

Australian Government Australian Transport Safety Bureau

Ground fire involving a Robinson R44, VH-TZE

32 km N of Daly Waters, Northern Territory, 15 October 2013

ATSB Transport Safety Report Aviation Short Investigations

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Addendum

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Ground fire involving a Robinson R44, VH-TZE

What happened

On 15 October 2013, the pilot of a Robinson R44 helicopter, registered VH-TZE (TZE), was conducting gravity survey¹ work, north of Daly Waters, Northern Territory. On board were the pilot and a geophysical field technician. The survey consisted of landing about every 4 km along a planned grid to collect data. The pilot had completed several landings already that day.

At about 1630 Central Standard Time (CST), the pilot conducted a routine landing at a designated grid point. He then reduced the engine power to idle to prevent vibrations from the helicopter interfering with the survey equipment

VH-TZE- Intensity of the fire



Source: Pilot

reading. The technician disembarked with his equipment to carry out a reading, about 5 m away from the helicopter.

An uncommanded change in engine noise prompted the pilot to increase engine power a small amount in order to improve engine performance. While doing this, he checked the gauges and noticed that the engine revolutions per minute (RPM) had dropped significantly and the rotor RPM was decaying toward zero. He then saw the technician waving his arms in an attempt to gain his attention. The pilot looked toward the rear of the helicopter and saw a fire underneath, which was spreading into the engine bay. The pilot exited the helicopter and notified the landholders via phone so they could construct fire breaks to contain the ensuing grass fire. The helicopter was not equipped with a portable fire extinguisher. The occupants were uninjured; however, the helicopter was destroyed by the fire (Figure 1).

Location and survey details

The survey was being conducted in an area about 32 km north of Daly Waters. The temperature was about 40 °C with a relative humidity of around 10% and wind speed of 6 kt.

Several types of grass grow in the area, including tussock, all of which was very dry. The pilot advised he was aware of the danger of landing in long grass. The survey guidelines allow for up to 300 to 400 m deviation from the grid point locations to encourage safe landing site selection.

Proactive standard operating procedures between the survey company and helicopter operator have the field technician look underneath and around the helicopter after landing, to check for any signs of danger and, if required, stamp down any long grass, before moving away to carry out their survey work. The survey field technicians undergo training for field and helicopter operations before they are deployed and again once on site. Daily pre-flight briefings between pilots and technicians discuss each day's tasks and identify risks associated with the operation and location.

¹ Gravity surveying measures small differences in gravity due to the variation in density of rocks across the earth's surface. The data is used for many purposes including minerals exploration, mapping and to underpin the Global Positioning System.



Figure 1: Fire damage to VH-TZE and surrounding bush

Source: Pilot

Grass fire risk

The Australian Transport Safety Bureau (ATSB) has been notified of 13 occurrences since 2000 where a helicopter has been destroyed by grass fire, with many reports highlighting the speed with which the grass ignited and the fire spread beyond control.

In November 2002, Robinson Helicopter Company published *Service Bulletin SB-46*,² which recommended that shields could be installed on the exhaust collectors and tailpipe to reduce the chance of grass fire, with all R44 helicopters serial number 1270 and subsequent being fitted with these shields at manufacture.

TZE had a serial number of 1333, indicating that the helicopter had been fitted with aluminium exhaust collector and tailpipe shields during the manufacturing process. A review of the post-accident photographs³ was unable to identify the presence of these shields in the wreckage; however, it was possible that they had melted in the ensuing fire. The associated stainless steel brackets and clamps were also not observed.

The photographs also indicated that the muffler shroud, a stainless steel shroud that fitted over the muffler to heat the air flow for the cabin heater system⁴ and assisted with cooling the muffler and engine compartment, was not visible. The absence of a muffler shroud would reduce engine compartment cooling and expose a larger surface area of heated metal, thereby increasing the risk of a grass fire during off-airport landings. The reason for the muffler shroud not being evident in the photographs could not be determined.

The operator reported that the shields and muffler shroud had been fitted to TZE.

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.

² <u>www.robinsonheli.com/service_library/r44_service_bulletins/r44_sb46.pdf</u>

³ The ATSB did not attend the accident site

⁴ The cabin heater system is required to be installed in the R44 helicopter as per Robinson R44 Maintenance Manual Section 11.100

Survey Company

Prior to this occurrence, the survey company had commenced research into incorporating Bluetooth into the flight helmets to allow for continuous and effective communication between the pilot and technician for a distance of up to 50 m from the helicopter. This has since been successfully implemented.

Safety message

Robinson R22 and R44 helicopters have exhaust systems that are low to the ground. The ground to muffler height on a new R44 is about 49 cm. The *Pilot Operating Handbook* for both types has a note in *Section 10, Safety Tips* stating:

Do not land in tall dry grass. The exhaust is low to the ground and very hot; a grass fire may be ignited.

Pre-flight briefings highlighting the dangers of landing on grass, especially in areas of high temperatures and low humidity, can reinforce the importance of carefully choosing a landing site.

The Civil Aviation Safety Authority (CASA) airworthiness directive *AD/GENERAL/65 Amdt 5⁵* states that, not all Australian registered aircraft are required to have a hand held portable fire extinguisher fitted. However, in airworthiness bulletin *AWB 26-002 Issue 2*,⁶ CASA recommends that each aircraft be fitted with at least one extinguisher that is accessible by the pilot. 'Halon'⁷ type extinguishers (those most commonly found in aircraft), while initially rated for class B 'flammable liquids' and class C 'electrical fires', can also be effective against class A 'common combustible fires'.

General details

Occurrence details

Date and time:	15 October 2013 – 1630 CST		
Occurrence category:	Accident		
Primary occurrence type:	Fire (ground)		
Location:	32 km N of Daly Waters, Northern Territory		
	Latitude: 15° 15.97 S	Longitude: 133° 23.30' E	

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44		
Registration:	VH-TZE		
Serial number:	1333		
Type of operation:	Aerial work		
Persons on board:	Crew – 1	Passengers - 1	
Injuries:	Crew – Nil	Passengers - Nil	
Damage:	Destroyed		

⁵ <u>www.casa.gov.au/ADFiles/airgen/gen/GEN-065.pdf</u>

⁶ <u>www.casa.gov.au/wcmswr/_assets/main/airworth/awb/26/002.pdf</u>

⁷ Halon is a liquefied, compressed gas that stops the spread of fire by chemically disrupting combustion. It is a preferred extinguisher for aviation as it does not reduce oxygen concentration, impair visibility or leave a residue.

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.