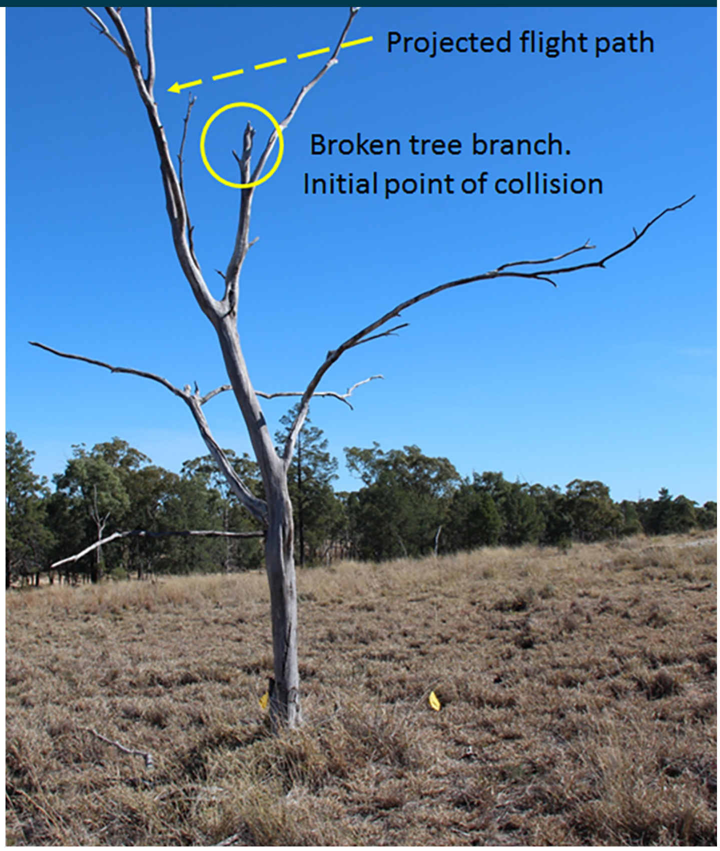
Australian Government
Australian Transport Safety Bureau

# Collision with terrain involving Robinson R22 helicopter, VH-HRW

63 km north-north-east of Mitchell, Queensland | 28 May 2015




Investigation

**ATSB Transport Safety Report**
Aviation Occurrence Investigation
AO-2015-055
Final – 26 May 2016

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**Addendum**

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# Safety summary

## What happened

On 28 May 2015, the pilot of a Robinson 22 helicopter, registered VH-HRW, was engaged in aerial mustering operations about 63 km north-north-east of Mitchell, Queensland. Late in the afternoon the helicopter's tail rotor struck the branch of a 7 m-high dead and defoliated tree, the pilot lost control of the helicopter and it collided with terrain. The helicopter was destroyed and the pilot, the sole occupant, was fatally injured.

**VH-HRW**

Source: M. Dean

## What the ATSB found

The ATSB found that the pilot was appropriately qualified and flying due west in a serviceable helicopter at low level. The sun was to the north-west and about 13°–15° above the horizon at that time. The helicopter's tail rotor collided with the upper branch of an isolated tree. That collision separated a portion of the tail rotor blades, leading to the remainder of the tail rotor and the helicopter's horizontal and vertical stabilisers and tail rotor gearbox also separating. The pilot could not control the helicopter and it collided with terrain.

Given the conditions, it is likely that sun glare and the darkened backdrop of a tree-lined dry creek bed affected the pilot's vision and perception, and therefore ability to identify the isolated tree. Despite the pilot wearing a helmet that was fitted with sun visors, the ATSB could not determine whether the visors were lowered at the time. In any event, it is likely that the pilot did not see the tree, or misjudged its height and/or its distance from the approaching helicopter.

The ATSB did not identify any pre-existing mechanical defects and established that, at the time of the accident, the helicopter was likely serviceable. The helicopter was fitted with a three-point safety harness and bladder-type fuel tanks. These tanks decrease the risk of a post-impact, fuel-fed fire. Despite these additional safety features, and the safety benefits possible from the pilot wearing a helmet, the accident was not survivable due to impact forces. A number of unrestrained items in the cabin increased the risk of injury as a result of those forces.

## Safety message

Low-level aerial mustering operations are an inherently high-risk activity. When conducting this type of operation, pilots need to consider the environmental conditions as part of their flight planning and operational risk assessment. The ATSB and the Civil Aviation Safety Authority have released a number of publications illustrating the risks associated with this type of operation that provide guidance and strategies for mitigating those risks.

# Contents

# The occurrence

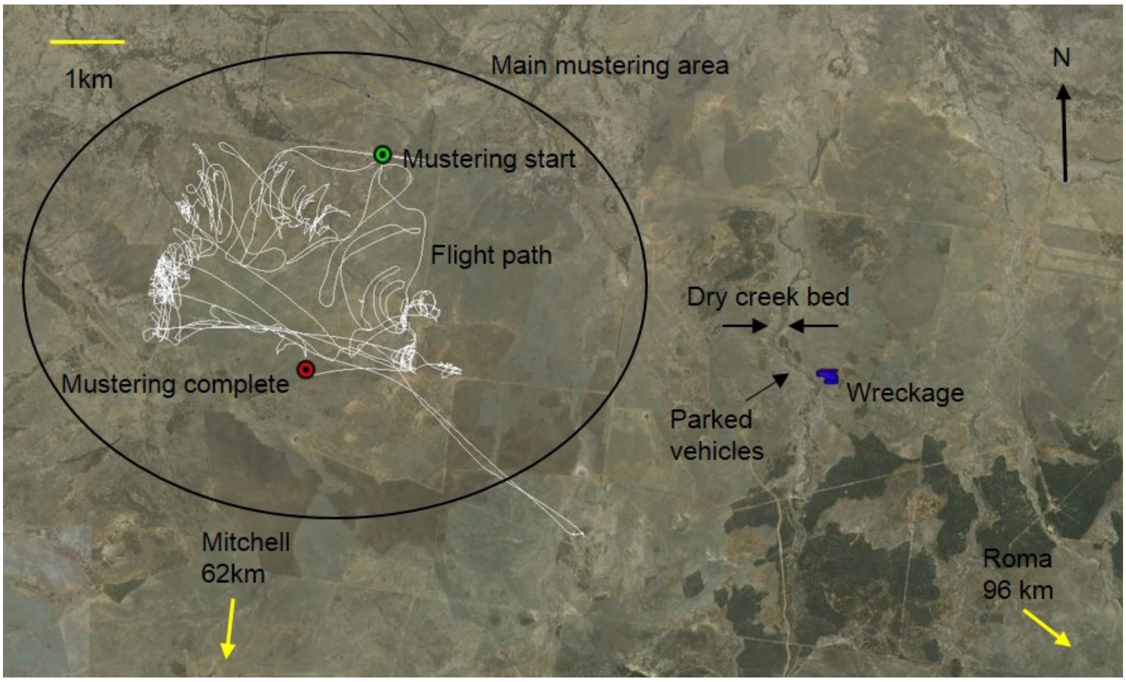
On 28 May 2015, the pilot of a Robinson 22 helicopter, registered VH-HRW, was carrying out aerial mustering operations on a property about 63 km north-north-east of Mitchell, Queensland (Figure 1). One of the property owners reported that the pilot had previously conducted mustering activities at the property.

The pilot flew VH-HRW to the mustering area from his home base earlier that day. This entailed a flight of about 20 minutes. The majority of the mustering activity followed between 1032 and 1329 Eastern Standard Time[1].

One of the property owners reported that the pilot then had a long break and a meal with the property owners and a station hand. The afternoon's activities were discussed during the meal. The plan for those activities included that, while flying back to his home base, the pilot would look for stray cattle and muster them towards a number of stationary vehicles. These vehicles were to be stationed to the west of the afternoon's operating area.

After several minutes, the station hand unsuccessfully attempted to contact the pilot by ultra high frequency radio. The station hand then drove their vehicle in the direction that the helicopter had departed. After several more minutes, the station hand located the helicopter wreckage. An attempt was made to revive the pilot but without success.

**Figure 1: Image showing the helicopter's track (in white) during the morning's mustering. This track was derived from data downloaded from the helicopter's on-board Global Positioning System receiver. The location of the helicopter wreckage is shown (in blue) reference the townships of Roma and Mitchell**




Source: Google earth, modified by the ATSB

1 Eastern Standard Time (EST) was Coordinated Universal Time (UTC) +10 hours.

# Context

The pilot held:

- a Commercial Pilot (Helicopter) Licence that was issued in 2003
- a Single Engine Helicopter rating
- an Aerial Mustering Helicopter approval
- a Civil Aviation Safety Authority (CASA) Aviation Medical Certificate.

A review of the pilot's logbook and previous aircraft maintenance releases for VH-HRW showed that the pilot had accumulated about 1,170 flight hours in R22 helicopters prior to the accident.

## Fatigue

Family and friends of the pilot provided a consolidated 72-hour history of the pilot's activities prior to the accident. These were considered to be consistent with normal rural living. No activities that would be considered overly strenuous were identified and the pilot had adequate rest periods prior to, and on the day of the accident. The mustering activity on the day was not considered excessive.

Data downloaded from the helicopter's Global Positioning System (GPS) receiver and witness accounts were reviewed to understand the pilot's activities that day. This review showed that the pilot flew for about 3 hours and 20 minutes over a period of 7 hours. This included a stop to refuel and the previously-discussed rest period and lunch after completing the main mustering activity that morning.

Based on the recorded GPS data and witness statements, the ATSB concluded that it was unlikely pilot fatigue contributed to the accident.

## Operations

The muster was coordinated with the property owners and a station hand and entailed the pilot using the helicopter to help ground personnel move the cattle to a holding point.

Recorded data from the helicopter's GPS receiver indicated that the pilot commenced mustering at 1032 and completed the muster at 1329. This was consistent with the recollection of one of the witnesses. The muster was conducted over an area of about 16 $km^2$ and could be expected to include turns and complex manoeuvres at low level to encourage cattle to move in the desired direction.

The station hand reported that, after lunch and resting, they observed the helicopter land on a property road shortly after it departed on the return flight to the pilot's home base. The landing was to the west of a tree-lined dry creek. The pilot got out of the helicopter, opened a gate, got back in the helicopter, and then departed in an easterly direction.

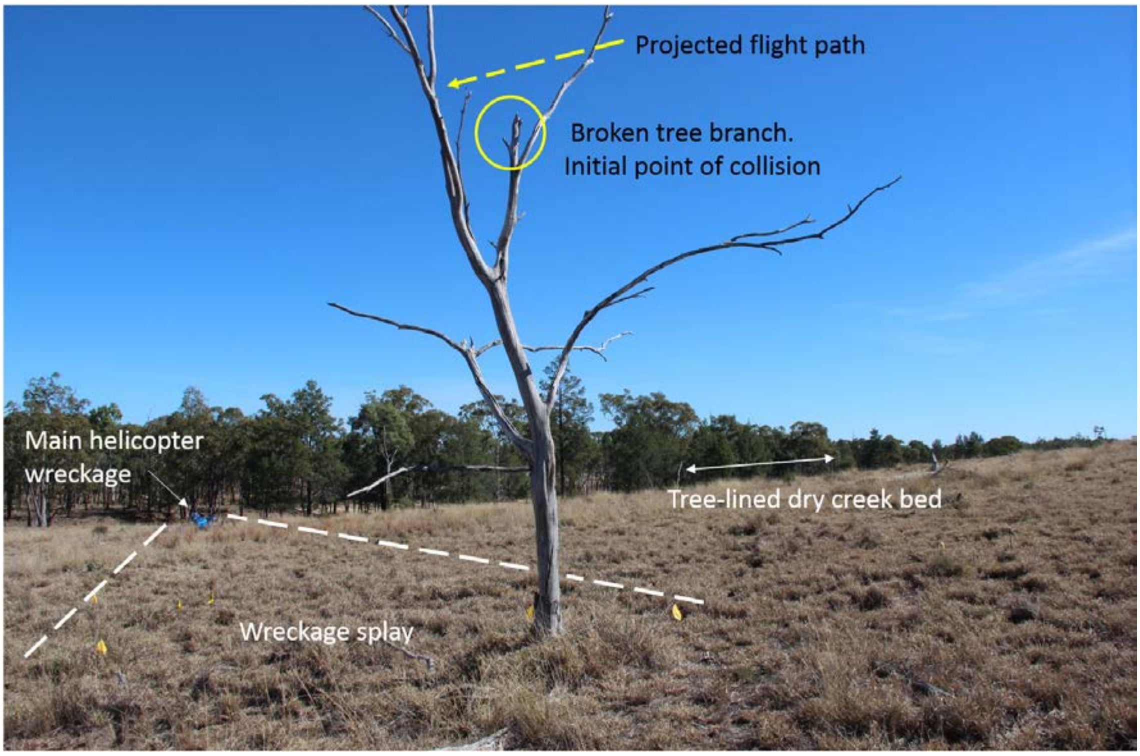
The station hand and the property owner recalled separately that the 1600 radio news broadcast commenced on their vehicle's radios at about that time.

The station hand, who reported being familiar with the helicopter, reported that when the helicopter departed from the road it sounded and appeared to be operating normally. That was the last recorded sighting of the helicopter prior to the discovery of the wreckage.

## Wreckage information

Examination of the helicopter wreckage and ground scars found that the tail rotor blades collided with the upper branch of an isolated, 7 m-high dead and defoliated tree (tree) that was about 100 m to the east of a tree-lined dry creek bed. The terrain sloped down towards the creek bed at about 2°–5° (Figure 2).

**Figure 2: Helicopter flight path looking to the west. The estimated right-to-left flight path (indicated by a yellow dashed arrow) is derived from the impact point with the dead and defoliated tree and the position of the main helicopter wreckage**

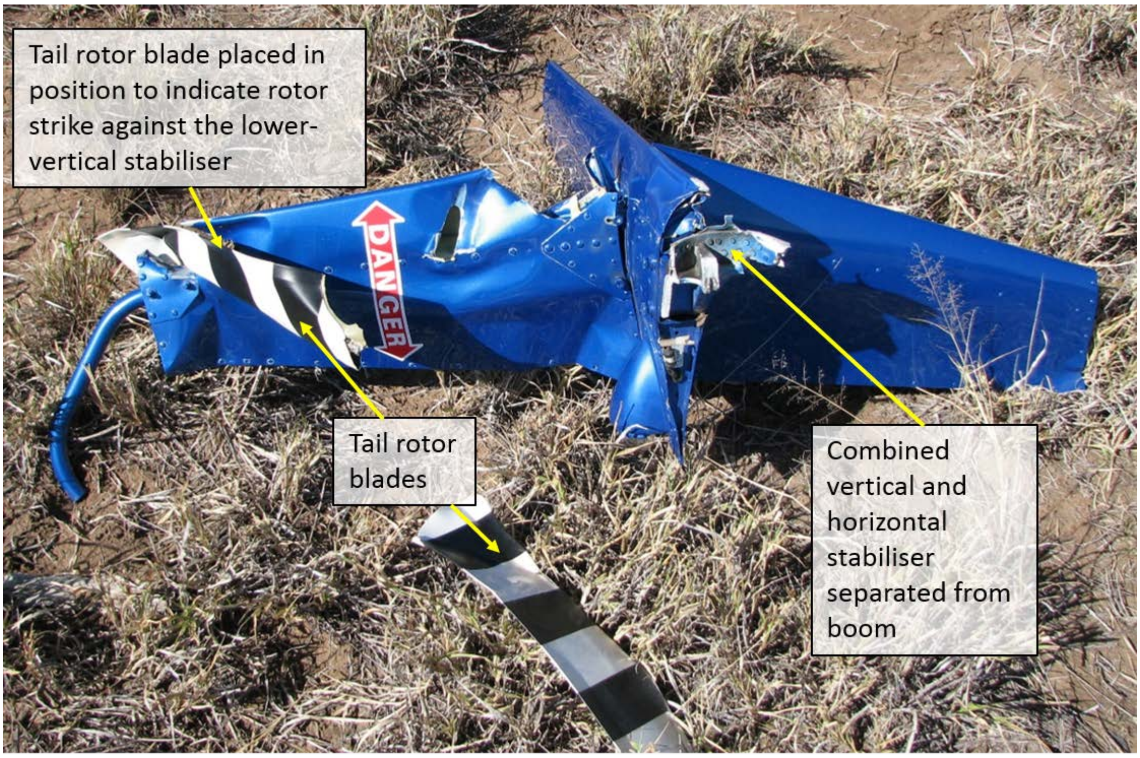



Source: ATSB

On contact with the tree, segments of the two tail rotor blades separated from the tail rotor. During the ensuing impact sequence, one of these blades struck the lower-vertical stabiliser, causing the combined vertical and horizontal stabilisers[2] and tail rotor gearbox to separate from the tail boom (Figure 3). The tail rotor blades, combined horizontal and vertical stabilisers and gearbox were co-located in close proximity to the tree.

[2] The R22 has combined vertical and horizontal stabilisers fixed to the right side of the tail boom.

**Figure 3: Combined horizontal and vertical stabilisers and tail rotor blades after their separation from the helicopter. One of the two tail rotor blades has been placed against the lower-vertical stabilizer to demonstrate the impact point after the initial strike with the dead and defoliated tree**




Source: ATSB

The remainder of the helicopter continued for an additional 40–50 m west of the tree, impacted terrain and pivoted on the remainder of the tail boom in a clockwise direction. Shortly after, the fuselage and main rotor blades collided with terrain.

During the accident sequence, the main rotor blade pitch links fractured in overload, consistent with the impact forces. One of the two rotor blades penetrated the acrylic glass canopy. The instrument console was dislodged from its mounting and ejected from the cockpit (Figure 4). The helicopter’s clock stopped at 1605, not inconsistent with the helicopter colliding with terrain about 5 minutes after it departed from the property road and the time taken by the station hand to locate the wreckage of the helicopter.

The main and auxiliary fuel tanks contained a significant quantity of fuel. A sample of that fuel was tested on-site and found to be adequate for continued flight. The fuel tanks sustained significant crushing and deformation damage. In addition, the tail rotor drive train flex plate[3] coupling penetrated the full thickness of the main aluminium tank. However, the internal fuel bladder was not punctured and did not leak (Figure 5). There was no fire.

Continuity of the main rotor drive train was established with evidence that, at impact, the engine was producing significant power. This included torsional deformation of the main and tail rotor drive shafts, chord wise scratching of the main rotor blades and absence of main rotor blade coning.

The ATSB established that, based on the on-site physical evidence, it was likely the helicopter was mechanically sound prior to colliding with the tree with no pre-existing mechanical defects that may have contributed to the accident.

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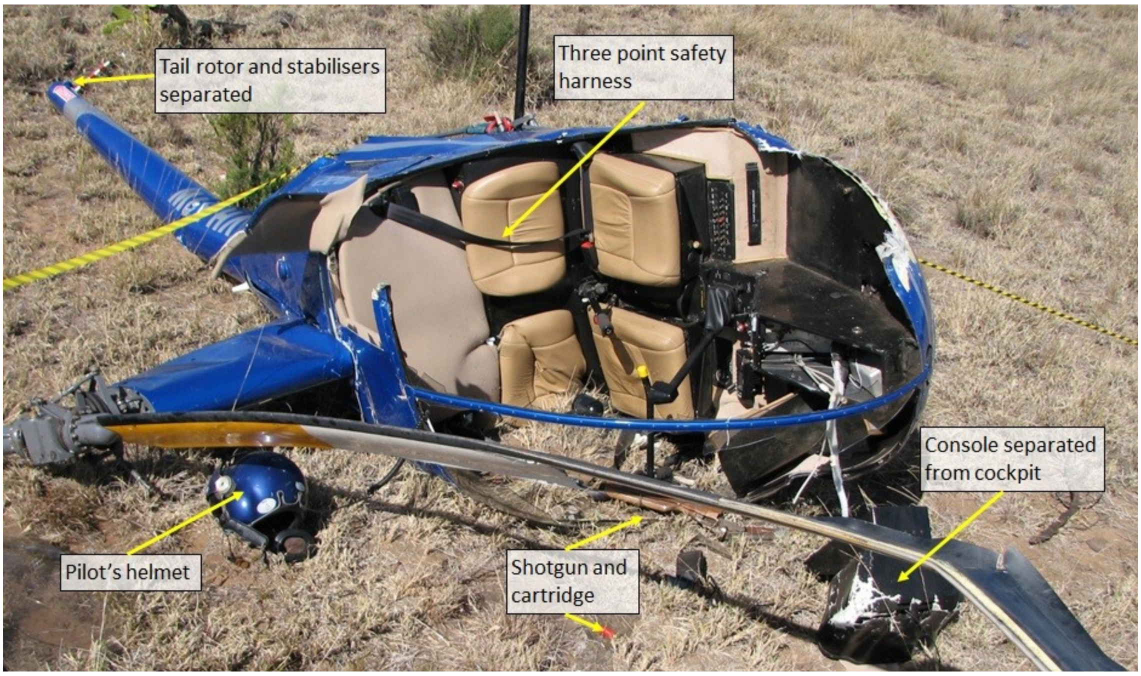
3 The flex plate is a device that allows for small misalignments of the rotating clutch shaft as it transmits engine power to the rotor system drive train.

**Figure 4: Helicopter wreckage, showing the ejected instrument console, damaged main rotor blade and destroyed canopy**




Source: ATSB

## Survivability

### *Helicopter equipment*

The two seat bases in the R22 helicopter also serve as storage compartments for the helicopter. Constructed of aluminium, the seat 'boxes' are designed to absorb and limit the transfer of impact forces to the pilot and passenger in the event of an accident. Goods that do not impede that safety feature, and are within specific weight limits, can be placed inside the storage compartment.

The pilot's seat base was found partially compressed, consistent with the absorption of vertical impact forces during the accident sequence. The pilot and passenger seat bases contained various stowed items that were within the manufacturer's allowable weight limits. All items found at the accident site had been retained within the compartments.

During recent maintenance the helicopter was fitted with front-seat three-point safety harnesses. The pilot was wearing their three-point safety harness and, although fatally injured, was effectively restrained during the impact sequence.

### *Installation of bladder-type fuel tanks*

During the recent maintenance, the helicopter was modified and fitted with bladder-type fuel tanks. These tanks reduce the risk of a post-impact, fuel-fed fire.

**Figure 5: Ruptured aluminium main fuel tank. Note that the remaining fuel was retained by the internal fuel bladder**


Source: ATSB

### *Personal equipment - aviation helmet*

The pilot was wearing an aviation helmet built to the United States (US) military standard MIL-DTL-87174A that was fitted with yellow and dark grey sun visors. The visors could be raised and lowered by the pilot at two pivot points, one on each side of the helmet. The ATSB could not determine if either visor was being used at the time of the accident.

Impact damage was identified to the left and right sides of the helmet. The right side of the cockpit, above the door cut-out, had an impression consistent with the shape of the pilot's helmet sun visor pivot point.

### *Loose/unrestrained items*

Loose, or unrestrained items were recovered in and around the wreckage. The most significant items were a digital single-lens reflex camera, two shotguns and a bag of live ammunition. A witness reported that some pilots use shotguns during mustering operations and for feral animal control.

One of the shotguns collided with one of the main rotor blades during the impact sequence. Live cartridges were scattered throughout the wreckage and the digital single-lens reflex camera was severely disrupted.

Unrestrained or loose items are known to increase the risk of loss of flight control or injury during flight.

## Medical and pathological information

Post-mortem examination and toxicology analysis of the pilot did not reveal any evidence of a physiological condition that may have contributed to the occurrence, nor any evidence of drug or alcohol use. The examining forensic pathologist reported that the pilot sustained fatal injuries that were consistent with the type of injuries encountered in a helicopter accident.

## Meteorological information

According to the Bureau of Meteorology, at about 1500 the weather at Mitchell, about 63 km south-south-west of the accident site, included few[4] clouds with light south-westerly winds and a temperature of 26 °C.

Witnesses who were associated with the mustering operation reported that the flying conditions at the property were 'very good'.

The pilot was flying in a westerly direction at the time of the accident. According to the Geoscience Australia website (see www.ga.gov.au/), between 1600 and 1615 the sun was at an elevation of about 13°–15° above the horizon and at an azimuth[5] of about 301°–303°. That was, about 30° to the right of the helicopter's westerly track.

## Research

### Aerial mustering

Aerial mustering is the use of aircraft to locate, direct and concentrate livestock. It involves operating in an inherently hazardous environment while the aircraft is manoeuvred close to obstacles at very low heights, usually below a height of 500 ft above the surface.

In 2015, CASA released a report titled *Sector Risk Profile for the aerial mustering sector.* The report showed that the Robinson R22 helicopter is the most common model of helicopter on the Australian register and that about 62 per cent of the total R22 hours flown has been in aerial mustering operations. The report also discussed the development of a CASA risk profile tool to take account of the risks associated with aerial mustering operations and the associated operating environment. The report stated that the purpose of the 'aerial mustering risk profile' was to:

> …present a picture of the key risks and effects arising from the operations of the sector's fleet of aircraft at a given point in time. CASA and selected industry sector participants developed the sector risk profile through a process in which risks were jointly identified, assessed and evaluated for treatment. When fully implemented these risk treatments should reduce the risk profile of the sector.

A study conducted by the ATSB in 2004 titled *Light Utility Helicopter Safety in Australia* found that between 1985 and 2003, of the 141 accidents involving the R22 helicopter, 102 occurred during aerial mustering. The majority of aerial mustering accidents involved collision with terrain, trees, man-made features or other obstacles.

## Sun glare

Research has shown that environmental conditions can greatly hinder a pilot's ability to perform visual tasks. One of the most serious conditions in aviation is glare. When flying in the presence of strong light, as in this case flying directly towards the west when the sun was at an elevation of 13°–15° above the horizon, light from the sun is scattered within the eye and onto the retina. This results in a loss of visual performance and is termed 'disability glare'. The problems associated with disability glare are reported to increase with age.

Disability glare is exacerbated when objects are being viewed through media or atmospherics that scatter the light further than that occurring naturally in the eye. Such conditions include dirty windscreens, flying in haze and taking off or landing directly into the sun. Research has found that pilots experience difficulty perceiving distances and depth due to glare from bright lights. Bright light sources are also shown to lead to visual misperceptions of height and distance and a momentary flash blindness (Nakagawara et al, 2006). In addition, glare was reported to distract

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[4] Cloud cover is normally reported using expressions that denote the extent of the cover. The expression few indicates that up to a quarter of the sky was covered

[5] The clockwise horizontal component of the sun's or moon's position from true north, measured in degrees.

pilot's 'truthful' perception. A study conducted on behalf of the US Federal Aviation Administration (Nakagawara et al, 2003) of the US National Transportation Safety Board aviation accident database found that during a 12-month period there were:

> …130 accidents in which glare from natural sunlight was found to be a contributing factor. The majority of the events occurred during clear weather and atmospheric conditions (85%), and were associated with the approach/landing and take-off/departure phases of flight (55%).

The study concluded that:

> Exposure to glare from natural sunlight has contributed to aviation accidents, primarily under optimal visual conditions. The majority of accidents occurred during flight maneuvres at low altitude in airspace congested with other aircraft or obstacles, such as trees, power lines, utility poles, and terrain.

## Related occurrences

The ATSB has investigated numerous accidents where sun glare was found to be a contributing factor. A number of these accidents and investigation reports are listed below and are available from the ATSB website:

- AO-2009-018. Midair collision involving Robinson Helicopter Company R22 Betta II, registered VH-HCB, 15 km south-east of Springvale Station, Western Australia on 5 May 2009.
- AO-2012-107. Runway excursion involving Cessna 210N, registered VH-WPD, at Urapunga Aeroplane Landing Area (ALA), Northern Territory on 23 August 2012.
- AO-2012-146. Controlled flight into water involving Robinson R22 helicopter, registered VH-HOA, 89 km north-north-west of Innamincka ALA, South Australia on 31 October 2012.
- AO-2013-178. Hard landing involving Grob G-115C2 aircraft, registered VH-ZIV, at Merredin ALA, Western Australia on 11 October 2013.
- AO-2014-118. Aircraft separation issue involving a Skyfox CA25N aircraft, registered 24-3265 and a Piper PA-28 aircraft, registered VH-WJO, near Roma Airport, Queensland on 3 July 2014.
- AO-2014-191. Collision with terrain involving an Air Tractor AT-502 aircraft, registered VH-PTF, 45 km west of Moree Airport, New South Wales on 18 December 2014.

# Safety analysis

## Introduction

This analysis will examine the factors in the development of an accident involving a qualified pilot, who was carrying out mustering operations in an airworthy helicopter, in good weather. These factors include:

- the position and elevation of the sun and its impact on the pilot's ability to see and react to an isolated, dead and defoliated tree (tree) along the pilot's track
- the loss of a number of helicopter components as a result of the helicopter striking that tree and the resulting effect on the pilot's ability to control the helicopter
- a number of survivability considerations.

## Development of the accident

Examination of the wreckage and accident site found that the helicopter struck an upper branch of an isolated, 7 m-high tree about 100 m to the east of a tree-lined dry creek bed. This resulted in the tail rotor blades separating from the tail rotor assembly, followed by the vertical and horizontal stabilisers and structure, then the tail rotor gearbox. Control of the helicopter was no longer possible and the helicopter collided with terrain coming to rest on the right side.

The main wreckage was located about 50 m west of the tree. This was consistent with the helicopter being in forward flight, rather than in the hover, and indicated the helicopter's westerly direction of travel preceding the tree strike.

The pilot's reported departure from the road coincided at the commencement of the 1600 radio news. The time taken for the station hand to attempt to contact the pilot by ultra high frequency radio and then search for the missing helicopter, and the helicopter's clock stopping at 1605 were consistent, suggesting that the helicopter impacted terrain sometime between about 1605 and 1615. At that time, the sun was at an elevation of about 13°–15°above the horizon and about 30° to the right of track.

Given the westerly direction of travel and the ambient conditions, it was likely that the pilot was subjected to sun glare. The ATSB considered whether the helicopter's main rotor downwash would have produced significant airborne dust and other particles, exacerbating the pilot's disability glare. However, given the helicopter's forward motion, any particles would, if agitated, have been behind the helicopter's position along the westerly flight path.

The pilot was wearing an aviation helmet fitted with two sun visors but the ATSB could not determine if either or both of the visors were in use at the time. Even so, while visors lessen glare, they do not reduce its effect under all circumstances. Compounding the pilot's difficulty identifying and/or avoiding the tree, it was possible that the tree line to the west along the dry creek bed acted as a darkened backdrop, decreasing the salience of the isolated tree.

The ATSB concluded it was probable that, due to the effects of sun glare, the pilot either did not see or misjudged the distance to the tree, leading to the tree strike and subsequent loss of control and collision with terrain.

## Survivability

Unrestrained items in the cabin, including shotguns, a bag of ammunition and a digital single-lens reflex camera, increased the risk of flight control interference during normal flight and injury to the pilot during the accident sequence. Despite this, the ATSB could not determine if the unrestrained items contributed to the accident or the pilot's injuries.

The helicopter was fitted with bladder-type fuel tanks that did not rupture during the accident sequence, preventing fuel leakage and therefore reducing the risk of a post-impact fire. In addition, the pilot's seat structure was compressed, consistent with its design to absorb impact forces during an accident.

The helicopter was also fitted with three-point safety harnesses, increasing the likelihood of effective restraint in the case of an accident. Moreover, the pilot was wearing an aviation-flying helmet to reduce the risk of injury in an accident.

Despite all of the above safety features, the pilot was fatally injured. This indicated that the impact forces were such that the accident was not survivable.

# Findings

From the evidence available, the following findings are made with respect to the collision with terrain involving Robinson R22 helicopter, registered VH-HRW, which occurred about 63 km north-north-east of Mitchell, Queensland on 28 May 2015. These findings should not be read as apportioning blame or liability to any particular organisation or individual.

## Contributing factors

- Given the low-level flight into the afternoon sun, it was likely that due to sun glare, the pilot did not see or misjudged the height and/or distance to the dead and defoliated tree before the tree strike.
- As a result of the tree strike, the tail rotor, combined vertical and horizontal stabilisers and tail rotor gearbox separated from the tail boom, rendering the helicopter uncontrollable and resulting in the collision with terrain.

## Other factors that increased risk

- Unrestrained items in the helicopter’s cabin increased the risk of control interference during normal flight and injury to the pilot during the accident sequence.

## Other findings

- The helicopter was modified to include bladder-type fuel tanks, which did not puncture. This prevented fuel escaping after the impact and reduced the risk of a post-impact, fuel-fed fire.

# General details

## Occurrence details

| | | |
|---|---|---|
| Date and time: | 28 May 2015 – between 1605 and 1615 EST | |
| Occurrence category: | Accident | |
| Primary occurrence type: | Collision with terrain | |
| Location: | 63 km north-north-east of Mitchell, Queensland | |
| | Latitude: 25° 56.40’ S | Longitude: 148° 08.10’ E |

## Pilot details

| | |
|---|---|
| Licence details: | Commercial Pilot (Helicopter)Licence, issued April 2003 |
| Endorsements: | Single Engine Helicopter |
| Ratings: | Aerial Mustering Helicopter |
| Medical certificate: | Class 1 |
| Aeronautical experience: | Approximately 1,170 hours |
| Last flight review: | February 2014 |

## Aircraft details

| | | |
|---|---|---|
| Manufacturer and model: | Robinson R22 Beta | |
| Year of manufacture: | 1988 | |
| Registration: | VH-HRW | |
| Serial number: | 0901 | |
| Total Time In Service | 9,003.2 hours | |
| Type of operation: | Aerial work- Aerial Mustering | |
| Persons on board: | Crew – 1 | |
| Injuries: | Crew – Fatal | Passengers – 0 |
| Damage: | Destroyed | Passengers – N/A |

# Sources and submissions

## Sources of information

The sources of information during the investigation included the:

- witness reports from a number of participants in the muster that day
- results and findings of the ATSB's on-site investigation.

## References

Aviation Research and Analysis report – B2004/0292, *Robinson R22 helicopter aerial mustering usage investigation,* ATSB Transport Safety Investigation report.

Civil Aviation Safety Authority (2015). *Sector Risk Profile* for the aerial mustering sector.

Gibb R, Gray R, and Scharff L (2010), *Aviation Visual Perception*, Ashgate Publishing Limited: Surrey England, pp.72-74.

Nakagawara V, Wood K, and Montgomery R (2003), *Natural Sunlight and its Association to Aviation Accidents: Frequency and Prevention*, Civil Aerospace Medical Institute, Federal Aviation Administration.

## Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the ATSB may provide a draft report, on a confidential basis, to any person whom the ATSB considers appropriate. Section 26 (1) (a) of the Act 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 Civil Aviation Safety Authority, the maintenance provider and a number of the witnesses.

No submissions were received from those parties.

# Australian Transport Safety Bureau

The ATSB is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: 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 that fall within Commonwealth jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

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

## Purpose of safety investigations

The object of a safety investigation is to identify and reduce safety-related risk. ATSB investigations determine and communicate the factors related to the transport safety matter being investigated.

It is not a function of the ATSB to apportion blame or determine 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.

## Developing safety action

Central to the ATSB's investigation of transport safety matters is the early identification of safety issues in the transport environment. The ATSB prefers to encourage the relevant organisation(s) to initiate proactive safety action that addresses safety issues. Nevertheless, the ATSB may use its power to make a formal safety recommendation either during or at the end of an investigation, depending on the level of risk associated with a safety issue and the extent of corrective action undertaken by the relevant organisation.

When safety recommendations are issued, they focus on clearly describing the safety issue of concern, rather than providing instructions or opinions on a preferred method of corrective action. As with equivalent overseas organisations, the ATSB has no power to enforce the implementation of its recommendations. It is a matter for the body to which an ATSB recommendation is directed to assess the costs and benefits of any particular means of addressing a safety issue.

When the ATSB issues a safety recommendation to a person, organisation or agency, they must provide a written response within 90 days. That response must indicate whether they accept the recommendation, any reasons for not accepting part or all of the recommendation, and details of any proposed safety action to give effect to the recommendation.

The ATSB can also issue safety advisory notices suggesting that an organisation or an industry sector consider a safety issue and take action where it believes it appropriate. There is no requirement for a formal response to an advisory notice, although the ATSB will publish any response it receives.

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Investigation

**ATSB Transport Safety Report**
Aviation Occurrence Investigation

In-flight break-up involving Cicaré CH-7B, VH-SWQ
43 km north-west of Barcaldine Airport Queensland, on 12 May 2014

AO-2015-055
Final – 26 May 2016