Australian Government

Australian Transport Safety Bureau

Power loss involving Robinson R44, VH-NWD

Mount Molloy, Queensland. 11 October 2012

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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

Power loss involving Robinson R44, VH-NWD

What happened

VH-NWD

Source: Aircraft owner

On 11 October 2012, at 0845 Eastern Standard Time[1] a Robinson R44 Raven 1 helicopter departed a property near Mount Molloy for Georgetown, Queensland, on a private flight. On board the helicopter were the pilot and one passenger.

The pilot performed his usual pre-takeoff checks which included a check of the magnetos, with nothing unusual noted. The helicopter departed to the west from an elevated position located on a spur of a hill.

About 30 seconds after becoming airborne and as the helicopter passed through 250 ft and 60 knots indicated airspeed, the pilot heard a loud grinding noise from the rear of the helicopter. This noise was immediately followed by the illumination of the clutch light[2] and an uncommanded left yaw.

The pilot immediately executed a 180^{o} turn to the left, in an attempt to return to the clear area from which the helicopter had become airborne. As the pilot rolled out of the turn, the low Revolutions Per Minute (RPM) light and warning horn activated and he reported that the helicopter "kicked" three times to the left. The pilot lowered the collective[3] and entered autorotation[4] in an attempt to recover the rotor RPM.

The low RPM light and horn deactivated and the pilot autorotated towards the only clear, level area within autorotative distance; a contour drain located down a slope from the departure point.

At about 30 ft above ground level, the low RPM horn and light reactivated. The pilot initiated a flare[5] and increased the collective to its upper limit in order to utilise the remaining rotor RPM to cushion the landing. The helicopter touched down nose-high, on the heels of the skids with substantial forward momentum. The helicopter tipped forward and up onto the toes of the skids and the main rotor severed the tail boom. The helicopter came to rest straddling a contour drain and remained upright with the engine still running. The pilot shut down the helicopter and together with the passenger exited the helicopter without injury.

Weather

The pilot reported the weather as fine at 5 knots from the north-east.

Pilot information

The pilot held a Private Pilot Licence (Helicopter) with approximately 100 hours total time and 43 hours on the R44.

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[1] Eastern Standard Time (EST) was Coordinated Universal Time + 10 hours.

[2] Indicates clutch actuator circuit is on, either engaging or disengaging clutch.

[3] 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.

[4] Descent with power off, air flowing in reverse direction upwards through the lifting rotor(s) causing it to continue to rotate at approximately cruise RPM. Pilot preserves usual control functions through pedals, cyclic and collective, but cannot alter steep 'glide path'. The rate of descent is reduced just before ground impact by an increase in collective pitch; this increases lift, trading stored rotor kinetic energy for increased aerodynamic reaction of the blades, and should result in a gentle touchdown.

[5] Final nose up pitching of landing helicopter to reduced rate of descent and forward airspeed to close to zero.

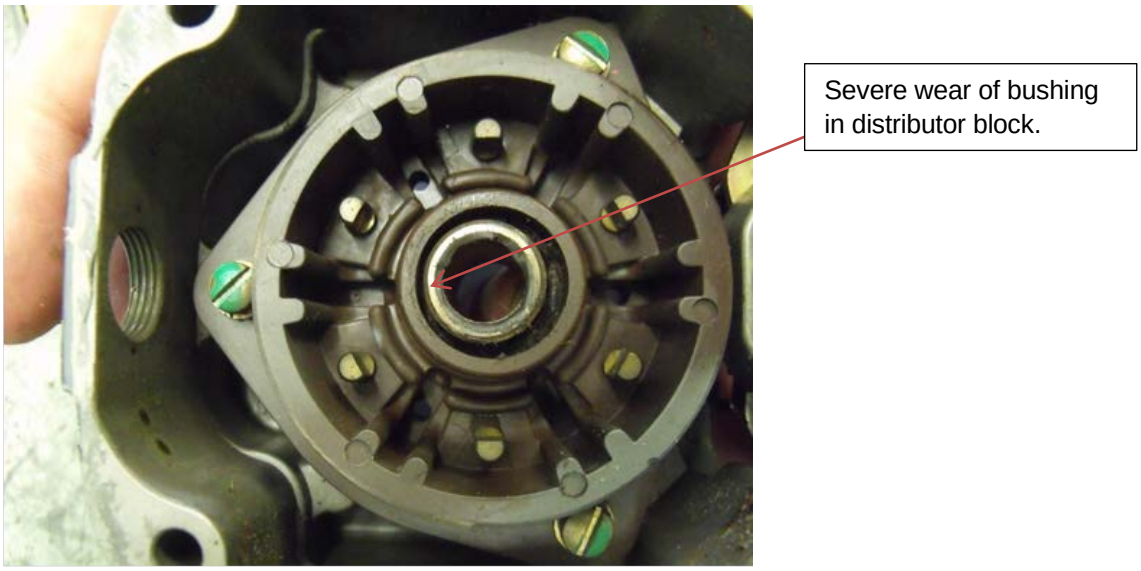
Helicopter history

The maintenance records indicated that the helicopter was serviceable and had flown a total of 174 hours at the time of the accident. A 100-hourly inspection had been performed approximately 70 flight hours prior to the accident and all the engine cylinders were found to be glazed and were replaced. The carburettor was found to be providing an overly lean mixture and was also replaced, with another brand of carburettor. On 15 August 2012, a 50-hourly inspection was performed with no defects noted. The aircraft had flown 19.9 hours since the performance of the 50-hourly inspection.

Engine examination

The aircraft was transported by the insurer to a contracted maintenance organisation for inspection. The magnetos were removed, inspected and checked for timing. The right magneto timing was found to be correct. The timing gear on the left magneto was found to be worn with a large amount of play. On disassembly, the left magneto was found to have a badly worn distributor block, which allowed the timing gear to move and alter the internal timing by approximately 40^0.

Figure 1: Left magneto distributor block



Source: Insurer

Safety message

Every take-off is unique and will require a different course of action in the event of a malfunction. Pilots are encouraged to perform a self-briefing prior to each take-off. Self-briefing is important, as it serves as a reminder in the event of an emergency, such as a complete or partial power loss.

Also, having made a plan prior to an emergency situation may mitigate some effects of decision making under stress, such as reduced short term memory. Further, knowing that you have made a plan under non-stressful and controlled conditions, should give you the confidence to carry out the required actions in an emergency situation.

For further information on what a pre-take-off brief should take into account see:

- ATSB Avoidable Accident booklet: Managing partial power loss after take-off in single-engine aircraft.

  www.atsb.gov.au/publications/2011/partial-power-loss.aspx

General details

Manufacturer and model:	Robinson R44 Raven 1	
Registration:	VH-NWD	
Type of operation:	Private	
Occurrence category:	Accident	
Primary occurrence type:	Mechanical	
Location:	38 km north west Cairns Airport, Queensland	
	Latitude:16°40’13.33 S	Longitude: 145°28’21.15 E
Persons on board:	Crew – 1	Passengers – 1
Injuries:	Crew – 0	Passengers – 0
Damage:	Substantial	

About the ATSB

The Australian Transport Safety Bureau (ATSB) is an independent Commonwealth Government statutory agency. The Bureau 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.