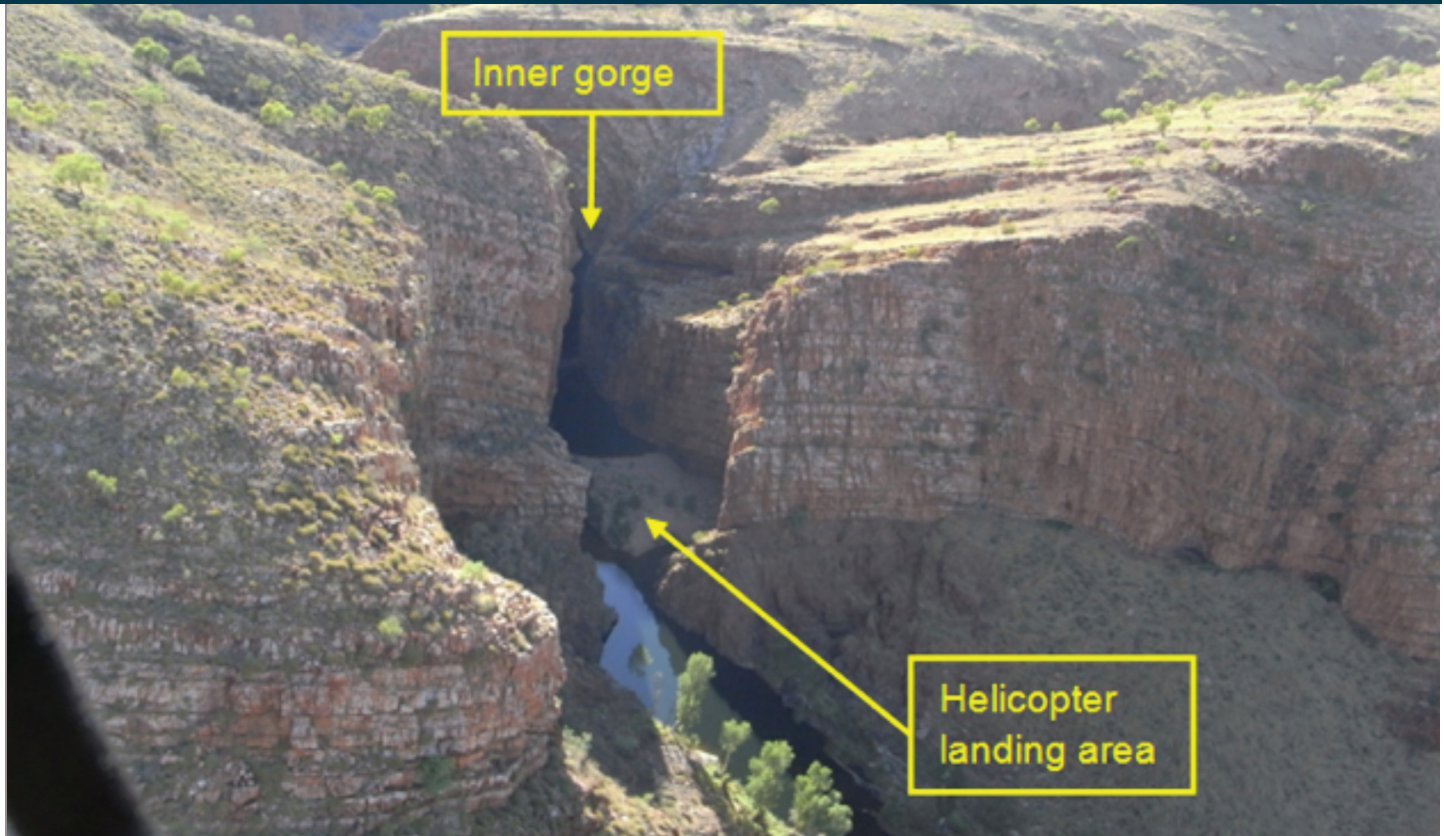




Australian Government
Australian Transport Safety Bureau

Collision with terrain involving Robinson R22, VH-LLF

130 km west of Halls Creek, Western Australia | 3 October 2012



Investigation

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Safety summary

What happened

On 3 October 2012 the pilots of two Robinson R22 helicopters, each with a passenger on board, landed in the vicinity of a narrow gorge about 130 km west of Halls Creek, Western Australia. With the others on the ground, one of the pilots lifted off in VH-LLF to have a look at the gorge from the air.

The pilot descended into the gorge and then during the ascent the helicopter tail contacted a rock overhang about 30 m above the gorge pool and separated, resulting in loss of control, collision with the surrounding rocks, and submersion. The pilot did not survive.

The pilot of the remaining R22 ferried the two passengers, in turn, out of the gorge area.

What the ATSB found

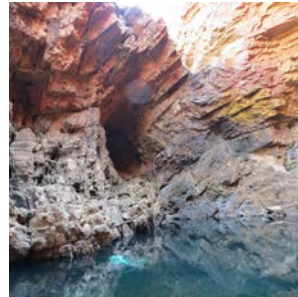
The ATSB found that the pilot of VH-LLF descended into a confined gorge through a relatively narrow opening without prior knowledge of the gorge characteristics. That created a situation where the pilot was required to climb the helicopter out of the gorge with marginal clearance and potential disorientation in fading light.

Subsequently, although the pilot of the remaining R22 was able to ferry the passengers out of the gorge area post-accident, it was carried out with higher risk than was absolutely necessary.

Safety message

As this occurrence demonstrates, helicopter pilots need to be mindful that some confined areas will allow access, but will present significant risks on the climb out.

Accident site



Source: ATSB

Contents

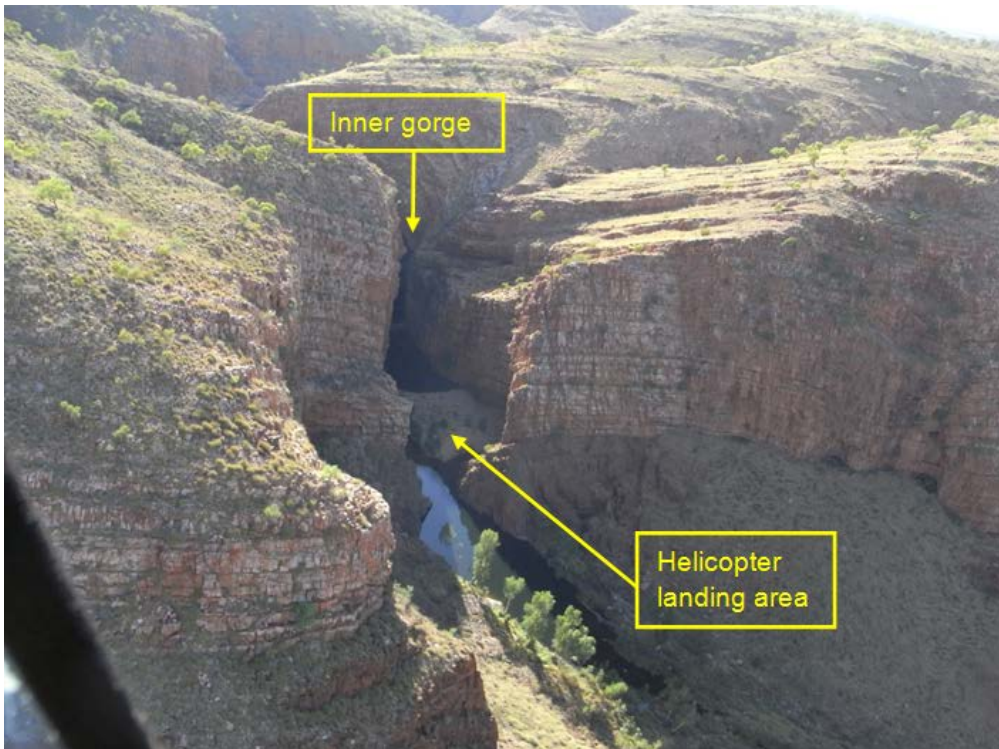
The occurrence	1
Context	3
Safety analysis	4
Findings	5
Contributing safety factors	5
Other safety factors	5
General details	6
Occurrence details	6
Pilot details	6
Aircraft details	6
Sources and submissions	7
Sources of information	7
Submissions	7
Australian Transport Safety Bureau	8
Purpose of safety investigations	8
Developing safety action	8
Terminology used in this report	9

The occurrence

On 3 October 2012, the pilots of two Robinson R22 helicopters were engaged in aerial stock mustering on 'Louisa Downs', a cattle station about 115 km south-west of Halls Creek, Western Australia. At about 1430 Western Standard Time¹, the pilots had completed a successful muster and landed at the homestead. The weather was fine with light to no wind.

In the daylight remaining, it was decided to take two station personnel for a sightseeing flight over the station property. With a passenger on board each helicopter, the pilots overflew the yarded cattle and other parts of the property. At about 1545, the pilots landed on a section of river bed in the Margaret River for some fishing. After about 30 minutes on the ground, it was decided to return to Louisa Downs. Once airborne, the pilots arranged to visit a gorge that had been spotted during the muster. The gorge was about 2 minutes flying time away from the fishing spot on the Gliddon River, not far from where it runs into the Margaret River. On arrival, the pilots surveyed the area from the air before landing on a pebble-covered sandbar in a relatively open part of the gorge (Figure 1).

Figure 1: Aerial view along the gorge



Source: ATSB

One of the pilots and a passenger swam further into the narrower and obscured part of the gorge (Figure 2), leaving the other pilot and passenger with the helicopters. At some point the pilot who remained at the helicopters indicated that he wanted to explore the gorge further, and departed alone in the helicopter, registered VH-LLF (LLF).

¹ Western Standard Time (WST) was Coordinated Universal Time + 8 hours.

Figure 2: Overhead view of the inner gorge



Source: ATSB

The pilot and passenger swimming in the inner gorge heard a helicopter start up and, unaware of the pilot's intentions, thought it was a prompt to return to the helicopters. The swimmers were still in the inner gorge when the pilot of LLF descended into the same area and hovered above the water. The pilot was observed to manage a steady hover and did not show any signs of discomfort. The swimmers exited the inner gorge area and were part-way across the pool, when they turned around to see LLF ascending. The helicopter appeared to be operating normally with no indication of any technical problem. In view of the two swimmers and the passenger located on the sandbar, the tail of the helicopter contacted an overhanging rock formation and a section of the tail boom separated from the fuselage. The helicopter rolled to the left and descended out of view.

One of the witnesses recalled hearing two bangs, the second louder than the first, moments after the helicopter had fallen out of view. The swimmers returned to the inner gorge to find the helicopter submerged, on its right side with substantial damage. The pilot was trapped in the wreckage and, despite a number of attempts, could not be extricated. The swimmers returned to the remaining helicopter and the waiting passenger.

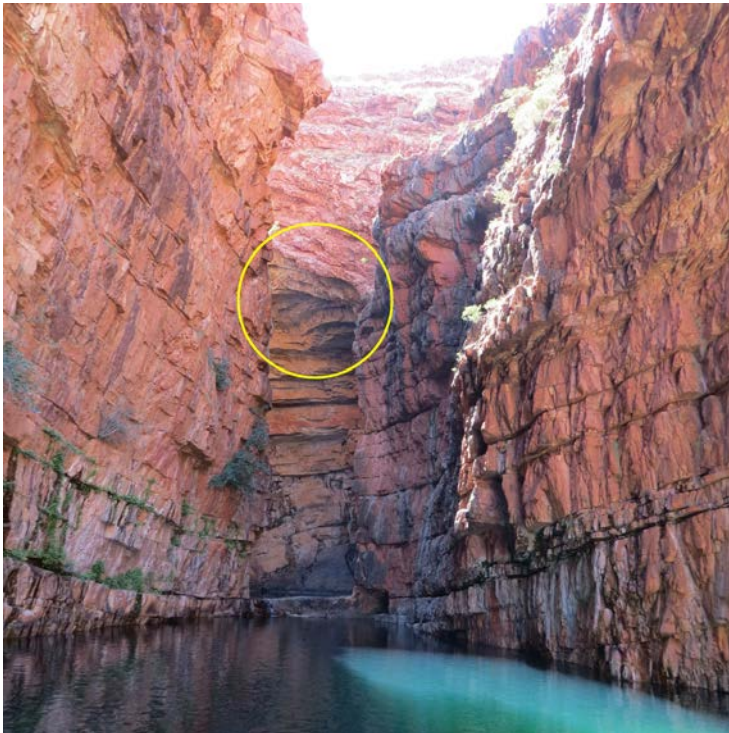
The pilot of this helicopter ferried the passengers, in turn, out of the gorge to the previous Margaret River landing site. At this point no-one else knew of the accident or the intentions of the pilot, and the pilot did not use his satellite phone in an attempt to advise anyone. The pilot then departed for the 30-minute flight to nearby 'Larrawa' station with one passenger, with the intention to return for the remaining passenger. It was too dark to return, however, and the second passenger remained at the Margaret River site until the next morning. The pilot notified the operator and local police of the fatal accident.

Context

The Australian Transport Safety Bureau attended the accident site, but was unable to closely examine the submerged wreckage. From the surface it was evident that the cabin roof was crushed in, both main rotor blades had severed a short distance from the main rotor hub, and one of the fuel tanks had detached from the aircraft structure.

Except for a narrow opening that allowed access from the outer gorge pool where the helicopters were parked (Figure 3), the inner gorge was enclosed by walls varying in height from about 30 to 50 m. At the base of the gorge was a pool about 40 m across. Wall profile varied from concave through vertical to convex, such that there was at least 40 m between opposite wall surfaces in the lower part of the gorge. That provided a cavern-like space in which the pilot was able to manoeuvre the 8.8 m long R22. However, about 30 m above the pool was a rock overhang that substantially reduced the clearance between the walls adjacent to the pool. The helicopter's tail contacted that overhang.

Figure 3: View from the helicopter landing area across the outer pool, showing part of inner gorge with the rock overhang circled



Source: ATSB

The second helicopter was equipped and authorised for visual flight in daylight only and the other pilot was qualified for visual flight in daylight only. This limited flying to between first light and last light, and last light was calculated as 1754 for the accident site. While the times for various events were not recorded, the ATSB estimated that the pilot departed from the Margaret River site for the homestead before last light, but completed the flight in darkness.

The post-mortem examination indicated that the pilot was not affected by drugs or alcohol. There was no evidence to indicate that he had any medical issues and he appeared to be a healthy individual.

Safety analysis

This fatal accident was the result of the helicopter tail contacting a rock overhang and separating, with consequent loss of control, collision with the surrounding rocks, and submersion in the gorge pool.

At the time of the collision with terrain, the pilot was ascending out of a confined gorge through a relatively narrow opening. As such, there were a number of risk factors including minimal clearance from obstacles and the potential for disorientation arising from the lack of a horizon and uneven gorge walls. That might also have been compounded by fading daylight and the need for the pilot to look up through the rotor disc to ascertain terrain clearance.

While these risks were apparent from inside the gorge, it is likely that they were not as obvious to the pilot from above the gorge. The pilot descended into the gorge without full appreciation of the risks that would be involved in flying out of the gorge. Once the helicopter was inside the gorge there was sufficient space to hover and reverse direction, but with nowhere to land and no other exit path, the pilot was committed to climb out through the narrow opening.

Following the accident the other pilot would have been under a deal of stress and was faced with the difficult situation of having to cater for two passengers using a single-passenger helicopter in fading light. Although the pilot was able to ferry both passengers to the Margaret River site, and then the other passenger back to a station homestead, it was carried out with higher risk than was absolutely necessary.

Post-accident, and despite the understandable desire to address the passengers' needs, the ferrying of the passengers without any search and rescue alerting exposed the helicopter occupants and on-ground passenger to an extended time in a remote area if the helicopter had been forced down. And, during the flight to transfer one of the passengers to a homestead, the helicopter was operated in darkness without the appropriate equipment or pilot qualifications. That exposed the pilot to the risk of spatial disorientation and/or collision with terrain. A lower risk option would have been to remain at the Margaret River site and seek support from the operator or authorities via the pilot's satellite phone.

Findings

From the evidence available, the following findings are made with respect to the collision with terrain involving Robinson R22, VH-LLF and should not be read as apportioning blame or liability to any particular organisation or individual.

Contributing safety factors

- The pilot descended into a confined gorge through a relatively narrow opening without prior knowledge of the gorge characteristics.
- While ascending out of the gorge the helicopter tail contacted a rock overhang and separated, resulting in loss of control, collision with the surrounding rocks, and submersion in the gorge pool.

Other safety factors

- After the accident, the other pilot ferried the passengers from the gorge without any search and rescue alerting being active.
- During the flight to transfer one of the passengers to a homestead, the helicopter was operated in darkness without the appropriate equipment or pilot qualifications.

General details

Occurrence details

Date and time:	3 October 2012 – 1700 WST (approximately)	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Type of operation:	Private	
Location:	130 km west of Halls Creek, Western Australia	
	Longitude: S 18° 14.42'	Latitude: E 126° 25.32'

Pilot details

Licence details:	Commercial Pilot (Helicopter) Licence, issued May 2010
Endorsements:	Robinson R22, R44 and Bell 206 helicopters
Ratings:	Aerial stock mustering, issued September 2011
Medical certificate:	Class 1, issued April 2012
Aeronautical experience:	1,034 hours total, 775 hours R22
Last flight review:	June 2012

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R22 Beta	
Registration:	VH-LLF	
Serial number:	1468	
Persons on board:	Crew – 1	Passengers – Nil
Injuries:	Crew – 1 fatal	
Damage:	Substantial	

Sources and submissions

Sources of information

The sources of information during the investigation included the:

- pilot of the other R22 and the two passengers
- operator of VH-LLF.

Submissions

Under Part 4, Division 2 (Investigation Reports), Section 26 of the *Transport Safety Investigation Act 2003* (the Act), the Australian Transport Safety Bureau (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 pilot of the other R22, the two passengers, the operator of the aircraft, and the Civil Aviation Safety Authority. No substantive comment was received.

Australian Transport Safety Bureau

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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 fare-paying passenger operations.

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 safety factors related to the transport safety matter being investigated. The terms the ATSB uses to refer to key safety and risk concepts are set out in the next section: Terminology Used in this Report.

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.

Terminology used in this report

Occurrence: accident or incident.

Safety factor: an event or condition that increases safety risk. In other words, it is something that, if it occurred in the future, would increase the likelihood of an occurrence, and/or the severity of the adverse consequences associated with an occurrence. Safety factors include the occurrence events (e.g. engine failure, signal passed at danger, grounding), individual actions (e.g. errors and violations), local conditions, current risk controls and organisational influences.

Contributing safety factor: a safety factor that, had it not occurred or existed at the time of an occurrence, then either: (a) the occurrence would probably not have occurred; or (b) the adverse consequences associated with the occurrence would probably not have occurred or have been as serious, or (c) another contributing safety factor would probably not have occurred or existed.

Other safety factor: a safety factor identified during an occurrence investigation which did not meet the definition of contributing safety factor but was still considered to be important to communicate in an investigation report in the interests of improved transport safety.

Other key finding: any finding, other than that associated with safety factors, considered important to include in an investigation report. Such findings may resolve ambiguity or controversy, describe possible scenarios or safety factors when firm safety factor findings were not able to be made, or note events or conditions which ‘saved the day’ or played an important role in reducing the risk associated with an occurrence.

Safety issue: a safety factor that (a) can reasonably be regarded as having the potential to adversely affect the safety of future operations, and (b) is a characteristic of an organisation or a system, rather than a characteristic of a specific individual, or characteristic of an operational environment at a specific point in time.

Risk level: The ATSB’s assessment of the risk level associated with a safety issue is noted in the Findings section of the investigation report. It reflects the risk level as it existed at the time of the occurrence. That risk level may subsequently have been reduced as a result of action taken by individuals or organisations during the course of an investigation.

Safety issues are broadly classified in terms of their level of risk as follows:

- **Critical safety issue:** associated with an intolerable level of risk and generally leading to the immediate issue of a safety recommendation unless corrective safety action has already been taken.
- **Significant safety issue:** associated with a risk level regarded as acceptable only if it is kept as low as reasonably practicable. The ATSB may issue a safety recommendation or a safety advisory notice if it assesses that further safety action may be practicable.
- **Minor safety issue:** associated with a broadly acceptable level of risk, although the ATSB may sometimes issue a safety advisory notice.

Safety action: the steps taken or proposed to be taken by a person, organisation or agency in response to a safety issue.

Australian Transport Safety Bureau

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Investigation

ATSB Transport Safety Report

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