



Australian Government

Australian Transport Safety Bureau

Hard landing involving a Robinson R22, VH-YZO

Toowoomba Airport, Queensland, 20 February 2014

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Addendum

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Hard landing involving a Robinson R22, VH-YZO

What happened

On 20 February 2014, at about 1600 Eastern Standard Time (EST), a Robinson R22 helicopter, registered VH-YZO, lifted off at Toowoomba Airport, Queensland, for a local training flight with an instructor and student pilot on board.

The training sequence included conducting a simulated tail rotor failure in the hover. Prior to take-off, the instructor demonstrated to the student, the use of the override spring to disconnect the throttle correlator. Once disconnected, the throttle does not automatically increase and decrease as the collective¹ is raised and lowered.

The instructor established the helicopter in the hover at about 3 ft above ground level (AGL). He demonstrated applying right pedal and allowing the helicopter to yaw. He then demonstrated use of the cyclic² to control the helicopter in one position over the ground. The instructor then demonstrated the simulated tail rotor failure sequence, applying right pedal to cause the helicopter to yaw, closing the throttle, allowing the helicopter to sink, and then gently raising collective to allow it to settle onto the ground.

The instructor then established the helicopter in the hover at about 3 ft AGL and announced 'practice tail rotor failure, 3 2 1', and applied right pedal. The student completed the sequence as demonstrated. The instructor then counted the student into a second attempt and as he applied right pedal, the student lowered the collective very quickly. The instructor recovered control of the helicopter and raised the collective, however the helicopter landed hard.

The instructor then conducted a walk-around inspection of the helicopter to assess for any damage. He observed that there was no evidence of damage compatible with a hard landing, such as marking on the top of the cabin or near the tail cone.

The student then practiced the sequence for the third time. After establishing the hover and counting the student in, the instructor applied right pedal, and ensured that he covered the throttle detent and placed his hand so as to prevent the student from rapidly lowering the collective. On this attempt, the student rolled the throttle off and rapidly raised the collective. The helicopter ballooned, to about 8 ft AGL, landed heavily, bounced once and subsequently landed on the left skid before settling level on both skids.

The instructor again exited the helicopter and conducted a walk-around inspection with no damage observed. After a further demonstration by the instructor, the student completed the sequence twice more. The instructor and student then conducted further training exercises and subsequently concluded the flight. After landing, the instructor detected that the helicopter was leaning to the right. He exited the helicopter and observed that the landing skid was damaged (Figure 1). The instructor then taxied the helicopter to the hangar for an engineering inspection.

VH-YZO



Source: Operator

¹ The collective pitch control, or collective, is a primary flight control used to change the pitch angle of the main rotor blades. Collective input is the main control for vertical velocity.

² The cyclic pitch control, or cyclic, is a primary flight control that allows the pilot to fly the helicopter in any direction of travel: forward, rearward, left and right.

Figure 1: Damage to VH-YZO



Source: Operator

Safety action

Whether or not the ATSB identifies safety issues in the course of an investigation, relevant organisations may proactively initiate safety action in order to reduce their safety risk. The ATSB has been advised of the following proactive safety action in response to this occurrence.

Helicopter operator

As a result of this occurrence, the helicopter operator has advised the ATSB that they are taking the following safety actions:

The chief flying instructor has recommended company flight instructors commence the sequence at about 2 ft AGL, in line with the Robinson R22 Flight Training Guide for simulated engine failures in the hover. A specific guide for tail rotor failures, the accompanying student brief, and instructor patten for the sequence have been amended in the company Flight Instructor Guide.

Company flight instructors have been advised that following a suspected hard landing or other possible damage to an aircraft, the aircraft is to be shut down. If damage is suspected, the aircraft should not be flown or relocated until a qualified engineer has deemed the aircraft to be airworthy.

Safety message

This incident highlights the importance of a flight instructor understanding the possible ways a student may respond to a training scenario. The instructor can then guard the controls in anticipation of incorrect control input by the student.

General details

Occurrence details

Date and time:	20 February 2014 – 2245 EST	
Occurrence category:	Incident	
Primary occurrence type:	Hard landing	
Location:	Toowoomba Airport, Queensland	
	Latitude: 27° 32.48' S	Longitude: 151° 54.75' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R22	
Registration:	VH-YZO	
Serial number:	4289	
Type of operation:	Flying training – dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – Nil	Passengers – Nil
Damage:	Minor	

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.