



Federal Aviation Administration

Memorandum

Date: **MAR 12 2018**

To: John S. Duncan, Executive Director, Flight Standards Service, AFX-1
Dorenda D. Baker, Executive Director, Aircraft Certification Service, AIR-1

From: Leisha Bell, Chair, Regulatory Consistency Communication Board (RCCB)

Subject: RCCB Decision: Alteration of R44 and Major versus Minor

Action Required

Concur or non-concur with comment on the resolutions facilitated by the Regulatory Consistency Communication Board (RCCB).

This memo will serve as documentation of the resolution of the issues described below.

Summary

The FAA's Flight Standards Service (FS) and Aircraft Certification Service (AIR) are aware of a situation where two Flight Standards District Offices (FSDO) disagreed on whether a helicopter was properly altered. The question is whether a Robinson Helicopter Company (RHC) R44 may be converted from manual to hydraulic flight controls by a person other than RHC. On May 9, 2017, a Flight Standards Regional Office submitted this issue to the RCCB to facilitate a resolution.

In order to address this issue FS and AIR identified key questions relevant to the resolution of the issue. These questions were:

1. Is the installation of the RHC hydraulic flight control system in an R44 a major or minor alteration?
2. What is the role of the LA ACO memo in an FS determination on whether an alteration is major or minor?
3. Does exemption 6692 apply only to RHC or can anyone modify the R44 with hydraulic controls under the exemption?

4. Is an amended airworthiness certificate required if hydraulic flight controls have been installed as discussed in exemption 6692?

This memo outlines the actions taken by FS and AIR as a direct result of the questions above.

Background

In February 2015, a mechanic altered an R44 helicopter by removing the manual flight controls and electric trim system and replacing them with hydraulic flight controls as a minor alteration. Hydraulic flight controls are listed in the aircraft specifications and, therefore, are an approved configuration. Before making the modifications, the mechanic consulted with RHC and obtained the necessary parts. It is unknown what advice RHC provided.

The helicopter was subsequently moved and fell under a different FSDO's service area. The owner of the helicopter applied for an amended airworthiness certificate to include exemption 6692 as a listed exception. The FSDO denied the application for the airworthiness certificate because they had determined that the modification of the flight control system required Supplemental Type Certificate (STC) approval.

The FSDO processing the application for the amended airworthiness certificate consulted with the FS regional office and referred to FAA Order 8300.16, *Major Repair and Alteration Data Approval*, and the Major Repair/Alteration Data Approval Job Aid.

The FS region sought support from the LA ACO to confirm who could perform the alteration from manual to hydraulic flight controls given the exemption issued to RHC on October 17, 1997. Exemption 6692 granted relief to RHC from § 27.695 for the hydraulic flight controls. However, some within the FAA felt that the exemption only allowed RHC to perform the alteration. The FS regional office also sought input on whether the alteration was major or minor.

The April 21, 2016, response from the LA ACO stated they would define the alteration as major but it could be completed if all RHC parts were used, correct RHC manuals were used for installation guidance, and FAA accepted practices were applied, such as AC 43.13.

Based upon the 2016, LA ACO memorandum and discussions with the other FSDO, the jurisdictional FSDO where the modifications were made sent a letter in December 2016, to the mechanic that had altered the helicopter. In that letter the FSDO informed the mechanic about the LA ACO memo, the method that RHC uses for performing the conversion to hydraulic controls, and that operators should request an amended airworthiness certificate because of the exemption. They also advised the mechanic to continue to perform the modifications per the LA ACO memo and recommended amending the maintenance records for the helicopters that had been modified prior to receiving the guidance from the LA ACO. The mechanic followed the instructions from the FSDO and submitted an FAA Form 337, *Major Repair and Alteration*, for the February 2015, maintenance record entry.

Multiple telecoms were held between May 2017, and September 2017, with FS, AIR, and Office of the Chief Counsel (AGC) personnel to discuss these issues. Stakeholders represented included

the Aircraft Maintenance Division, AFS-300; Los Angeles ACO; Policy and Innovation Division, AIR-600; Assistant Chief Counsel, Regulations, AGC-200; and AFS-1, Standards Division.

The RCCB determined that the primary factor contributing to this issue was the incorrect use of guidance documents.

Actions Taken

The RCCB addressed the following key questions relevant to the resolution of whether the R44s were properly altered.

Question 1: Is the installation of the RHC hydraulic flight control system in an R44 a major or minor alteration?

Title 14 Code of Federal Regulations (CFR) section 1.1 defines a major alteration as “an alteration not listed in the aircraft, aircraft engine, or propeller specifications” and then defines a minor alteration as “an alteration other than a major alteration.” The installation of the RHC hydraulic flight control system in the R44 rotorcraft is listed in the aircraft type design and used by RHC to perform the alteration. This allows the FAA to consider the alteration as being included in the aircraft specifications as an approved modification/configuration. Therefore, it could be accomplished as a minor alteration as long as it conforms to the approved aircraft specifications. The determination of major versus minor alteration must be evaluated on a case-by-case basis. The major versus minor determination is always within the purview of the installer, and is not made by FAA inspectors. In an instance where an FAA inspector does not concur with the installer’s determination of a minor alteration, the responsibility lies with the inspector to prove why a particular installation must be classified as major alteration.

Consistent with the CFRs, guidance to assist in the major versus minor determination can be found in Advisor Circular (AC) 43-210A, *Standardized Procedures for Obtaining Approval of Data Used in the Performance of Major Repairs and Major Alterations*. Figure 3-2, *Determination of Major or Minor Alteration or Repair*, asks “repair or alteration listed in product specifications?” If yes, the flow chart states, “consider as a minor repair or minor alteration.”

Question 2: What is the role of the LA ACO memo in an FS determination on whether an alteration is major or minor?

On April 21, 2106, the LA ACO responded to an FS memo requesting assistance on the role of exemption 6692 and input on the major versus minor determination.

The LA ACO memo responded that they would define “this change as a major alteration.” This statement has caused some disagreement and confusion within the FAA, particularly with FS inspectors who are working with the modified helicopters in the field. On October 20, 2017, the LA ACO issued a memo clarifying their earlier 2016 memo.

Title 14 CFR requires the installer to make the major versus minor determination. If an airworthiness safety inspector questions that determination, they should follow the procedures specified in Order 8900.1, Flight Standards Information Management System (FSIMS).

Question 3: Does exemption 6692 apply only to RHC or can anyone modify the R44 with hydraulic controls under the exemption?

Exemption 6692 does not prescribe or limit who can modify an R44.

On October 17, 1997, the FAA granted an exemption to RHC to provide relief from Title 14 CFR § 27.695. Relief was sought by RHC for a “type certification of the Robinson Helicopter Company Model R44 without considering the jamming of the control valve in the powered flight control system as a possible single failure.” This relief would allow for the installation of hydraulic controls.

The last paragraph of the exemption reads, “...Robinson Helicopter Company, is hereby granted an exemption from § 27.695 to the extent necessary to allow Robinson Helicopter Company to install hydraulically boosted controls on the Model R44 without the necessity of considering the jamming of a control valve as a possible single failure.”

This particular wording has caused confusion leading some FAA personnel to believe that only RHC could alter existing R44 helicopters from manual to hydraulic controls. Exemption 6692 allows RHC to receive approval for a type design change allowing for the installation of hydraulically boosted controls on the R44 without the necessity of considering the jamming of a control valve as a possible single failure.

This exemption provides relief to RHC for the purpose of type design approval only, it does not affect who performs the modification.

Question 4: Is an amended airworthiness certificate required if hydraulic flight controls have been installed as discussed in exemption 6692?

No.

FAA Order 8130.2, *Airworthiness Certification of Aircraft*, specifies the information to be placed upon an airworthiness certificate. Prior to revision J, the order incorrectly required listing applicable exemptions for the aircraft in block 5 of the certificate. The heading in block 5 of the certificate is:

5 AUTHORITY AND BASIS FOR ISSUANCE This airworthiness certificate is issued pursuant to 49 U.S.C. § 44704 and certifies that, as of the date of issuance, this aircraft has been inspected and found to conform to its type certificate and be in a condition for safe operation. This aircraft meets the requirements of the applicable airworthiness standards in Annex 8 to the Convention on International Civil Aviation, except as follows:

Note that the requirement is to list exceptions to Annex 8, not exemptions to the CFR. An exemption to the airworthiness requirements the CFR is not necessarily an exception to Annex 8. Because Title 14 CFR part 11 requires the petitioner to describe how the exemption would not adversely affect safety, or how the exemption would provide a level of safety at least equal to the rule, the resulting exemption will comply with Annex 8. There are no known exemptions that do not meet the Annex 8 requirements.

FAA Order 8130.2J directs entering "None" in block 5. In the next change to the order, AIR is considering removing block 5 from the certificate.

Attachments:

Memo: Los Angeles ACO (LAACO) position on field installation of Robinson R44 Hydraulic Flight Control System (HFCS)

Concur: John S. Duncan Concur: Dorenda D. Baker

Non-Concur: _____ Non-Concur: _____

Date: 12/20/17 Date: 3/12/18

John S. Duncan
Executive Director, Flight Standards
Service

Dorenda D. Baker
Executive Director, Aircraft Certification
Service



Federal Aviation Administration

Memorandum

Date: October 20, 2017

From: Kevin Hull, Manager, Los Angeles ACO Branch, AIR-790

To: Kim O. Davies, Manager, Technical Branch, ASO-230

Prepared by: Ameet Shrotriya, Aviation Safety Engineer, AIR-792
James Guo, Aviation Safety Engineer, AIR-792

Kevin Hull
10-23-17

In reply refer to: 120L-17-408

Subject: Los Angeles ACO (LAACO) position on field installation of Robinson R44 Hydraulic Flight Control System (HFCS)

This memorandum provides clarification to the April 21st, 2016 Memorandum (Letter 120L-16-144) from Kevin Hull to Kim O. Davies concerning field installation of HFCS on Robinson Model R44 rotorcraft. That memo was issued in response to a request from Flight Standards to the LAACO for interpretation of exemption 6692. In that request, the LAACO was also asked if they consider field installation of the HFCS to be a major alteration. Robinson Helicopters currently installs the HFCS on their assembly line as an approved configuration.

In the 2016 memo, the LAACO detailed its finding that the 6692 exemption granted to Robinson Helicopters is also applicable to operators who install the HFCS themselves. In that memo, the LAACO provided a statement that the LAACO "would define this change as a major alteration." This statement has caused some disagreement within the FAA and this memo is intended to clarify the basis for the statement and which organization is responsible for determining whether the alteration is major or minor.

It is not the ACO's responsibility to make the determination if an alteration is major or minor. The LAACO's statement that the alteration would be considered major was based on the 1st part of the definition of "major alteration" in Title 14 CFR Part 1, Section 1.1 which considers whether the alteration has an appreciable effect on certain characteristics or qualities affecting airworthiness. Specifically, the LAACO found that alteration could affect structural strength and flight characteristics of the altered product. The 2nd part of the definition of alteration concerns whether the alteration can be accomplished by accepted practices or by elementary operations. Flight Standards personnel are in the best position to make this evaluation. It is the responsibility of the installer to determine if an alteration is major or minor and it is the responsibility of Flight Standards to make an evaluation of the installer's decision.