SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division Accident and Incident Investigations Division Form Number: CA 12-57

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10284					
Classification	Accident	**Date**	13 April 2023	**Time**	0900Z	
Type of Operation	General Aviation and Operating Flight Rules – Game Capture Operation (Part 91)					
Location						
Place of Departure	Zoutpan Farm, Baltimore District, Limpopo Province	Place of Intended Landing	Zoutpan Farm, Baltimore District, Limpopo Province			
Place of Occurrence	Bushy terrain on Zoutpan Farm, Baltimore District, Limpopo Province					
GPS Co-ordinates	Latitude	23°10'18.53" S	Longitude	028°24'39.27" E	Elevation	3 100 ft
Aircraft Information						
Registration	ZT-RWJ					
Make; Model; S/N	Schweizer 269C (Serial Number: S1507)					
Damage to Aircraft	Substantial	Total Airframe Hours	2 390.7			
Pilot-in-command						
Licence Type	Commercial Pilot Licence (CPL)	Gender	Male	Age	35	
Licence Valid	Yes	Total Hours on Type	969.0	Total Flying Hours	4 344.0	
Total Hours 90 Days	84.0	Total Hours on Type Past 90 Days	84.0			
People On-board	1 + 0	**Injuries**	0	**Fatalities**	0	**Other (on ground)** 0

What Happened

On Thursday morning, 13 April 2023, a pilot on-board a Schweizer 269C helicopter with registration ZT-RWJ took off on a game capture operation at approximately 0845Z from Zoutpan Farm near Baltimore in the Limpopo province, with the intention to land back at the same take-off farm. 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 had bought the impalas from the farmer prior to the game capture operation. The pilot took off from the farm as planned. Whilst at a height of approximately 60 feet (ft) above ground level (AGL) and as he turned to assume position for the game capture, he felt a decrease in engine power. He then made a decision to land the helicopter as soon as possible. However, before he could find a suitable landing spot, the engine stopped. He then conducted a zero-speed vertical autorotation in accordance with the emergency procedures as prescribed in Chapter 3-2 of the pilot's Flight Manual.

Extract from the Pilot's Flight Manual, Engine Failure – Altitude above 7 feet and below 450 feet:

Conduct take-off operation in accordance with the restrictions shown on the Height Velocity Diagram. In the event of a power failure during take-off, lower the collective pitch (altitude permitting), in order to maintain rotor speed. The amount and duration of collective reduction depends upon the height above the ground at which the engine failure occurs. As the ground is approached, use back cyclic and collective as needed to decrease forward and vertical velocity. Establish level attitude prior to ground contact.

The helicopter touched down hard and as a result, the skid gear collapsed (flattened outwards) and the tail rotor drive assembly broke off and separated from the tail boom (see Figure 3).

The pilot stated that he took off with 15 US gallons (56 litres) of fuel and, when the helicopter came to rest in an upright position following the hard landing, the fuel gauge indicated 10 US gallons (37 litres). The pilot was not injured during the accident. The helicopter sustained substantial damage.

The accident occurred during daylight at Global Positioning System (GPS) co-ordinates determined to be 23°10'18.53" South, 028°24'39.27" East at an elevation of 3 100ft.

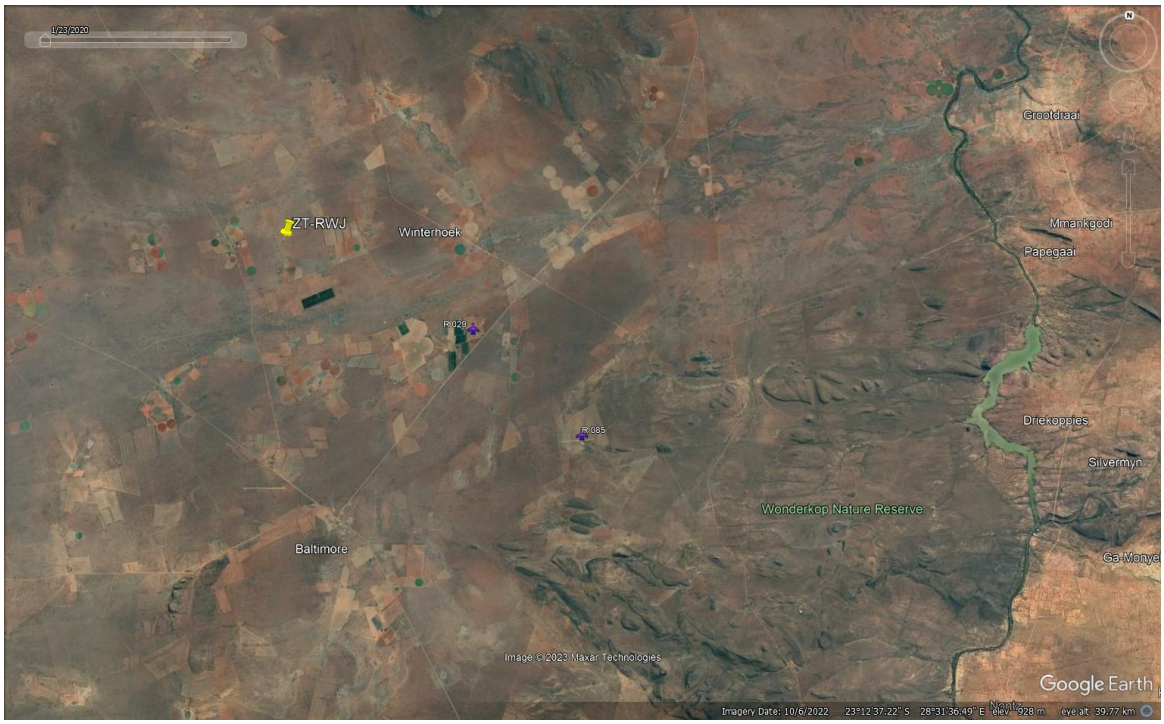

Figure 1: The yellow pin indicates the position of the accident site. (Source: Google Earth)

Figure 2: The helicopter as it came to rest. (Source: Pilot)

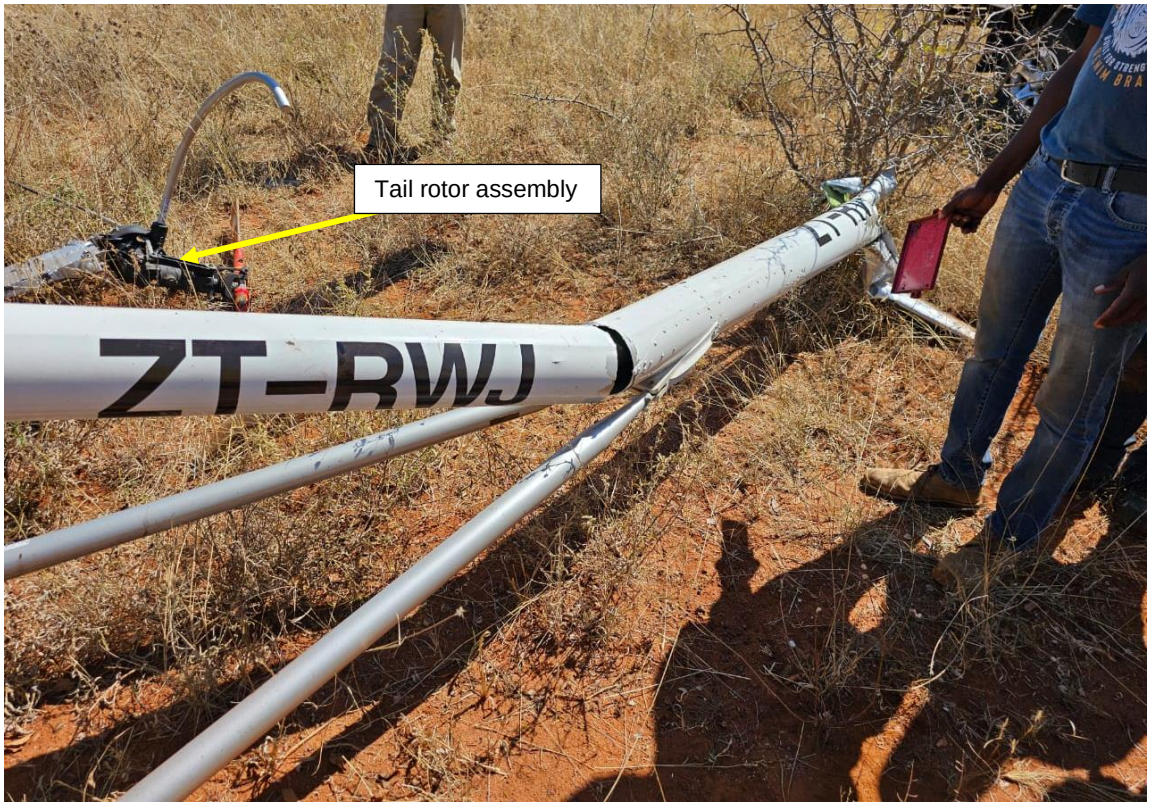

Figure 3: The damaged tail boom and the tail rotor drive assembly. (Source: Pilot)

Figure 4: The damaged main rotor blades. (Source: Pilot)

Findings

1. Personnel Information

1.1 The pilot had a valid Commercial Pilot Licence (CPL). The last renewal of the pilot's licence was on 25 June 2022 with an expiry date of 30 June 2023. The pilot had flown a total of 4 344.0 hours of which 969.0 hours were on the helicopter type.

1.2 The pilot had a Class 1 aviation medical certificate that was issued on 4 May 2022 with an expiry date of 31 May 2023.

1.3 The pilot was properly licensed and medically fit to conduct the flight in accordance with the existing regulations. The helicopter type was endorsed on his licence.

1.4 The pilot followed the emergency procedure for engine failure as per Chapter 3-2 of the pilot's Flight Manual.

2. Aircraft Information

2.1 The last maintenance inspection that was carried out on the helicopter prior to the accident flight was certified on 27 February 2023 at 2 337.8 airframe hours by an aircraft maintenance organisation (AMO). Since the inspection, a further 52.9 hours were flown on the helicopter.

2.2 The helicopter had a valid Certificate of Airworthiness (C of A) that was issued on 14 February 2019 with an expiry date of 28 February 2024. The helicopter was airworthy when it dispatched for the flight.

2.3 The aircraft Certificate of Registration (C of R) was issued on 29 November 2018.

2.4 The aircraft was issued a Certificate of Release to Service (CRS) on 27 February 2023 with an expiry date of 26 February 2024 or at 2 437.8 airframe hours, whichever occurs first.

2.5 The helicopter was fitted with a Lycoming HIO-360-D1A engine with serial number L-24847-51A. The engine was installed in the helicopter on 20 August 2021. At the time of installation, the engine had been in operation for 1 558.4 hours (total time since new) and 573.3 hours since overhaul. The engine had been in operation for 1 898.7 hours (total time) and 913.6 hours since overhaul at the time of the accident.

3. Meteorological Information

3.1 The weather information in the table below was obtained from the pilot questionnaire (form CA 12-03).

Wind Direction	045°	Wind Speed	20 kt	Visibility	9999 m
Temperature	26°C	Cloud Cover	Nil	Cloud Base	CAVOK
Dew Point	10°C	QNH	1019hPa		

4. Follow-up inspection

4.1 On-site investigation was not conducted; however, a follow-up inspection was carried out on 19 April 2023 following the recovery of the helicopter to an approved aircraft maintenance organisation (AMO). It was noted that there was no damage to the engine/components or anomaly on the helicopter fuel, induction or electrical system. The gascolator, which was undamaged was removed and inspected; the fuel inside of the gascolator was of the correct grade (Avgas 100LL) and was free of contamination. The screen type filter within the unit was clean. The gascolator was replaced, and an engine ground run with the engine in the airframe

was conducted. The wreckage was secured on a trailer used for the recovery, and an external power supply was connected. There was sufficient oil in the engine oil sump. The engine started without difficulty and ran for several minutes. Once the oil temperature and pressure were within the green arc, the engine revolutions per minute (RPM) were increased by manipulating the throttle control lever; and normal engine operation was observed. The engine was shut down and, after several minutes, a second engine start was performed. Once again, normal engine operation was observed. The engine run was captured on video.

Figure 5: Gascolator with fuel in it.

4.2 With the evidence presented during the post-recovery investigation, no evidence could be found to support the pilot's recollection that the engine stopped in operation during flight, which necessitated a forced landing.

Probable Cause

The cause of engine stoppage, which led to the pilot executing a forced landing and causing substantial damage to the helicopter, could not be determined.

Contributing Factor

(i) The wind was from the north-east (045°) at approximately 20 knots, according to the pilot. The possibility that the wind (pilot turning downwind) might have contributed to this accident could not be excluded, however, the pilot did not respond on the effect of the wind when asked to do so.

(ii) The pilot stated that the helicopter was 60ft above ground level (AGL) when he experienced a decay in engine power, followed by an engine stoppage, which is associated with low-level operations within the height velocity diagram.

Safety Action
None.
Safety Recommendation/Message
None.
About this Report
The decision regarding whether to investigate and the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited scope, fact gathering investigation was conducted to compile this limited report and allow for greater industry awareness of potential safety issues as well as possible safety action/s that the industry might want to consider in preventing a reoccurrence. *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.*
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South African Civil Aviation Authority
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