



Australian Government

Australian Transport Safety Bureau

Aircraft configuration event involving a Robinson R22, VH-ONT

near Armidale Airport, New South Wales, 13 September 2013

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Addendum

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Aircraft configuration event involving a Robinson R22, VH-ONT

What happened

On 13 September 2013, the flight instructor and student pilot of a Robinson R22 helicopter, registered VH-ONT, were preparing for a dual training flight from Armidale, New South Wales.

The instructor conducted a pre-flight briefing with the student and revised effects of controls, straight-and-level flight, climbing, descending, and turning.

Prior to take-off, the instructor explained the purpose of the fuel mixture control guard,¹ the use of the carburettor heat, and took the student through the start-up checklist.²

At about 1515 Eastern Standard Time,³ the helicopter departed, with the instructor operating the controls. During the climb, at about 300 ft above ground level (AGL), the instructor handed control of the helicopter over to the student. The instructor monitored the student's control inputs and asked the student to talk through his actions prior to performing them.

When maintaining 1,200 ft AGL, the instructor discussed with the student how to enter a descent. After confirming that they would reduce the engine power, the instructor asked the student to pull the carburettor heat on. The instructor looked outside to check for traffic and the engine then stopped. The instructor immediately initiated an autorotation⁴ and lowered the collective.⁵ He then looked around the cyclic⁶ control and observed that the fuel mixture control was in the idle cut-off position. The student had removed the fuel mixture control guard, inadvertently pulled the fuel mixture control instead of the carburettor heat control and then replaced the guard. The instructor asked the student to push the fuel mixture control back in and he broadcast a 'MAYDAY'⁷ call on the common traffic advisory frequency (CTAF).

The instructor reported that, due to the lack of height available, he elected not to attempt an engine restart. He selected a paddock and focused on the autorotation. Prior to the landing flare,⁸ the low rotor revolutions per minute (RRPM) horn sounded. The instructor held the flare and used the helicopter's tail to absorb the impact with the ground. The helicopter landed and ran on the ground on its skids, before rolling onto its side due to the slope of the paddock. Both occupants sustained minor injuries and the helicopter was substantially damaged (Figure 1).

VH-ONT



Source: Operator

¹ The fuel control mixture guard was a plastic piece of pipe that sat around the fuel mixture control to prevent inadvertent operation of the control.

² The fuel mixture and carburettor heat controls were positioned on the right side of the cyclic, on the lower centre pedestal near the student's leg. The fuel mixture control was positioned in front of, and about 20 cm, from the carburettor heat control.

³ Eastern Standard Time (EST) was Coordinated Universal Time (UTC) + 10 hours.

⁴ Autorotation is a condition of descending flight where, following engine failure or deliberate disengagement, the rotor blades are driven solely by aerodynamic forces resulting from rate of descent airflow through the rotor. The rate of descent is determined mainly by airspeed.

⁵ 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.

⁶ A primary helicopter flight control that is similar to an aircraft control column. Cyclic input tilts the main rotor disc varying the attitude of the helicopter and hence the lateral direction.

⁷ Mayday is an internationally recognised radio call for urgent assistance.

⁸ Flare is aimed to reduce rate of descent before ground impact by increasing collective pitch; this increases lift, trading stored rotor kinetic energy for increased aerodynamic reaction by blades, and should result in a gentle touchdown.

Figure 1: Damage to VH-ONT



Source: Operator

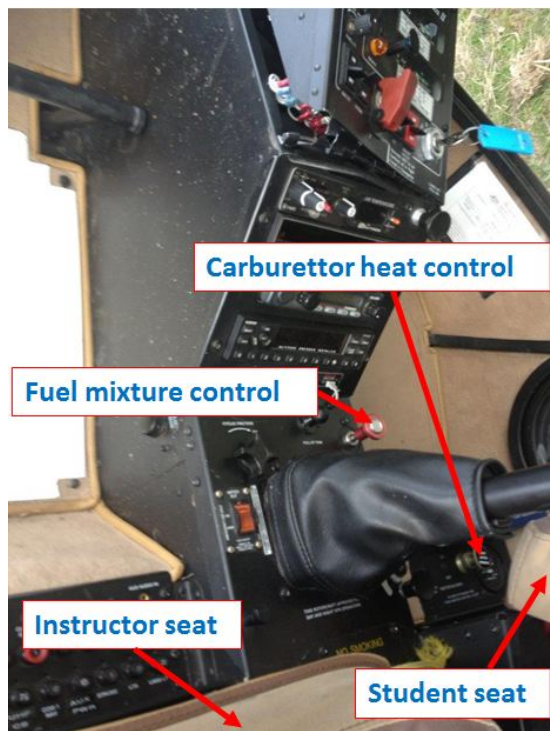
Pilot experience

The pilot held a Student Pilot Licence, with about 6.6 hours total time, all of which were on the R22. The student had not flown in the 18 months prior to the accident.

Pilot comments (instructor)

The instructor reported that he could not see the fuel mixture and carburettor heat controls from his normal seated position on the left side of the helicopter as the controls were obscured by the cyclic (Figure 2). He believed that he had observed the student reach down (toward the carburettor heat control) not forward (toward to fuel mixture control), prior to looking outside to check for traffic.

Figure 2: Location of the controls in VH-ONT



Source: Operator

Pilot comments (student)

The student pilot provided the following comments regarding the accident:

- he had inadvertently pulled the fuel mixture control instead of the carburettor heat
- he had not previously used the carburettor heat control
- the fuel mixture control was positioned forward of the carburettor heat control
- given his low amount of flying hours, he suggested that he should have confirmed where the carburettor heat control was, before pulling it out.

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:

- devising a procedure, and determining limits, that do not allow a student to operate the carburettor heat until a certain number of flying hours and recency have been achieved
- placing an increased emphasis on secondary control awareness
- students will be required to verbally confirm 'carby heat identified' prior to pulling the control and then saying 'carby heat off'
- increasing the frequency of emergency procedures training.

Safety message

This accident highlights the benefit of pilots positively identifying the control to be manipulated, prior to performing the action. Robinson Helicopter Company Safety Notice SN-1⁹ advises that cases have been reported where a pilot inadvertently pulled the mixture control instead of the carburettor heat control, resulting in sudden and complete engine stoppage. The notice recommends that the mixture control guard and the differences between the controls be emphasised to new pilots. If the mixture control is advertently pulled, the notice advises pilots to lower the collective and enter autorotation, or if there is sufficient altitude, to push the mixture in and restart the engine using the left hand.

General details

Occurrence details

Date and time:	13 September 2013 – 1600 EST	
Occurrence category:	Accident	
Primary occurrence type:	Aircraft configuration event	
Location:	near Armidale Airport, New South Wales	
	Latitude: 30° 31.68' S	Longitude: 151° 37.03' E

⁹ www.robinsonheli.com/rhc_safety_notices.html

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R22	
Registration:	VH-ONT	
Serial number:	4495	
Type of operation:	Flying training - dual	
Persons on board:	Crew – 2	Passengers – Nil
Injuries:	Crew – 2 (Minor)	Passengers – Nil
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.