Australian Government
Australian Transport Safety Bureau

Forced landing involving Robinson Helicopter R44 VH-MQE

27 km N Silver Plains (ALA), Queensland, on 6 April 2017

ATSB Transport Safety Report
Aviation Occurrence Investigation
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Addendum

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Forced landing involving Robinson Helicopter R44, VH-MQE

What happened

At about 1500 Eastern Standard Time (EST) on 6 April 2017, a Robinson Helicopter R44 II, registered VH-MQE (MQE), departed from Melanie Camp landing area, Queensland. The pilot and three passengers were on board the scenic charter flight.

After about half an hour into the scenic flight, the pilot commenced a large orbit around a lake that was located about 15 km NE of Melanie Camp. They turned downwind at about 550 ft above ground level (AGL), with an airspeed of about 65 knots and the main rotor RPM was about 101 per cent. About 15 seconds later, the main rotor low RPM horn sounded through the pilot's headset. The pilot observed the main rotor low RPM warning light illuminate and a rapid decrease in main rotor speed. The pilot advanced the engine throttle and lowered the collective[1] but found that this made little difference with no increase in main rotor speed even though full engine power was applied. Shortly afterwards, the pilot initiated an autorotation[2] and prepared to land on a beach.

As the helicopter approached the landing spot, the pilot arrested the helicopter's rate of descent and the skids contacted the sand in a run-on landing.[3] After touchdown, the helicopter continued to travel forward about 3 m before the left skid dug into soft sand, which resulted in a dynamic roll over.[4] The helicopter came to rest on the left side (Figure 1). The pilot unfastened their seat belt and noted that the engine was not operating. They turned the fuel selector to off, moved the engine throttle to idle cut off, and turned off the engine magneto switches and the electrical master switch. The pilot and three passengers exited the helicopter through the right forward and aft exits.

About 40 minutes later, a company helicopter that had also been flying in the area located them. There were no injuries and the helicopter was substantially damaged (Figure 1).

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1 Collective is the primary helicopter flight control that simultaneously affects the pitch of all blades of the lifting rotor. Collective input is the main control for vertical velocity.

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 is determined mainly by airspeed.

3 A run-on landing refers to where the helicopter still has forward speed.

4 Dynamic rollover is when the helicopter starts to pivot laterally around its skid or wheel.

Figure 1: VH-MQE accident site

Source: Pilot

Pilot comment

The pilot provided the following comments:

- They had flown in this area previously. On the day of the accident, they had flown MQE to Coen Airport to pick up the passengers and flown back to Melanie Camp landing area without any issues.
- They were using a noise-cancelling headset (active noise reduction), which cancelled out any ambient noise. The pilot noted that if they did not have this type of headset they may have been able to hear if there were any unusual engine noises.
- At an altitude of about 550 ft they felt that there was insufficient height to position the helicopter into wind for landing. From that height, it was not possible to estimate the slope or the nature of the landing surface. After the landing, the pilot determined that the sand was very soft with a slight downslope towards the direction of the landing.
- At about 10 minutes prior to the main rotor low RPM warning, the clutch light had illuminated. The light extinguished in about 4 seconds, which was within the normal operating limits for the clutch light. The pilot indicated that there had been no other issues with the clutch mechanism during the day.
- The helicopter had sufficient fuel for the flight and was within the weight and balance limits.
- They had not experienced such a dramatic decrease in main rotor RPM before, despite conducting practice autorotations.

Operator comment

The operator reported that subsequent to the accident, the helicopter sustained substantial damage due to ocean tide (Figure 2). The operator was not able to provide any information in relation to any mechanical defects that may have contributed to the accident.

Figure 2: Subsequent damage due to the ocean tides

Source: Operator

Previous accident

Another ATSB investigation (AO-2012-096 - Ditching involving Robinson R44, 83 km N of Horn Island Airport, Queensland) documented the accident pilot using a noise-cancelling headset on the flight. The accident pilot believed that the headset may have dampened any abnormal engine sounds. Consequently, they only became aware of the engine problems when the engine governor failed.

Safety analysis

Due to the nature of the subsequent damage to the helicopter after the accident the integrity of the helicopter systems prior to the accident were not determined. Consequently, the reason for the loss of main rotor speed was not determined.

The pilot indicated that if a noise-cancelling headset was not used then they would have been able to hear the ambient noises and detect any changes in the 'normal' sounds of the helicopter.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- At about 550 ft, after the main rotor low RPM warning system activated, the pilot initiated an autorotation and the helicopter rolled onto the left side after landing. The reason for the main rotor low RPM warning was not determined.
- The pilot was using a noise-cancelling headset that may have masked any abnormal sounds from the helicopter prior to the low rotor RPM warning.

Safety message

The noise-cancelling headset worn by the pilot may have masked changes in the 'normal' sounds of the helicopter. The Civil Aviation Safety Authority (CASA) Airworthiness Article 1-43 Noise

Isolating Headsets highlights that noise attenuating and noise-cancelling headsets can in some circumstances reduce the effectiveness of aural cues, such as abnormal noises, which might give some warning of unusual operations.

General details

Occurrence details

Date and time:	6 April 2017 – 1530 EST	
Occurrence category:	Accident	
Primary occurrence type:	Forced landing	
Location:	27 km N Silver Plains (ALA), Queensland	
	Latitude: 13° 44.00' S	Longitude: 143° 32.40' E

Aircraft details

Manufacturer and model:	Robinson Helicopter Co R44 II	
Registration:	VH-MQE	
Serial number:	13338	
Type of operation:	Charter - Passenger	
Persons on board:	Crew – 1	Passengers – 3
Injuries:	Crew – 0	Passengers – 0
Aircraft 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 operations involving the travelling public.

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.