



Australian Government

Australian Transport Safety Bureau

Loss of control involving a Robinson R44 helicopter, VH-ZWA

Darwin Airport on 7 October 2015

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2015-117
Final – 22 December 2015

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

Published by: Australian Transport Safety Bureau
Postal address: PO Box 967, Civic Square ACT 2608
Office: 62 Northbourne Avenue Canberra, Australian Capital Territory 2601
Telephone: 1800 020 616, from overseas +61 2 6257 4150 (24 hours)
Accident and incident notification: 1800 011 034 (24 hours)
Facsimile: 02 6247 3117, from overseas +61 2 6247 3117
Email: atsbinfo@atsb.gov.au
Internet: www.atsb.gov.au

© Commonwealth of Australia 2015



Ownership of intellectual property rights in this publication

Unless otherwise noted, copyright (and any other intellectual property rights, if any) in this publication is owned by the Commonwealth of Australia.

Creative Commons licence

With the exception of the Coat of Arms, ATSB logo, and photos and graphics in which a third party holds copyright, this publication is licensed under a Creative Commons Attribution 3.0 Australia licence.

Creative Commons Attribution 3.0 Australia Licence is a standard form license agreement that allows you to copy, distribute, transmit and adapt this publication provided that you attribute the work.

The ATSB's preference is that you attribute this publication (and any material sourced from it) using the following wording: *Source:* Australian Transport Safety Bureau

Copyright in material obtained from other agencies, private individuals or organisations, belongs to those agencies, individuals or organisations. Where you want to use their material you will need to contact them directly.

Addendum

Page	Change	Date

Loss of control involving a Robinson R44 helicopter, VH-ZWA

What happened

Late in the afternoon of 7 October 2015, a pilot prepared the Robinson 44 helicopter, registered VH-ZWA (ZWA), for a solo training flight. The local flight from Darwin Airport, Northern Territory, was to consolidate the pilot's knowledge of the local area, and become more familiar with the helicopter, as it was the pilot's first day in a new job. Earlier in the day, the chief pilot had conducted an acceptance flight with the pilot in ZWA.

The pilot refuelled the helicopter and conducted a pre-flight inspection, before boarding, and completing the pre-start checklist.

The pilot then conducted the following engine start checklist from memory.

Engine start (main actions)

- engaged the starter until it fired
- engaged the clutch and turned the alternator on
- when the clutch light went out, increased the rotor RPM to 79%
- conducted a magneto check; and noted that all warning lights were out
- began to increase the rotor RPM toward 100% and turned the governor on

Just as the pilot was about to conduct the next checklist item, a low rotor horn check¹, the pilot reported that the helicopter yawed slightly to the left. The pilot quickly checked that the pedals were neutral and put some 'weight' on the collective to confirm that it was fully down.

However, the helicopter continued to yaw left rapidly, through about 90° (Figure 1). The pilot applied full right pedal but the helicopter did not respond and continued the yaw, through about 180°, before falling onto its right side. The pilot, who sustained minor injuries, quickly exited the helicopter and the helicopter was substantially damaged (Figure 2).

Pilot experience

The pilot held a Commercial Pilot Licence (H) and a Private Pilot Licence (A). The pilot had logged about 340 hours in helicopters, with about 16 hours of these in the Robinson R44 and about 15 hours in the Robinson R22 helicopter.

Apart from the acceptance flight earlier that day, and a check flight a couple of weeks earlier, the pilot had not flown a R44 for more than three years. The pilot's most recent helicopter experience was in a MD 520N helicopter. Although the pilot had flown two separate one-hour flights in the last three weeks, the pilot stated they were not current nor experienced on the R44. The pilot reported that flying opportunities had been limited, and spread out over about 4-5 years. During this time, the pilot had also worked as a helicopter support person and as a teacher of commercial helicopter theory subjects.

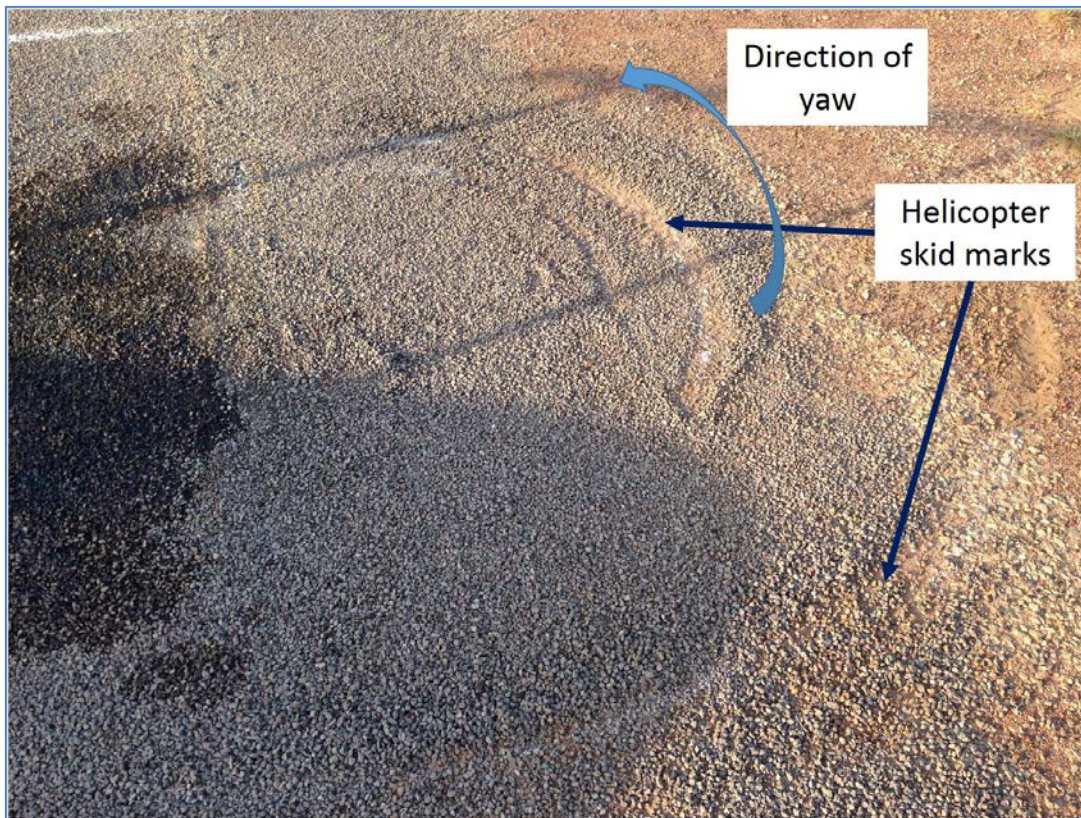
VH-ZWA on right side



Source: Operator

¹ This check requires a slight lift of the collective and a slight reduction in RPM. The warning horn/ light should occur at 97% RPM

Figure 1: Skid marks made by VH-ZWA yawing to the left



Source: Operator

Figure 2: VH-ZWA on right side showing damage to main rotor and cabin



Source: Operator

Pilot comments

The pilot arrived from interstate at 0100 on the morning of the accident, ready to start the new job. They signed on for duty at 1000 after 7 hours of sleep. After completing some paperwork, the pilot underwent a one-hour company acceptance flight with the chief pilot. This flight was conducted in ZWA.

After a lunch break, more paperwork was completed before the chief pilot suggested the pilot go for a solo flight, to consolidate their knowledge of the local area and become more comfortable with the R44. The pilot reported feeling a little uncomfortable conducting the solo, but reasoned that it would be a good opportunity to gain some more practice. In addition, the pilot stated being slightly fatigued, and affected by the extra pressure of 'new employee expectations'.

The pilot made a number of comments regarding different factors of the occurrence, these included:

- at the time of the accident, not understanding why the helicopter turned to the left, or yawed so rapidly, particularly after full right pedal had been applied. The pilot later reflected that the pedals must not have been as neutral, as first thought and that this had allowed the yaw leading to the resultant loss of control
- suggesting the left yaw may have been from the collective lock being jammed under the collective just enough for the control to feel fully down, but actually have sufficient play to allow the yawing movement.
- felt that the helicopter falling onto the right side was consistent with dynamic rollover

Operator comments

The operator acknowledged that the new pilot had low total flying hours and low time on the R44 helicopter. This was combined with only 1.9 hours of flying logged in the last 90 days. Although two recent dual checks had been carried out, the additional solo practice was suggested to allow the pilot some consolidation time. In hindsight, the company realised that the pilot required even more dual time prior to being authorised for any solo practice.

A post-accident engineering inspection did not reveal any mechanical defects with ZWA.

ATSB comment

The ATSB did not conduct an onsite investigation to this accident. The pilot reported not being aware of making any errors during the engine start, but noted that a helicopter is unable to move if the collective is fully down.

In researching several databases for like occurrences, the ATSB found a [Robinson 44 accident](#) with similarities, in the United Kingdom. In this accident, the helicopter yawed to the left and fell onto the right side during an engine start. The UK Air Accidents Investigation Branch (AAIB) commented that a rapid yaw to the left could be induced, if too much left pedal is applied at the point of governor engagement, due to the effectiveness of the tail rotor.

The fact that the pilot's most recent helicopter experience was on a MD 520N, also supports this possibility. The MD520N does not have a traditional tail rotor; it is fitted with a NO Tail Rotor (NOTAR) system, and requires very little pilot input on the pedals. It is probable that the pilot defaulted to this more relaxed pedal pressure during the accident flight.

Other R44 accidents, with relatively inexperienced solo pilots at the controls, were attributed to the pilot's lack of recency, or inexperience, managing the different handling characteristics of the helicopter, due to the weight shift, which occurred without a person occupying the left seat.

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.

Operator

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

Operations manual amendment

All pilots recruited with under 500 hours total time and / or 30 hours in the previous 90 days, must fly with a Grade 1 instructor. This flight is to assess the pilot's practical and mental status. The Grade 1 instructor is to provide a report on the flight to the Chief Pilot prior to the new pilot undergoing company induction.

General details

Occurrence details

Date and time:	7 October 2015 – 1718 CST	
Occurrence category:	Accident	
Primary occurrence type:	Loss of control	
Location:	Darwin Airport, Northern Territory	
	Latitude: 15° 28.83' S	Longitude: 128° 32.38' E

Aircraft details

Manufacturer and model:	Robinson Helicopter Company R44 II
Registration:	VH-ZWA
Serial number:	11752
Type of operation:	Training - solo

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 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.

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.