Vintage Aircraft Replacement & Modification Article (VARMA)

Work Instruction

WI-51822

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1. Purpose:

This work instruction (WI) provides guidance for substantiating article (parts, materials, processes or components per 14 CFR § 21.1(b)(2)), substitutions to maintain the airworthiness of out-of-production general aviation (GA) aircraft, or other GA aircraft where the parts or materials are no longer available. This WI also provides the guidance and the framework to obtain Federal Aviation Administration (FAA) approval for making these substitutions. Vintage Aircraft Replacement & Modification Article (VARMA) program is intended for obsolete, out of production, and none attainable article.

2. Audience

This document is primarily intended for Aircraft Certification Office (ACO) engineers. Other offices (e.g., AFS, MIDO, etc.) that are involved in the acceptance process may also follow the instructions outlined in this WI. The ACO engineer should coordinate with the accountable AFS office before issuing the acceptance letter.

3. Background

Vintage aircraft need replacement and modifications to maintain their continued airworthiness. These aircraft no longer have factory support for replacement parts. An approved duplicate replacement part or the data describing the original part (form, fit, and function) are difficult to find or no longer exist. Many materials, parts, or components used to manufacture or maintain the original parts on vintage aircraft are no longer available, or practical for reproduction to the original design data. To manufacture the needed parts requires material or part substitution, such as replacing a cast part with a machined part or substituting a material rarely used today with an equal to or an improved material. This makes it difficult for owners to maintain their aircraft in an airworthy condition, if they are unable to produce the article without substitution.

4. Applicability

This work instruction applies to the followings listed below:

a. Class of powered aircraft should meet all of the following criteria:

(1) Type certificated before January 1, 1980

(2) Fixed wing;

(3) Reciprocating engine(s);

(4) Unpressurized; and

(5) Certificated weight of 12,500 pounds or less.

b. Aircraft must meet the certification basis below, and substitution cannot change to the certification basis for that particular aircraft:

(1) Aircraft (both as approved by the Department of Commerce), and acceptances issued per CAR 3, CAR 4, CAR 4a, CAR 8, and Aeronautics Bulletin 7; or

(2) TCs issued under 14 CFR part 23 where the aircraft was certificated before January 1, 1980.

NOTE: *The acceptance process for replacement or modification under this WI is not an acceptance for installation on the aircraft. It provides guidance to follow when collecting information needed for an FAA acceptance. Based on the work done, the aviation safety inspector (ASI), Flight Standard District Office (FSDO), or an authorized personnel (e.g., Airframe & Powerplant mechanic, Inspection Authorization personnel) makes the final determination for installation acceptance. The guidance in this WI promote consistency and reduce time required to accomplish replacement or modifications done to the aircraft. It is the installer's responsibility to follow industry established guidance (e.g., aircraft maintenance manual, Instructions for Continued Airworthiness, AC43.13-X, etc.) to properly install and document the installation.* .

5. Consideration Factors prior to acceptance

When a direct substitution is not available, you may establish the replacement part/material equal to the original part/material per standards such as Military Specifications (MS), Air Force/Navy (AN), Society of Automotive Engineers (SAE), Testing and Materials (ASTM), National Aerospace Standards (NAS), United Laboratory (UL), National Institute of Standards (NIST), Technical Standard Order (TSO), Aerospace Standard (AS), Mil Handbooks, or any other specification(s) deemed acceptable to the FAA. In these cases, substitutions should be consistent with information already available in maintenance documents (e.g., Civil Aeronautic Manual (CAM) 18, AC 43-13, etc.). Appropriately authorized DERs can also assist in replacement part which has little or no documentation regarding the replacement suitability for installation on a specific aircraft model.

The ACO engineer should consider some of the factors listed below, but not limited to, when determining whether a part is a suitable substitution for another.

(1) What is the function of the original article?

(a) Critical

(b) Non-critical

(2) Are there current industry standards for the article?

(3) Does the part replacement affect the fit of the part or cause the part to interfere with mating parts or other components?

(4) Will the safety of the aircraft be compromised by replacement of the part?

(5) Does the part replacement have a detrimental effect on the overall product quality?

(6) Is the part dissimilar to other installations (original equipment, approved by field acceptance, etc.)?

(7) Does the replacement part require special installation procedures, maintenance, special inspections, or different operating instructions from the original part?

Note: *The most important aspect to consider when substituting parts is whether the failure of the part would prevent continued safe flight and landing. Often, there is a safety benefit when original obsolete parts are replaced with the newer improved parts. However, if the failure of the part would prevent continued safe flight and landing, then more substantiating data is required for acceptance. The overall safety evaluation should consider both the failure of the part as installed, but also its detrimental effect on the aircraft as a whole.*

6. Minimum Design Requirement

Minimum design requirement (MDR) are design requirement found acceptable by the FAA that satisfy the acceptance of the article. MDRs are usually industry standards proposed by the applicant. The FAA can accept the proposed industry standard, partially accept, or add additional requirements to meet the objectives of the MDR. Once accepted, this standard becomes a MDR for any subsequent equipment with a similar design and creates standardization for the equipment. If an applicant proposes a different MDR than already accepted, a re-evaluation and acceptance is needed.

7. Use of Previously Approved Data

FAA may accept previously approved article substitutions on similar type aircraft, if the part/material is installed with previously approved data, (e.g., STC, PMA, TSO, field approval, etc.), and it is completed in a similar manner consistent with the previous approval. FAA may use those prior approvals as the basis for the acceptance on the new aircraft.

Note: *The applicant is required to have all the necessary data to support their request for acceptance.*

8. Applicant Responsibilities

An applicant should submit a request for a letter of acceptance (LOA) to the Aircraft Certification Office (ACO) for Vintage Aircraft Replacement & Modification Article (VARMA) program. Before submittal, the applicant should discuss their intention to seek an acceptance for a specific article with their geographic ACO (preferably during the early stages), so the FAA and applicant can determine the required documentation for replacement or modification. An applicant's data submittal should contain sufficient detail and substantiating data to describe the design and demonstrate that it complies with the proposed standards and provisions of Advisory Circular 23-27, (Parts And Materials Substitution For Vintage Aircraft), AC20-62E (Eligibility, Quality, and Identification of Aeronautical Replacement Parts) or later revision.

9. Aircraft Certification Responsibilities

The ACO engineer should use the items below as a minimum checklist prior to issuing an acceptance letter. The checklist is used for reference only and can be revised to a specific project.

- Submittal letter (See Appendix B for sample template)
- Certifying Statement (The attestation that the applicant has met the requirement)
- Quality (assures quality of the article is at least equal to the original)
- Product Design (data to substantiate the replacement article)
- Installation Instructions (use original MFG instructions or new revised instructions)
- Maintenance Instructions (use original MFG instructions or new revised instructions)

Note: *The accountable ACO can provide further guidance and may identify additional requirements to meet the intent of this work instruction.*

APPENDIX A

Example of Submittal Letter

Mr. John Smith
Chicago ACO Branch, Manager -- AIR-7CO
Compliance and Airworthiness Division, FAA
2300 E. Devon Avenue
Des Plaines, IL 60018

Dear Mr. Smith:

The ABC is applying for Vintage Aircraft Replacement & Modification Article (VARMA) for acceptance of our (article name) for aircraft model (Cub Crafter XX).

The article : insert a concise and complete description of the form, fit and function requesting acceptance for.
NOTE – *this description will be repeated in the acceptance letter as the only authorized article. The acceptance may have one specific model, or series of models, if the applicant has demonstrated its compatibility, (i.e., form, fit, function) with the requested models.*

Applicant statement to include the following paragraph:
This acceptance request is compliant with Advisory Circular (AC) 23-27, (Parts And Materials Substitution For Vintage Aircraft), and AC20-62E (Eligibility, Quality, and Identification of Aeronautical Replacement Parts).
The request should at minimum contain the following. ACO may include additional verbiage if necessary.

1. Article Name Fuel Pump
2. Part number FP-23X
3. Authorized function supply fuel to the engine
4. Replacement for Fuel pump GS-1240
5. Installation Eligibility Model XYZ, or series of models