

Airworthiness Bulletin

AWB 63-010 Issue 2 - 23 September 2021

Robinson Helicopter Drive Train Failure

An Airworthiness Bulletin is an advisory document that alerts, educates and makes recommendations about airworthiness matters. Recommendations in this bulletin are not mandatory.

1. Effectivity

All Robinson Helicopter Company (RHC) R22 and R44 series helicopters.

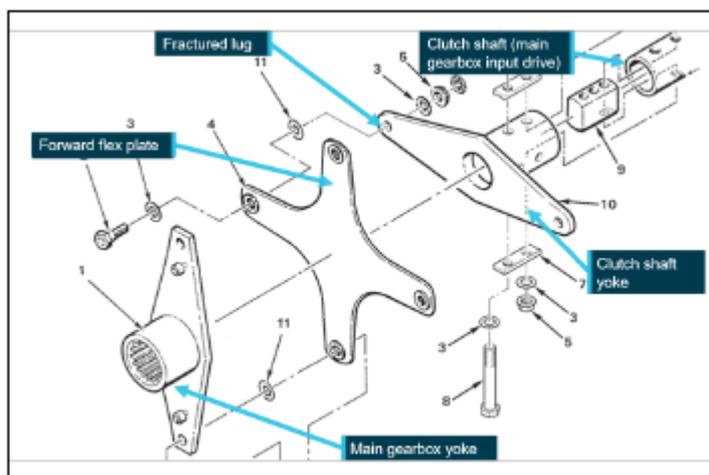
2. Purpose

To inform owners, registered operators, maintenance organisations and Licensed Aircraft Maintenance Engineers of a failure in a Robinson R44 drive train component that was found by the Australian Transport Safety Bureau (ATSB) during investigation AO-2020-064. ATSB had issued a Safety Notice AO-2020-064-SAN-014 to highlight this component failure.

The content and scope of this document is based on preliminary investigation findings and may be updated as additional information becomes available.

3. Background

The ATSB has provided the preliminary results of an investigation (AO-2020-064) to CASA which highlighted a fatigue crack at a bolt hole on the C907 yoke's arm that connects to the flex plate of the main transmission drive.



Source: Robinson Helicopter Company Illustrated parts catalogue, annotated by the ATSB.

Figure 1 - Main gearbox and forward flex plate and yoke assembly.
Refer RHC online IPC/MM for current configuration data.



4. Recommendations

The ATSB report identifies the failure as fatigue in nature and the crack progressed entirely through the clutch shaft yoke cross section. The ATSB has highlighted that the yoke life is managed via on-condition maintenance with only visual inspections at the 100-hour or annual inspection. The opportunity to conduct a detailed inspection is currently only scheduled to occur at the 12 year/2200-hour overhaul interval.

Failures of this type with helicopter drive trains are usually associated with repeatedly exceeding power limitations, combined with misalignment and nicks or corrosion on the yoke or flex plate edges and incorrect assembly particularly washer placement or incorrect hardware torque following maintenance.

Failure of the drive train causes a forced, autorotative landing and may result in damage or injury depending on the pilot skill and terrain.

Pilots and licenced engineers should be vigilant of any signs of deterioration of components within the helicopter drive train and rotating flexible couplings. Any tell-tale sign such as loose fasteners, corrosion or discolouration will warrant further investigation.

Further investigation of these components serviceability may require specialised inspection methods such as non-destructive testing (NDT). The manufacturer's maintenance data should be consulted and if lacking sufficient detail for the required inspection method/s either contact the manufacturer for the appropriate inspection data, or if a specialised inspection is required, then the inspection data will need to be generated and approved under civil aviation legislation.

Any specialised inspections will need to be conducted using approved data by an appropriately authorised person.

5. Reporting

All defects identified should be reported to CASA via the CASA defect reporting system. Details of the maintenance history for the drive train should be provided in addition to information concerning the method of detection, the location and condition of defective parts and any other information on possible triggers for the reported event. This information will facilitate a detailed review of potential failure causes and contributing factors.

6. Enquiries

Enquiries with regard to the content of this Airworthiness Bulletin should be made via the direct link email address:

AirworthinessBulletin@casa.gov.au

or in writing, to:

Airworthiness and Engineering Branch
National Operations and Standards
Civil Aviation Safety Authority
GPO Box 2005, Canberra, ACT, 2601