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Airworthiness Bulletin

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Retrofit of Symmetrical Horizontal Stabilizers to Robinson Helicopters

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 variants of aircraft manufactured by Robinson Helicopter Company (RHC) fitted with asymmetrical horizontal stabilizers, except for R22 Mariner aircraft.

For accurate eligibility of the retrofit, please refer to the latest service documents as published from time to time by RHC.

2. Purpose

To inform owners, operators, and maintainers of the option to retrofit symmetrical horizontal stabilizers to certain Robinson Helicopters aircraft. This new empennage configuration improves safety by reducing the tendency to roll to the right in low-G flight.

3. Background

On 28th March 2024, the Australian Transport Safety Bureau (ATSB) published Safety Advisory Notice reference AO-2023-051-SAN-001 (the SAN) relating to a Robinson R66 helicopter. This SAN as well as Safety Notice SN-11 from Robinson Helicopters draws attention to the fact that a low-G condition can ultimately result in a “powerful” right roll of the aircraft. (ATSB, 2024) (RHC, 1982) SN-11 also draws attention to the potential for this hazardous condition to have catastrophic consequences.

Retrofitting the new empennage configuration with symmetrical horizontal stabilizers is a measure that can be taken to mitigate the risks related to low-G conditions by reducing the tendency of the helicopter to roll to the right. An additional benefit is an improvement in ride comfort while flying through turbulence due to the reduced tendency to roll in response to gusts.

4. New empennage configuration

The new empennage configuration replaces the asymmetric horizontal stabilizer with a symmetrical one installed directly to the tail boom, forward of the tail rotor. The change is a result of extensive design and flight testing conducted by RHC [1].

The design change has been approved by the Federal Aviation Administration (FAA) on R22, R44, and R66 aircraft, except for the R22 Mariner. Under regulation 21.470 of the Civil Aviation Safety Regulations (CASR), the FAA approval is accepted as an approval of the design change on Australian-registered aircraft.

The new empennage is now standard on production aircraft [2]. RHC has provided CASA with images of aircraft with the new empennage. See Figures 1 to 3 below.

Figure 1 – A Robinson R22 with symmetrical stabilizer

[1] See this article in verticalmag.com for interesting overview:
How Robinson Helicopter arrived at its new tail design - Vertical Mag

[2] An exception to this is for aircraft to be registered in a jurisdiction that is still in the process validating the design change. However, this will be a transition measure whilst the validation process is ongoing. Given that the FAA has already approved the design change, and this is accepted for Australian aircraft under the CASR regulation referenced above, new aircraft built for registration in Australian will have the new configuration at build.

Figure 2 – A Robinson R44 with symmetrical stabilizer

Figure 3 – A Robinson R66 with symmetrical stabilizer

5. Retrofit instructions

At the time of writing, the following Service Letters and Kit Instructions are available via the Robinson Helicopters' website:

- **For R22 helicopters:**
  - Kit KI-285-4 is approved for installation on all R22-series helicopters registered in Australia, except for R22 Mariner variants [3].
  - A958-1 bellcranks must first be fitted, if not already installed [4].
  - Robinson states that the basic kit is currently priced at US$4,850 if ordered by 31 December 2024 and requires 24 labour-hours for installation.
  - Service Letter R22 SL-98A and Kit Instruction KI-285-4 Revision A refer.

- **For R44 helicopters:**
  - Kit KI-285-2 is approved for installation on all R44-series helicopters registered in Australia.
  - Robinson states that the basic kit is currently priced at US$3,600 if ordered by 31 December 2024 and requires 24 labour-hours for installation.
  - Service Letter R44 SL-89C and Kit Instruction KI-285-2 Revision D refer.

- **For R66 helicopters:**
  - Kit KI-285-1 is approved for installation on all R66-series helicopters registered in Australia.
  - Robinson states that the basic kit is currently priced at US$3,600 if ordered by 31 December 2024 and requires 24 labour-hours for installation.
  - Service Letter R66 SL-45D and Kit Instruction KI-285-1 Revision F refer.

The above summary is intended as a quick and generic overview. Owners, operators, and maintainers should refer to Robinson Helicopters for the latest service documents to verify aircraft eligibility; to get latest kit pricing; and to access the current version of installation instructions.

6. Replacement at maximum service life (R44 and R66)

Chapter 3 in the R22 and R44 Maintenance Manual and Chapter 4 of the R66 Maintenance Manual detail the maximum service life for life limited components.

For R22 aircraft, the horizontal stabilizer does not have a maximum service life.

For R44 and R66 aircraft, the horizontal stabilizer has a maximum service life. RHC will not supply the old design for installation to aircraft registered in jurisdictions where the new design has been approved. Thus, the new design will need to be retrofitted to all Australian R44 and R66 aircraft when the existing stabilizer reaches its limit if not already upgraded before then.

[3] Robinson Helicopters has communicated to CASA their intention is to obtain approval for the new design on the R22 Mariner without floats in the near future.
[4] A958-1 bellcranks were installed on all R22 Alpha, R22 Beta, and R22 Mariner models.

It might interest owners and operators to note that some aircraft (depending on type and current configuration) may benefit from an increase in maximum service life when retrofitting the symmetrical stabiliser. Refer to the applicable Maintenance Manual for further information.

7. Recommendations

CASA recommends that owners and operators of all Robinson helicopters registered in Australia consider retrofitting the new empennage configuration to their aircraft.

Owners and operators are encouraged to take into account the benefits of enhanced roll stability, particularly in relation to assisting the pilot in managing events such as low-G conditions and turbulence.

8. References

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  New Empennage for R66 Turbine Helicopters Receives FAA Approval.
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  R22 Series Maintenance Manual - Chapter 3 – Life Limited Components

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  FAA Approves Robinson Empennage Design for R44 Helicopters.
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  R22 SL-98A - Symmetrical Horizontal Stabilizer Retrofit Kit.

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  R44 SL-89C - Symmetrical Horizontal Stabilizer Retrofit Kit.

- RHC. (2024). Service Letter.
  R66 SL-45D - Symmetrical Horizontal Stabilizer Retrofit Kit.

9. Enquiries

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

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