Australian Government
Australian Transport Safety Bureau

Collision with terrain involving a Robinson R44, VH-HLB

126 km ESE of Tindal Airport, Northern Territory on 23 September 2014

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Addendum

Page	Change	Date

Collision with terrain involving a Robinson R44, VH-HLB

What happened

On 23 September 2014, at about 1500 Central Standard Time, a Robinson R44 helicopter, registered VH-HLB, departed Bulman camp, Northern Territory, to conduct gravity survey operations.[1] On board were a pilot and a geophysical field technician. The operation involved flying to specified locations 2 km apart and selecting a suitable landing site within 400 m of the location.

At about 1630, after completing landings at about 30 sites, the helicopter arrived overhead a specified location. The pilot identified a potential landing site, overflew it for a closer inspection, and then entered an out of ground effect hover[2] just above treetop height to determine whether the selected site was suitable for landing. The pilot decided the site was unsuitable as trees prevented sufficient clearance for the main and tail rotors.

The pilot commenced moving the helicopter forwards to depart the landing site, but it started to sink and the pilot observed the rotor revolutions per minute (RRPM) decaying. He lowered the collective[3] and rolled on throttle in an attempt to increase the RRPM. The outside air temperature gauge indicated about 40 °C and the pilot reported that increasing the throttle did not provide any detectable increase in power. There was a light breeze, which the pilot assessed may have been from a northerly direction at that time, and the helicopter was heading south, resulting in a slight tailwind.

The pilot then eased forward on the cyclic[4] to increase translational lift[5] and at about the same time, the low RRPM horn sounded. The helicopter continued to descend and the main rotor blades collided with multiple tree branches. The pilot turned the helicopter towards a small creek bed. When at about 6 ft above ground level, the helicopter rotated about 180° and landed hard with the left skid touching the ground first. The helicopter sustained substantial damage (Figure 1) and the pilot and passenger were uninjured.

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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.

2 Helicopters require more power to hover out of ground effect due to the absence of a cushioning effect created by the main rotor downwash striking the ground. The distance is usually defined as more than one main rotor diameter above the surface.

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 A primary helicopter flight control that is similar to an aircraft control column. Cyclic input tilts the main rotor disc varying the attitude of the helicopter and hence the lateral direction.

5 The helicopter gains translational lift from horizontal movement or headwind.

Figure 1: Accident site

Source: Operator

Pilot comments

The pilot provided the following comments:

- The combination of the air temperature and the lack of wind reduced the performance of the helicopter.
- The helicopter had departed with full fuel and at the time of the incident the tanks were about half full.

Safety message

To maintain a steady hover, an increase in the weight of the helicopter requires more engine power. Increases in altitude and temperature reduce air density, and consequently the engine's ability to produce power and also reduce the power required.

The helicopter had been fitted with bladder fuel tanks. Despite the hard landing and substantial damage to the helicopter, there was no post-impact fire and the pilot and passenger were able to exit the helicopter uninjured.

This incident highlights the effect of air temperature on helicopter performance. Understanding the controllability issues at the limits of the normal operating envelope can assist pilots in recognising the symptoms of reduced aircraft performance. Further information is available in the following ATSB reports:

www.atsb.gov.au/publications/investigation_reports/2006/aair/aair200600979.aspx

www.atsb.gov.au/publications/investigation_reports/2013/aair/ao-2013-203.aspx

General details

Occurrence details

Date and time:	23 September 2014 – 1632 CST	
Occurrence category:	Accident	
Primary occurrence type:	Collision with terrain	
Location:	126 km ESE Tindal Aerodrome, Northern Territory	
	Latitude: 15° 01.28' S	Longitude: 133° 25.72' E

Helicopter details

Manufacturer and model:	Robinson Helicopter Company R44	
Registration:	VH-HLB	
Serial number:	1466	
Type of operation:	Aerial work - survey	
Persons on board:	Crew – 1	Passengers – 1
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.