



Australian Government

Australian Transport Safety Bureau

Power loss involving Robinson R44, VH-ZON

11 km NNE of Arkaroola (ALA), South Australia, 15 July 2013

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Addendum

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Power loss involving a Robinson R44, VH-ZON

What happened

On 15 July 2013, at about 1500 Central Standard Time,¹ a Robinson R44 helicopter, registered VH-ZON (ZON), departed from the helipad at Arkaroola, South Australia on a short scenic flight. On board were the pilot and two passengers.

On the return leg, at about 1510 and 3.5 NM east-north-east of the helipad, the pilot heard a loud noise from the rear of the helicopter, and suspected it was from the engine area. Almost immediately, the helicopter yawed to the right and began to descend. As there had been no indication of a possible mechanical issue during the flight, nor the previous two flights that day, the pilot reported being surprised at how quickly the situation had changed from normal, to a developing emergency.

The helicopter did not respond to the pilot's attempt to correct the yaw through his application of left anti-torque pedal. He noted there were no audible or visual warnings, so quickly scanned the instrument panel for any possible explanation. He could not recall seeing any abnormal instrument indications. The pilot advised his passengers of the situation and prepared them for an off-site emergency landing; radioed the helicopter's position and situation back to base; quickly sought out a landing area in the rugged terrain; and placed ZON into an autorotation.²

The pilot focussed on conducting the autorotation and landing, and ignored the repeated calls from base to check on the situation. The helicopter touched down on the rocky ridge and sustained substantial damage. After landing, the pilot noted the engine was not running, he shut the helicopter down and then checked on his passengers. The passengers did not sustain any injury.

Pilot experience and comments

The pilot reported conducting a thorough passenger and emergency briefing prior to the accident flight. This included location of the emergency locator transmitter (ELT), emergency rations location, ultra-high frequency (UHF) radio operation as well as the standard briefing including the operation of seat belts, doors, and exits.

The pilot held a Commercial Pilots (Helicopter) Licence, with about 190 hours total time, of which 11 hours were on the Robinson R44 helicopter. He also held a low-level endorsement.

The pilot commented on how quickly events unfolded, and how much quicker it was without the mental readiness that precedes autorotation practice conducted during training.

VH-ZON at accident site



Source: Pilot

¹ Central Standard Time (CST) was Coordinated Universal Time (UTC) + 9.5 hours.

² 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 airflow is determined mainly by airspeed.

Figure 1: VH-ZON at the emergency landing site



Source: Pilot

Engineering report – post accident

The operator arranged a full engineering inspection after the helicopter was retrieved. The insurance assessor also provided a further report of a detailed magneto inspection. The ATSB did not conduct an on-site investigation, and was not present at either of the two inspections.

At the time of the accident, the helicopter had 3,190.5 hours in service and had flown for 87.5 hours since the last 100-hourly inspection.

The magneto history report, provided to the ATSB by the insurance assessor, noted the following:

- The left magneto had been replaced twice since December 2012. The distributor block had been overhauled 32.1 hours prior to the accident.
- A detailed inspection of the magnetos found the right magneto was operating normally, but the left magneto had failed. The left magneto distributor block bearing had excessive movement beyond normal tolerances. This movement had allowed the timing gear to disengage and re-engage during operation, resulting in the significant alteration of the magneto timing. The incorrect timing may have opposed the operation of the right magneto, which could have resulted in an engine stall.

Figure 2: Two examples of unserviceable distributor blocks



Source: CASA Airworthiness Bulletin 74-005 Issue 1

The Civil Aviation Safety Authority (CASA) is aware of the existing problem with Teledyne Continental Motors and Champion Aerospace (Slick) magnetos. A search of the CASA Service Difficulty Report (SDR) database over the 24 months to June 2013 revealed nearly 45 per cent of ignition failures were attributed to magneto failures. On 24 July 2013, CASA issued Airworthiness Bulletin (AWB) No: 74-005, page 4 & 5, paragraph 3.3 – *Distributor Block Bearing Failures*. This AWB highlights many magneto related issues and indicates that despite close inspection of new distributor blocks, there is no way to determine if they will prove to be reliable. The AWB notes that this is currently the matter of an active on-going investigation in conjunction with manufacturers. Further reading is available at: www.casa.gov.au/wcmswr/_assets/main/airworth/awb/74/005.pdf

Safety message

This accident highlights the importance of thorough pre-flight safety briefs as conducted by the pilot in this situation. Although there were no injuries, the passengers were fully aware of the emergency exits and equipment had the outcome been different. The Australian Transport Safety Bureau (ATSB) safety research and analysis report B2004/0238, *Public Attitudes, Perceptions and Behaviours towards Cabin Safety Communications*, stated that when safety briefs are thoroughly and professionally delivered, the chances of survival for passengers increase. This report is available at www.atsb.gov.au/publications/2006/b20040238.aspx.

The pilot, although new to the type of helicopter, made clear decisions during an unexpected stressful situation. He continued to focus on the ‘aviate’ part of the time-proven message – ‘aviate, navigate, communicate’, despite the distraction of radio calls.

General details

Occurrence details

Date and time:	15 July 2013 – 1510 CST	
Occurrence category:	Accident	
Primary occurrence type:	Power loss	
Location:	11km NNE of Arkaroola (ALA), South Australia	
	Latitude: 30° 19.03' S	Longitude: 139° 23.65' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44	
Registration:	VH-ZON	
Serial number:	0179	
Type of operation:	Charter - passenger	
Persons on board:	Crew – 1	Passengers – 2
Injuries:	Crew – Nil	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.