



Australian Government

Australian Transport Safety Bureau

# Safety Advisory Notice

To Robinson R22 and R44 maintainers, operators, and pilots

Number: AO-2022-038-SAN-01

## R22 and R44 cylinder durability issues

More data is needed to understand ongoing engine cylinder issues in R22 and R44 helicopters

### What happened

On the morning of 6 August 2022, the pilot of a Robinson R22 Beta II was flying at about 500–600 ft en route to conduct aerial mustering in northern Queensland. After some time in cruise, the helicopter suddenly began to 'shake and vibrate'. In response, the pilot conducted an autorotation, flaring the aircraft just above the trees in a heavily wooded area. The aircraft collided with trees and was destroyed. The pilot was uninjured, and there was no fire.



Source: Helicopter operator

### Why did it happen

The ATSB found that the engine issues prompting the pilot to attempt a forced landing were likely the result of carbon deposits that had accumulated on the valve stem of the no. 2 cylinder exhaust valve and within its guide, reducing clearance to less than the specified minimum. The reduced clearance likely resulted in the valve binding in the guide, and not fully closing.

### R22 and R44 cylinder durability

R22 and R44 series helicopters have been used extensively in northern Australia for the aerial mustering of livestock. From around 2016, some operators reported an increase in engine cylinder failures due to low compression. Undetected loss of compression on one or more cylinders can lead to a reduction in power, and the possibility of an in-flight emergency.

Significant work was undertaken to determine the reasons for these cylinder failures, and multiple factors were identified. However, CASA Airworthiness Bulletins AWB 85-024 – *Robinson R22/R44 Engine Exhaust Valve and Valve Guide Distress* and AWB 85-025 – *Robinson R22/R44 Engine Intake Valve and Valve Seat Distress* (Civil Aviation Safety Authority, 2018) noted that:

A clear understanding of all potential causative factors needs to be established before any permanent solutions can be implemented through design, manufacturing, operational or maintenance changes.

In 2019, the Lycoming Cylinder Durability Investigation Group (LCDIG) was formed to gather further information, collecting defect reports through form 1529 that is available at:

<https://www.casa.gov.au/lycoming-cylinder-durability-investigation-group-defect-report>

### Safety advisory notice

**AO-2022-038-SAN-01:** The ATSB strongly encourages maintainers, operators, and pilots of Robinson R22 and R44 helicopters fitted with Lycoming O-320, O-360 and O-540 series engines to complete a Lycoming cylinder durability investigation group defect report form 1529 any time engine cylinder issues are identified.

Read more about this ATSB investigation:

[https://www.atsb.gov.au/publications/investigation\\_reports/2022/aair/ao-2022-038](https://www.atsb.gov.au/publications/investigation_reports/2022/aair/ao-2022-038)

Released: February 2024

Australia's national transport safety investigator

AVIATION | MARINE | RAIL

24 Hours 1800 020 616 › Web [www.atsb.gov.au](http://www.atsb.gov.au)

Twitter @ATSBInfo › Email [atsbinfo@atsb.gov.au](mailto:atsbinfo@atsb.gov.au)