail rotor gearbox was still intact.

1.12.4. Flight controls

The helicopter was equipped with dual flight controls. The control tubes were checked for continuity. The collective and cyclic movements were transmitted to the control tubes via the servo actuators. The anti-torque pedal check was not satisfactory due to damage on the tail boom. The servo actuators were still intact, and no hydraulic leaks were detected. The bell cranks were secured with no signs of failure.

1.12.5. Tailboom

The main rotor blades severed the tail boom where it attaches to the fuselage. The horizontal stabiliser and tail cone exhibited signs of damage after they contacted the main rotor blades. The tail cone skin had an imprint that matched the profile of the main rotor blade leading edge paint. Scrape marks were found on the underside of the tail rotor guard; but the tail rotor guard was not bent. The vertical stabiliser exhibited signs of contact with the tail rotor blades on the inner surface.



Figure 8: The tail cone at the accident site.



Figure 9: The severed horizontal stabiliser.



Figure 10: A section of the tail rotor drive shaft at the accident site.

1.12.6. The Engine

The external condition of the engine was in good condition. There were no leaks found around and on the underside of the engine. The outside surface of the compressor blades was in good condition. The compressor was turned by hand and it rotated smoothly. The exhaust section had no signs of debris, and the turbine blades were not damaged. There were no signs of fuel pipe and oil pipe rupture or dislocation. The forward and lower chip detectors were removed and checked for metal chips; they were found clean. Fuel sample from the forward and rear tanks was collected; the fuel was of the correct grade (Jet A1) and had no sediments or impurities.



Figure 11: The engine drive shaft.



Figure 12: The undamaged engine inlet compressor blades.

1.13. Medical and Pathological Information

1.13.1. Not applicable.

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/cabin structure remained intact. The occupants had made use of the factory-fitted 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. This was a training flight conducted under the provisions of Part 141 of the CAR 2011 as amended.

1.17.2. The ATO was issued the ATO certificate on 28 August 2023 with an expiry date of 30 September 2028.

1.17.3. The ATO had an approved training programme as required by the Regulator.

1.17.4. The AMO which conducted the last mandatory periodic inspection (MPI) had an AMO certificate that was issued on 27 March 2023 with an expiry date of 30 March 2024.

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 preliminary findings were made concerning 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

The Crew

- 2.2.1. The flight instructor was issued a Commercial Pilot Licence (CPL) on 2 August 2023 with an expiry date of 31 August 2024. The flight instructor was issued a valid Class 1 aviation medical certificate on 14 August 2023 with an expiry date of 31 August 2024 with medical restrictions (SSL). The flight instructor was issued a Grade 2 instructor rating on 2 August 2023 with an expiry date of 31 August 2024.
- 2.2.2. The student pilot was issued a Military Pilot Licence on 8 May 2009. He was issued a Class 2 medical certificate on 12 February 2024 with an expiry date of 28 February 2029 with no medical restrictions. The student pilot also had a medical certificate that was issued from India on 8 August 2023 with an expiry date of 7 August 2024.
- 2.2.3. The Military Pilot Licence was validated by the Directorate General of Civil Aviation of India on 8 February 2024.

The Helicopter

- 2.2.4. The aircraft maintenance engineer (AME) who conducted the last MPI was initially issued the AME Licence on 14 May 2015. The licence was renewed on 24 April 2023. The helicopter type was duly endorsed on his licence. The AME was authorised to conduct maintenance and to release the helicopter.

- 2.2.5. The last annual inspection on the helicopter was conducted on 9 June 2023 at 3 882.4 airframe hours. The Certificate of Release to Service (CRS) was issued on 9 June 2023 at 3 882.4 hours with an expiry date of 8 June 2024 or at 3 982.4 hours, whichever comes first.
- 2.2.6. The AMO which certified and released the helicopter was issued an AMO certificate on 27 March 2023 with an expiry date of 31 March 2024.
- 2.2.7. The aircraft was initially issued a Certificate of Airworthiness (C of A) on 11 July 1999; the reissued C of A had an expiry date of 30 June 2024.
- 2.2.8. The helicopter's Certificate of Registration (C of R) was issued to the current owner on 30 July 2019.
- 2.2.9. There were no sediments found in the fuel samples collected after the accident; the fuel was of the correct grade.

The ATO

- 2.2.10. The ATO was issued an ATO certificate on 17 June 2020 with an expiry date of 30 June 2025.
- 2.2.11. The ATO had an approved training programme.

3. ON-GOING INVESTIGATION

- 3.1. The AIID investigation is on-going and the investigator will look into 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**