Australian Government
Australian Transport Safety Bureau

Total power loss involving a Robinson R22, VH-STK

155 km SSW of Normanton aerodrome, Queensland, 13 November 2013

ATSB Transport Safety Report
Aviation Occurrence Investigation
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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

Addendum

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Total power loss involving a Robinson R22, VH-STK

What happened

VH-STK

Source: Operator

On 13 November 2013, the pilot of a Robinson R22 helicopter, registered VH-STK, was conducting aerial mustering on a property about 155 km SSW of Normanton, Queensland.

At about 1249 Eastern Standard Time,[1] the helicopter was hovering behind a mob of cattle, when the pilot felt the helicopter jerking. He landed and conducted a magneto check. He selected the left magneto and the engine rapidly lost power. He then selected the right magneto and the engine ran normally. He reselected the magneto switch to 'both' and attempted to contact the property manager.

He was unable to make contact with the manager and elected to take-off. Once airborne, he was able to communicate with the manager via the ultra-high frequency (UHF) radio. He turned the helicopter towards a road and commenced an approach to land on the road.

At about 20 ft above ground level, the engine stopped. The pilot lowered the collective[2] and flared[3] the helicopter for landing. On impact, the helicopter spun around 180º (Figure 1). The helicopter was substantially damaged and the pilot was uninjured.

Figure 1: Damage to VH-STK

Source: Operator

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

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

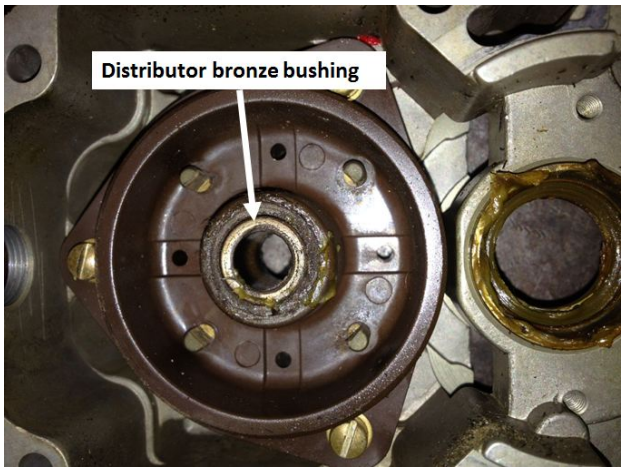
3 Flare is aimed to reduce rate of descent before ground impact by increasing collective pitch; this increases lift, trading stored rotor kinetic energy for increased aerodynamic reaction by blades, and should result in a gentle touchdown.

Engineering inspection

An engineering inspection of the left magneto revealed that the distributor bushing was loose (Figure 2) resulting in 6 mm of movement in the plastic gear wheel (Figure 3). This resulted in the magneto providing the ignition spark to an incorrect engine cylinder at the wrong time.

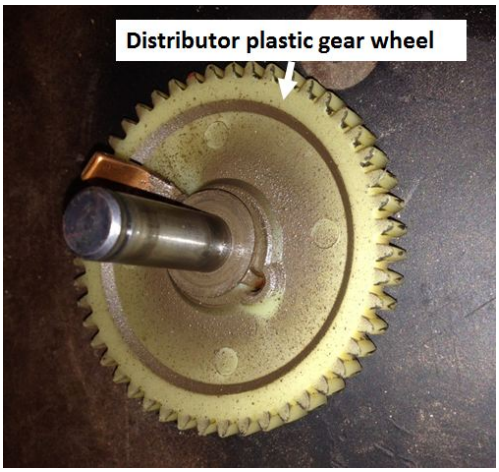
The magneto previously had a 500 hourly inspection carried out on it 80 hours prior to the accident.

Figure 2: Left magneto distributor



Source: Operator

Figure 3: Left magneto gear wheel



Source: Operator

Pilot comments

The pilot provided the following comments:

- he had added 1 L of oil to the engine prior to the day's flight, which was normal for that helicopter
- the magnetos had operated normally during the pre-flight checks
- he had completed a helicopter flight review[4] in April 2013, including practice autorotations and emergency procedures and he believed that low level emergency training was vital for pilots conducting aerial mustering operations
- the helicopter was fitted with an emergency locator transmitter (ELT), but it did not activate. The ELT had recently been serviced as it had activated spuriously on several occasions.

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 operator has advised the ATSB that they have requested all company pilots review the New Zealand Civil Aviation Authority's (CAA) publication *Magneto Checks Basics* and the Robinson R22 Flight manual safety notices (see safety message below for links).

[4] The Civil Aviation Safety Authority requires all Private and Commercial helicopter pilots to undergo a Helicopter Flight Review (HFR) every 2 years to maintain validation of their pilot licence. See Appendix C of Civil Aviation Advisory Publication (CAAP) 5.81-1(1).

Safety message

This accident highlights the importance of understanding the implications of abnormal engine indications. The Robinson R22 Pilot Operating Handbook advises pilots that, when a magneto malfunction is suspected in-flight, select the magnetos to the BOTH position and land as soon as practical (www.robinsonheli.com/manuals/r22_poh/r22_poh_full_book.pdf).

The following New Zealand CAA publication, *Magneto Check Basics* article provides guidance on conducting magneto checks: www.caa.govt.nz/Publications/Vector/Vector_Articles/Magneto_Check_Basics_MarApr08.pdf.

General details

Occurrence details

Date and time:	13 November 2013 – 1253 EST	
Occurrence category:	Accident	
Primary occurrence type:	Total power loss	
Location:	155 km SSW Normanton aerodrome, Queensland	
	Latitude: 18° 58.13' S	Longitude: 140° 28.57' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R22	
Registration:	VH-STK	
Serial number:	4581	
Type of operation:	Aerial work	
Persons on board:	Crew – 1	Passengers – Nil
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.