

Repair and Modification of Amateur-built Aircraft

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Recreational aviation

Owners of recreational aircraft, specifically amateur-built aircraft, sometimes have the impression that their recreational aviation activities take place outside the mainstream of civil aviation, and therefore certain requirements of the *Canadian Aviation Regulations* (CARs) do not apply, or have little application, to their aircraft.

In recent years, the regulatory burden applicable to recreational aviation has been made somewhat lighter and clarifications have been made where necessary. For example, with aircraft operating under a special certificate of airworthiness in the amateur-built classification, entries regarding the technical records for the airframe, engine and propeller may be kept in the journey log (see **CAR 605.92(3)**). In the case of airworthiness directives, a clarification was made about exemption from requirements for owners of aircraft in the amateur-built or owner-maintenance classification (see **CAR 605.84(1)(b)**).

Despite the above, unless the CARs say otherwise, amateur-built aircraft are subject to the same maintenance requirements as aircraft for which the Minister has issued a type certificate.

Maintenance

All maintenance tasks and all elementary work (see Appendix A of CAR standard **625**) must be entered in the aircraft's technical record. Aside from elementary work, a maintenance release for all maintenance tasks performed (see **CAR 571.10**) can be signed by the owner of the aircraft or by an aircraft maintenance engineer (AME) (see **CAR 571.11**).

This rule also applies to repairs and modifications to amateur-built aircraft, the subject of this article. **CAR 571.06** describes the conditions applicable to repairs and modifications to an amateur-built aircraft. Paragraphs **571.06(1)** and **(2)** are of the greatest interest in this case.

CAR 571.06

The first two paragraphs of **CAR 571.06** address repairs and modifications. They stipulate the following:

- (1) Except as provided in subsection (5) and in the case of aircraft that are operated under a special certificate of airworthiness in the owner-maintenance

classification, a person who signs a maintenance release in respect of a major repair or major modification on an aeronautical product shall ensure that the major repair or major modification conforms to the requirements of the relevant technical data

(a) that have been approved or the use of which has been approved within the meaning of the term “approved data” in section **571.06** of the *Airworthiness Manual*; or

(b) that have been established within the meaning of the term “specified data” in section **571.06** of the *Airworthiness Manual*.

(2) Except as provided in subsection (5), a person who signs a maintenance release in respect of a repair or modification, other than a major repair or major modification, shall ensure that the repair or modification conforms to the requirements of the relevant technical data within the meaning of the term “acceptable data” in section **571.06** of the *Airworthiness Manual*.

Admittedly, **CAR 571.06** is hard to understand, and the somewhat convoluted wording does not help. To make it easier to understand, here is a simplified version of these two paragraphs:

a) all repairs and modifications must be performed in accordance with acceptable technical data, within the meaning of the term “acceptable data” in section **571.06** of the *Airworthiness Manual*;

b) all major repairs and major modifications on an aircraft for which a type certificate has been issued or accepted by the Minister for the purposes of issuing a certificate of airworthiness must be performed in accordance with either “approved” technical data, within the meaning of the term “approved data” in section **571.06** of the *Airworthiness Manual*, or “specified” technical data, within the meaning of the term “specified data” in section **571.06** of the *Airworthiness Manual*;

c) aircraft for which a special certificate of airworthiness in the owner-maintenance classification has been issued are exempt from the requirement to perform major repairs and major modifications in accordance with “approved data” or “specified data”, within the meaning of the terms “approved data” and “specified data” in section **571.06** of the *Airworthiness Manual*; major repairs and major modifications may be performed in accordance with “acceptable data”, i.e. acceptable to the Minister.

The above version makes it clear that only the general rule in a) applies to amateur-built aircraft. Versions b) and c) above are exceptions to the rule; b) is an exception to a), and c) is an exception to b).

General rule

The general rule, as stated in a) – “all repairs and modifications must be performed in accordance with acceptable technical data, within the meaning of the term “acceptable data” in section **571.06** of the *Airworthiness Manual*” – is applicable to all aircraft, whether certified or not, whether used under a certificate of airworthiness or a special certificate of airworthiness, and whether used for commercial or recreational purposes. The same rule applies to all aircraft, including amateur-built aircraft.

The general rule specifies that technical data must be “acceptable” in order to perform any repair or modification. The data include:

- a) drawings and methods recommended by the manufacturer of the aircraft, component, or appliance (manufacturer's maintenance manual, structural repair manual, overhaul manual, service bulletins, technical instructions);
- b) Transport Canada advisory documents; and
- c) advisory documents issued by foreign airworthiness authorities with whom Canada has entered into airworthiness agreements or understandings such as current issues of Advisory Circular (AC) **43.13-1** and **-2** issued by the U.S. Federal Aviation Administration (FAA), Civil Aviation Information Publications issued by the Civil Aviation Authority (CAA) of the United Kingdom, or Advisory Circulars - Joint (ACJs) issued by the Joint Aviation Authority (JAA), or Acceptable Means of Compliance issued by the European Aviation Safety Agency (EASA).

FAA Advisory Circulars **43.13-1B** and **43.13-2B** are recognized as *the* references for all amateur-built aircraft owners and manufacturers. Whether for repairing fabric coverings, refurbishing tubular members, replacing a wooden part or installing a doubler, **AC 43.13** is the go-to source of information.

Methods and drawings set out in airworthiness directives may also serve as acceptable data for repairs or modifications. While amateur-built aircraft owners do not have to comply with airworthiness directives, it is highly recommended that they review applicable directives in order to decide whether to comply on a voluntary basis in order to improve the safety of their aircraft.

However, it is possible that **AC 43.13-1B** and **43.13-2B** do not have the answer for a particular repair or modification required. In such cases, aircraft owners could either develop their own data for a repair or modification, or they could show that their data complies with standards recognized in the aviation community or with generally accepted practices. This technical data does not need to be approved by Transport Canada. The owner must ensure that the data is appropriate to the repair or modification in question. It's a matter of common sense!

The general rule that all repairs and modifications must be performed in accordance with “acceptable” technical data is the only rule that applies to amateur-built aircraft (and to aircraft in the owner-maintenance classification), which greatly simplifies things for the owner. However, it must not be forgotten that a modification may have an impact on structural strength, performance, operation of the power unit, or flight characteristics. A modification must not be taken lightly. It is important to think before acting.

Technical records

Details of the repair or modification must be entered in the journey log or in the technical record, and must be accompanied by the maintenance release. It is important to enter data references; without them, the data has little value. For example, the entry might read:

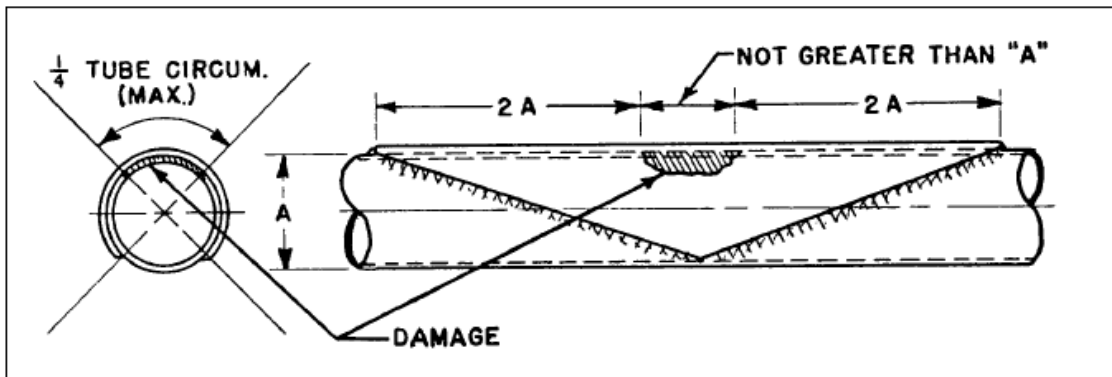


FIGURE 4-36. Welded patch repair.

Lower right fuselage spar, 20 inches from the leading edge of the horizontal stabilizer: repaired by adding doubler, oxy-acetylene weld, repainted. Reference: AC 43.13.1B, chapter 4, section 5, paragraph 4.94 and figure 4-36.

The described maintenance has been performed in accordance with the applicable airworthiness requirements.

[signed] John Smith date

Maintenance release

After a repair or modification, owners must not forget the maintenance release, which includes the following statement or similar: “The described maintenance has been performed in accordance with the applicable airworthiness requirements.”

Conclusion

Every repair or modification must be performed in accordance with acceptable technical data. This data may include analyses, calculations, references, drawings, or sketches. Every repair or modification must be entered in the appropriate technical record and there must be a maintenance release for it.

If a job needs to be done, it should be done well.

As the owner of an amateur-built aircraft, don't you deserve a job well done?

Wc 1727

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