SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

LIMITED OCCURRENCE INVESTIGATION REPORT – FINAL

Reference Number	CA18/2/3/10403						
Classification	Accident	**Date**	22 December 2023	**Time**	0535Z		
Type of Operation	Crop-spraying (Part 137)						
Location							
Place of Departure	Long Hill Farm near Dalton, KwaZulu-Natal Province	Place of Intended Landing	Long Hill Farm near Dalton, KwaZulu-Natal Province				
Place of Occurrence	Seven Oaks Farm near Dalton, KwaZulu-Natal Province						
GPS Co-ordinates	Latitude	29° 11’ 23” S	Longitude	030° 31’ 45.2” E	Elevation	3311ft	
Helicopter Information							
Registration	ZS-RTJ						
Make; Model; S/N	Robbinson R44 Raven II (Serial Number:10283)						
Damage to Helicopter	Substantial		Total Helicopter Hours	4137.7			
Pilot-in-command							
Licence Type	Commercial Pilot Licence (CPL)		Gender	Male	Age	36	
Licence Valid	Yes	Total Hours	4769.10	Total Hours on Type	3352.14		
Total Hours 30 Days	34.00		Total Flying on Type Past 90 Days	79.12			
People On-board	1+0	**Injuries**	0	**Fatalities**	0	**Other (on ground)**	0

What Happened

On Friday, 22 December 2023 at 0500Z, a pilot on-board a Robinson R44 Raven II helicopter with registration ZS-RTJ took off on a crop-spraying operation from Long Hill Farm near Dalton, KwaZulu-Natal province, to Seven Oaks Farm situated near Dalton in the same province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 137 of the Civil Aviation Regulations (CAR) 2011 as amended.

The pilot was engaged in spraying maize crops when the accident occurred. As he approached the designated spraying area and had aligned the helicopter to commence spraying, he became aware of the power lines that extended to the right of the helicopter’s flight path and proceeded in that direction.

During the crop-spraying operation, the helicopter collided with the power lines that were initially not visible to the pilot because the pylon and the power lines were obscured by trees. The power lines on the pylon connected to the power lines that the pilot was aware of at the start of the second crop-spraying operation. After impact with the power lines, the pilot initiated a gradual flare to slow down the helicopter, but the power lines entangled the tail rotor and severed it. This resulted in loss of rotor control and a rightward yaw. The pilot closed the throttle to counteract the yaw and, thereafter, pulled the collective to cushion the landing. Upon touch down, the helicopter rolled to its right and rested in that position. Post-accident, the pilot turned off the master switch and the fuel cock and exited the helicopter; he was uninjured. Thereafter, he reported the accident to the operator.

The helicopter sustained substantial damage to the windshield, tail boom, fuselage, landing skids, spray boom and the main rotor blades.

Figure 1: Sketch of the accident site. (Source: Pitot)

Figure 2: The helicopter after the accident. (Source: Operator)

Figure 3: The severed tail rotor at the accident site. (Source: Operator)

Figure 4: Damaged skids, spray boom and fuselage. (Source: Operator)

Post-accident:

The pilot reported that he conducted a risk analysis prior to the crop-spraying operation. He was aware of the power lines to the right of the helicopter's flight path but did not notice the power lines which spanned across the flight path as the trees obscured the pylon from his view. This led to the helicopter impacting the power lines. The pilot stated that it was not his first time conducting a crop-spraying operation at this farm.

Extract from the operator's flight operations manual:
7.1 MINIMUM QUALIFICATION

- *CPL (H) and Typing Rating*
- *Total time on Helicopter - 500 hours (including 500 hrs as pilot-in- command)*

7.2 SPRAYING TRAINING

- *A pilot should have at least the above minimum flight hours of experience and completed an approved Aerial Applicators course before being considered for aerial spray training'.*
- *Training must be carried out in accordance with the regulations, as stipulated'.*

7.3 TECHNICAL TRAINING

- *The Pilot is to undergo a Technical Training Course every three Years.*

Obstructions: (Source: Operator's Standard operating procedures)
Whilst spraying, the aircraft will regularly encounter obstructions in the field. Each field shall be carefully surveyed in order that the pilot establishes exactly what obstructions exist and where these exist.

At high all up weight the pull-up must be carefully monitored.
Severe downdraft can occur over tall trees at the end of fields. Initial entry and pullouts should allow for this possibility.
Flying too low is not only dangerous, with the risk of striking hidden obstacles, but also results in poor application and distribution of the chemical.

The failure of the pilot to notice the obscured pylon and the power lines indicate that the risk analysis or survey was not properly conducted. This resulted in the helicopter impacting one of the power lines which was not identified during the risk analysis and, hence, the resultant accident.

Findings

1. The pilot was initially issued a Commercial Pilot Licence (CPL) Helicopter by the Regulator (SACAA) on 15 June 2012. His licence was reissued on 27 June 2023 with an expiry date of 30 June 2024. The pilot's Class 1 medical certificate was issued on 6 June 2023 with an expiry date of 30 June 2024 with no restrictions.

2. The pilot had a total of 4 769.10 hours of which 3 352.14 hours were on the helicopter type; therefore, he met the minimum qualification as prescribed in the operator's manual specified above. On 26 January 2023, the pilot completed his flight training line check, and was found competent. On 8 November 2023, the pilot completed his pilot proficiency check with the chief pilot in which he scored 90%.

3. The last mandatory periodic inspection (MPI) conducted on the helicopter was on 23 November 2023 at 4087.4 total airframe. A Certificate of Release to Service (CRS) was issued on the same day with an expiry date of 22 November 2024 or at 4187.4 hours, whichever comes first. The helicopter had accumulated a total of 4137.7 hours at the time of the accident, which meant that it was flown a further 50.3 hours after the last MPI.

4. The helicopter was issued a Certificate of Airworthiness by the Regulator on 23 September 2010 with an expiry date of 30 September 2024.

5. The Certificate of Registration (C of R) was issued by the Regulator on 8 November 2018 to the present owner.

6. The operator had an Air Operating Certificate (AOC) and an Air Service Licence (Aerial Works) that was issued by the Regulator on 31 March 2023 with an expiry date of 31 March 2024. The helicopter was endorsed on the operations specifications (OpSpec).

7. The pilot's lack of awareness of the other power lines indicated that the risk analysis or survey was not properly conducted prior to initiating the crop-spraying operation, hence, the impact with one of the power lines.

Probable Cause(s)

Failure to notice the obscured pylon with power lines during the crop-spraying operation resulted in the helicopter impacting one of the power lines.

Contributing Factor(s)

Inadequate risk analysis of the area prior to the crop-spraying operation.

Safety Action(s)

The operator stated that they will find ways to make their operations safer.

Safety Message

In the interest of safety, the operator should consider the employ of a safety officer to conduct risk assessments.

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 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.

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

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This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa