



Australian Government

Australian Transport Safety Bureau

Wirestrike and collision with terrain involving Robinson R44 II, VH-WLH

Bingegang, Queensland on 4 April 2023

ATSB Transport Safety Report

Aviation Occurrence Investigation (Short)

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Addendum

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Executive summary

What happened

On 4 April 2023, the pilot of a Robinson R44 Raven II helicopter, registered VH-WLH, was conducting aerial mustering operations on a property at Bingegang, Queensland (about 60 km south-east of Middelmount). The pilot was the only person on board.

While the pilot was reportedly flying to look for straggling cattle the helicopter struck an aerial powerline and collided with terrain. The pilot was fatally injured and the helicopter was destroyed by post-impact fuel-fed fire.

What the ATSB found

The pilot had an operational reason to be in the area at low level at the time of the accident. There was no evidence of pre-existing helicopter defects and the terrain was generally suitable for a landing had an in-flight emergency arisen.

The pilot was reportedly familiar with the property and knew that there was a powerline running across it, although it was not possible to conclusively determine the level of awareness they had of the wire's presence and location during the flight. The ATSB concluded that the pilot likely lost awareness of, and did not see, the unmarked aerial powerline during low-level aerial mustering.

The powerline was not marked and nor was there a requirement to do so. The helicopter model was not able to be fitted with wirestrike protection equipment.

Safety message

This accident provides another reminder of the dangers posed by aerial powerlines during low-level mustering. There are limits to the extent to which operators can mitigate the risk of wirestrike during low-level operations near powerlines. Helicopter wirestrike protection (WSPS) can provide a last line of defence in the event of a wirestrike. Some aircraft selected for aerial agriculture operations can be configured to include WSPS. However, this technology is not currently available on smaller helicopters such as the Robinson R44.

The ATSB has released, in association with the Aerial Application Association of Australia (AAAA), an educational booklet, *Wirestrikes involving known wires: A manageable aerial agriculture hazard* ([AR-2011-028](#)). This booklet contains numerous wirestrike accidents and lessons learned from them.

Electrical power and telecommunications companies in Australia can mark powerlines that are identified as a hazard for low-level flying operations and some have a safety scheme to reduce the costs to property owners.

The investigation

Decisions regarding the scope of an investigation are based on many factors, including the level of safety benefit likely to be obtained from an investigation and the associated resources required. For this occurrence, a limited-scope investigation was conducted in order to produce a short investigation report, and allow for greater industry awareness of findings that affect safety and potential learning opportunities.

The occurrence

On 4 April 2023, the pilot of a Robinson R44 Raven II helicopter, registered VH-WLH, was conducting cattle mustering operations on a private property at Bingegang, Queensland (about 60 km south-east of Middlemount), owned and operated by the pilot's family business. The pilot was the only person on board and was reported to be familiar with the property. The weather was clear.

Mustering commenced early in the morning and according to witnesses the pilot took a 60–90 minute break before recommencing at about 1000. At about 1110, after mustering a large mob of cattle into a holding paddock, the pilot flew back to one corner of the lot to look for stragglers. The pilot then radioed for workers on the ground to help with further mustering.

As the workers approached, they saw a plume of smoke and were unable to contact the pilot via radio. They then saw that the helicopter had struck a single-strand aerial powerline and collided with terrain. The wreckage was on fire. The pilot was unresponsive and the workers were unable to remove the pilot due to the increasing intensity of the fire.

The pilot had been fatally injured and the helicopter was destroyed by post-impact fire.

Context

Personnel information

The pilot held a private pilot licence with a class rating for single-engine helicopters and a helicopter low-level operational rating. The pilot held a class 2 civil aviation medical certificate which included the requirement for distance vision correction lenses to be worn and reading correction lenses to be available. It was reported that the pilot always wore glasses, was wearing them on the day of the accident, and that they knew of the presence of the powerline on the property.

Aircraft information

The helicopter was a Robinson R44 Raven II, serial number 14253, manufactured in the United States in 2018 and registered in Australia on 30 October 2018. It was issued with a certificate of airworthiness in the normal category on 16 November 2018.

The R44 is a single-engine, light utility and training helicopter with a semi-rigid, two-bladed main rotor, a two-bladed tail rotor and skid type landing gear. It has an enclosed cabin with two rows of side-by-side seating for a pilot and three passengers. The pilot sat on the right side, and extensive windows at the front of the helicopter afforded generally excellent visibility ahead. The accident helicopter was being flown with the doors fitted.

A wirestrike protection system (WSPS) was not fitted to the accident helicopter. In general, smaller helicopters such as Robinson R22 and R44 series had no structural hard points to fit a wirestrike

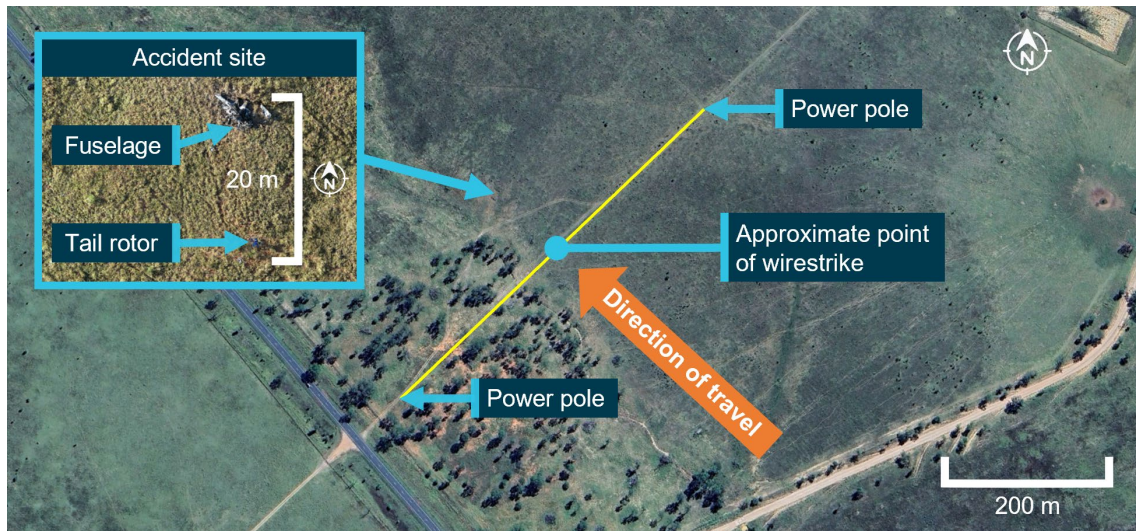
protection system, were too light, and in many instances travel too slowly for a WSPS to be effective.¹

Site information

Figure 1 shows an overview of the accident site. The powerline, a single-wire earth return (SWER) wire that ran across the property, was not marked and there was no requirement within the applicable aviation regulations, Australian Standards or elsewhere to do so. The wire was estimated to be at a height of 5.6 m at the point of impact.

The terrain was clear to the right of the helicopter's flightpath, and there were trees taller than the wire height that would have obscured the wire and pole on the left side.

Figure 1: Accident site



Source: Google, Queensland Police. Annotated by the ATSB

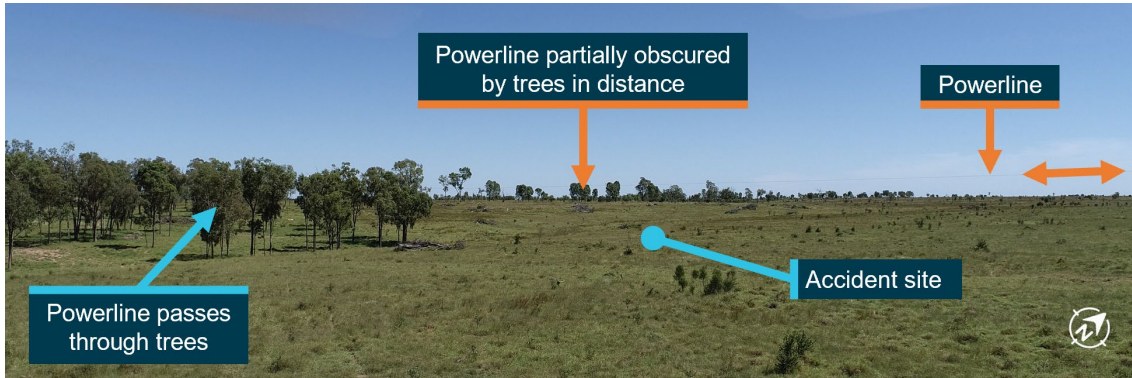
The helicopter impacted terrain left side down and yawing to the right about 90 m beyond the point of contact with the wire and facing back towards the wire. There was insufficient evidence available to determine the angle and speed of impact with the ground.

Visibility of powerline

Queensland Police officers later returned to the accident site to conduct a simulation using a remotely piloted aircraft system (RPAS) of the helicopter's approximate flight path and height prior to striking the powerline assuming that it had not turned. The simulation was conducted in conditions similar to those on the day of the accident. Images from the RPAS simulating what the pilot would have seen when approaching the wire showed the wire was difficult to distinguish from the background and the left pole was obscured by trees (Figure 2).

¹ ATSB Aviation Research and Analysis Report B2005/0055 *Wire-strike Accidents in General Aviation: Data Analysis 1994 to 2004 (Re-released September 2006)*.

Figure 2: RPAS simulation of flight path



Source: Queensland Police, annotated by the ATSB

Wreckage information

The ATSB examined the aircraft wreckage after it was moved to a secure facility by Queensland Police.

The examination of the wreckage indicated that the impact with terrain was likely not survivable. The helicopter’s cockpit, systems and engine were severely damaged by the impact and post-impact fire. Within the limitations of the available evidence, there were no indications of pre-flight defects, in-flight fire or birdstrike.

The examination found that the wire was struck between the helicopter’s nose and the upper surface of the skids. Additionally, the wire marks on the upper surface of both skids were similar, and in conjunction with the position of the wreckage indicated the helicopter was travelling about perpendicular to the wire.

During the accident sequence, the rotor struck and separated the tail boom. The nature of this damage, and other evidence, indicated that the rotor had high energy at the time.

Marks on the left oil cooler indicated that the engine and ring gear were rotating at the time of impact. Other impact marks indicated that the engine stopped rotating during the impact sequence.

The helicopter’s warning light filaments, including a carbon monoxide warning, were consistent with them not being illuminated at impact.

The helicopter was fitted with a bladder fuel tank, which was breached during the accident sequence. Due to the intense fire, it was not possible to assess how the tank was breached.

Maintenance information

The helicopter’s most recent periodic (100-hourly) inspection was carried out on 6 September 2022, at 660.6 hours in service, after which a maintenance release was issued. A review of all previous maintenance releases identified no discrepancies or significant defects. The most recent maintenance (a tail rotor blade inspection) was carried out at 674.1 hours, on 6 January 2023.

At each periodic maintenance inspection, engine cylinder compression checks were carried out. The tests resulted in satisfactory compression. However, during the most recent test (at 660.6 hours in service), the variation in compression levels was at the lower limit (10–15 psi) of where a re-test should be made within 10 engine operating hours (no later than 670.6 hours in service). There was no record that this was carried out, however, the time in service at the time of the accident could not be determined as the maintenance release was not found and was likely destroyed in the post-impact fire.

Medical and pathological information

A toxicological examination showed the pilot did not have elevated levels of carbon monoxide at the time of the accident and tests for other substances likely to have an effect on performance were negative.

Witnesses reported that the pilot was wearing the helicopter's three-point harness. The pilot was not wearing a helmet.

A final post-mortem examination report was not available at the time of publication, however, the autopsy certificate for the pilot recorded the cause of death as chest injuries resulting from the accident.

Safety analysis

Within the limitations of the available evidence, there were no indications of pre-impact defects, in-flight fire or birdstrike. Damage to the wire and helicopter were consistent with a wirestrike at a height of about 5.6 m.

The pilot had an operational reason to be in the area at low level at the time of the accident. The pilot was reportedly familiar with the property, which was also owned and operated by the pilot's family business, and knew that there was a powerline running across it, but it was not possible to conclusively determine the level of awareness they had of the wire's presence and location during the flight. However, the wire was unmarked and would have been very difficult to see from the air as it was partially obscured by large trees to the left of the helicopter's flight path and in the distance, and combined with the undulating terrain, deprived the pilot of critical visual cues. Further, the task of visually scanning for cattle that had been separated from the larger mob was a potential distraction. It is therefore likely that any awareness the pilot had of the wire was lost during the flight, and the pilot did not see it at all or in time to avoid the wirestrike.

Helicopter wirestrike protection (WSPS) can provide a last line of defence in the event of a wirestrike. Some aircraft selected for aerial agriculture operations can be configured to include WSPS. However, this technology is not currently available on smaller helicopters such as the R44.

Wreckage examination indicated that the fatal injuries sustained by the pilot probably would not have been prevented through the use of a helmet, and the pilot was wearing a three-point harness which reduces the likelihood of upper body injuries. However, in low-level operations where the risk of an accident is higher, options to improve accident survivability include the wearing of a helmet and the installation and use of a five-point harness.

Findings

ATSB investigation report findings focus on safety factors (that is, events and conditions that increase risk). Safety factors include 'contributing factors' and 'other factors that increased risk' (that is, factors that did not meet the definition of a contributing factor for this occurrence but were still considered important to include in the report for the purpose of increasing awareness and enhancing safety). In addition 'other findings' may be included to provide important information about topics other than safety factors.

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

From the evidence available, the following findings are made with respect to the wirestrike and collision with terrain involving Robinson R44 II, VH-WLH on 4 April 2023.

Contributing factors

- The pilot likely lost awareness of and did not see an unmarked aerial powerline during low-level aerial mustering.

Other factors that increased risk

- The powerline was partially obscured by trees and terrain, depriving the pilot of critical visual cues as to its presence.

General details

Occurrence details

Date and time:	4 April 2023 – 11:12 EST	
Occurrence class:	Accident	
Occurrence categories:	Wirestrike, Collision with terrain	
Location:	Bingegang, Queensland	
	Latitude: 23.1490° S	Longitude: 149.1374° E

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R44 II	
Registration:	VH-WLH	
Serial number:	14253	
Type of operation:	Part 138 Aerial work operations-Task specialist	
Activity:	General aviation / Recreational-Aerial work-Agricultural mustering	
Departure:	Mulgowrie Station, Qld	
Destination:	Unknown	
Persons on board:	Crew – 1	Passengers – 0
Injuries:	Crew – 1 (fatal)	Passengers – 0
Aircraft damage:	Destroyed	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- Civil Aviation Safety Authority
- Queensland Police Service
- maintenance organisations for VH-WLH.

References

Australian Transport Safety Bureau 2006, *Aviation Research and Analysis Report B2005/0055 Wire-strike Accidents in General Aviation: Data Analysis 1994 to 2004*.

Submissions

Under section 26 of the *Transport Safety Investigation Act 2003*, the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. That section allows a person receiving a draft report to make submissions to the ATSB about the draft report.

A draft of this report was provided to the following directly involved parties:

- the operator
- Civil Aviation Safety Authority.

A submission was received from the operator. The submission was reviewed and, where considered appropriate, the text of the report was amended accordingly.

Australian Transport Safety Bureau

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. It is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers.

The ATSB's purpose is to improve the safety of, and public confidence in, aviation, rail and marine transport through:

- independent investigation of transport accidents and other safety occurrences
- safety data recording, analysis and research
- fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia, as well as participating in overseas investigations involving Australian-registered aircraft and ships. It prioritises investigations that have the potential to deliver the greatest public benefit through improvements to transport safety.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, international agreements.

Purpose of safety investigations

The objective of a safety investigation is to enhance transport safety. This is done through:

- identifying safety issues and facilitating safety action to address those issues
- providing information about occurrences and their associated safety factors to facilitate learning within the transport industry.

It is not a function of the ATSB to apportion blame or provide a means for determining liability. At the same time, an investigation report must include factual material of sufficient weight to support the analysis and findings. At all times the ATSB endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why, in a fair and unbiased manner. The ATSB does not investigate for the purpose of taking administrative, regulatory or criminal action.

Terminology

An explanation of terminology used in ATSB investigation reports is available on the ATSB website. This includes terms such as occurrence, contributing factor, other factor that increased risk, and safety issue.