



Australian Government

Australian Transport Safety Bureau

Windscreen fogging and collision with terrain involving a Robinson R22, VH-RBT

11 km east of Boyup Brook ALA, Western Australia on 23 June 2015

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Addendum

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Windscreen fogging and collision with terrain involving a Robinson R22, VH-RBT

What happened

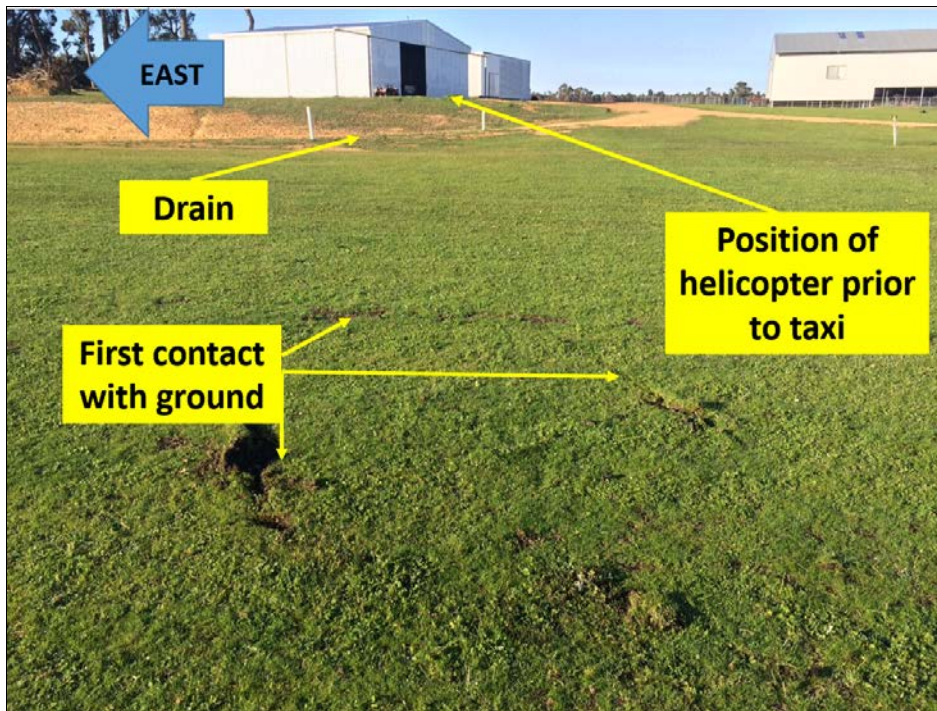
Early on the morning of 23 June 2015, the pilot pulled the Robinson R22 helicopter registered VH-RBT from the hangar on a property about 6 NM east of Boyup Brook aeroplane landing area (ALA), and prepared for a private flight with one passenger to Jandakot, Western Australia.

Prior to commencing the flight, the pilot re-checked the area meteorological forecast (ARFOR). The ARFOR indicated the probability of low cloud with fog, west of Boyup Brook ALA. The pilot reported that it was a cold and clear morning, with calm conditions. Although there was fog in a gully, about 200-300 m down the slope from the hangar, the general area and intended flight path were completely clear (Figure 1).

At about 0650 Western Standard Time (WST), the pilot started the helicopter engine and allowed the engine to warm up. The pilot then completed final preparations for departure while waiting for first light¹

At about 0700, just after first light, the pilot reported that the horizon and the outline of the buildings and trees were clearly visible. After broadcasting intentions on the radio, the pilot established the helicopter into a hover about 2-3ft above the ground.

Figure 1: Marks where the helicopter tail and skid struck the ground. The drain the pilot planned to clear prior to transitioning to forward flight and hangar are in the background



Source: Pilot

¹ First light is when the centre of the sun is at an angle of 6° below the horizon before sunrise. At this time, the horizon is clearly defined but the brightest stars are still visible under clear atmospheric conditions.

After completing a power check, the pilot conducted a pedal turn to the east. The pilot intended to gain some height prior to transitioning the helicopter into forward flight, in order to clear the hangar and drain areas.

Due to the down-sloping terrain, the helicopter was about 15ft above the ground soon after lift-off. As the pilot began to raise the collective² and with their attention momentarily inside the cockpit, the passenger alerted them to the almost instantaneous external fogging of the windscreen. The pilot was briefly able to see the ground through the side window, before that also became shrouded in condensation. The pilot described this instant lack of external reference, as like being in a 'white room'. In an attempt to keep some necessary visual reference, the pilot reached down and flipped open the small vent located in the right door. Although a snapshot of ground was visible, it was insufficient to pinpoint the helicopter's actual position.

Now about 30-40 ft above the ground, the pilot elected to put the helicopter back on the ground. Manoeuvring slightly left to avoid the assumed position of the drain, the pilot unexpectedly felt the tail and rear skids of the helicopter strike the ground. The pilot stated this was a heavy collision, and resulted in the helicopter bouncing back into the air. The pilot applied some collective and the helicopter bounced again then yawed rapidly to the right. The pilot applied full left pedal in an attempt to prevent the helicopter from entering a spin, however the yaw continued, so the pilot rapidly reduced the throttle to idle. As the yaw decreased, the helicopter fell onto its left side (Figure 2).

Figure 2: VH-RBT at rest on the left side. Note the broken tail boom and rotor blades



Source: Pilot

Although hanging in the seatbelt, the pilot reached forward and shut off the mixture control and master switch. The pilot then egressed and assisted the passenger to undo their seatbelt and safely egress. Ground assistance arrived shortly after. The pilot reported that the fog was no longer on the windscreen.

² A primary helicopter flight control that simultaneously affects the pitch of all blades of a lifting rotor. Collective input is the main control for vertical velocity.

The pilot was uninjured; however the passenger sustained minor injuries. The helicopter was substantially damaged.

Pilot experience and comments

The pilot had a total of about 915 helicopter and fixed wing hours, with about 756 of these on Robinson 22 helicopters.

The pilot commented that:

- the frost on the ground and the cold moist air above may have been mixed by the movement of the helicopter blades and caused the windscreen fogging
- when the windscreen fogged, the pilot thought that the helicopter had been moving forward, however when the helicopter tail struck the ground, the pilot realised that the lack of visual reference had led to a loss of situational awareness. The helicopter had in fact been moving backwards
- in hindsight, although the take-off was attempted immediately after first light, it may have been more prudent to delay the departure until the sun was properly up. This would have allowed a better natural horizon and a slight increase in temperature

Helicopter information

The helicopter had all the fittings and wiring to have a heater,³ however the operator had removed the heater at the start of summer, and it had not been re-installed.

The pilot advised that there was a fresh air vent at the front of the windscreen, which ran up on the inside of the windscreen. It was their practice to keep this open, although the pilot could not be sure that it was open on the accident flight. The vents fitted to each door were initially closed.

Pilot operating handbook

The Robinson Helicopter Company Safety Notice SN-18 R Issued: January 85 and revised in February 1989 and June 1994 states:

LOSS OF VISIBILITY CAN BE FATAL

Flying a helicopter in obscured visibility due to fog, snow, low ceiling, or even a dark night can be fatal. Helicopters have less inherent stability and much faster roll and pitch rates than airplanes. Loss of the pilot's outside visual references, even for a moment, can result in disorientation, wrong control inputs, and an uncontrolled crash. This type of situation is likely to occur when a pilot attempts to fly through a partially obscured area and realizes too late that he is losing visibility. He loses control of the helicopter when he attempts to turn to regain visibility but is unable to complete the turn without visual references.....

ATSB comment

A cold windshield that is exposed to slightly warmer or moist air can 'fog up'. It is likely that the helicopter moved between different temperature layers as it moved forward and up, and this may have led to a combination of temperatures suitable to allow fog.

The use of heaters, demisters (if fitted) and air vents should always be operated as per the manufacturer's recommendations.

³ The heater warms the air in the cabin and thus the windscreen

General details

Occurrence details

Date and time:	23 June 2015 – 0700 WST	
Occurrence category:	Accident	
Primary occurrence type:	Weather - other	
Location:	11 km east of Boyup Brook ALA, (Longridge Farm), Western Australia	
	Latitude: 33° 54.03' S	Longitude: 116° 19.80'

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R22 BETA	
Registration:	VH-RBT	
Serial number:	1980	
Type of operation:	Private	
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – Nil	Passenger – Minor
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (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; and 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.

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.

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.

About this report

Decisions regarding whether to conduct an investigation, 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 in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions