



Advisory Circular

Subject: Major Repair After Substantial Damage

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1.0 INTRODUCTION

- (1) This Advisory Circular (AC) is provided for information and guidance purposes. It may describe an example of an acceptable means, but not the only means, of demonstrating compliance with regulations and standards. This AC on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

1.1 Purpose

- (1) This AC is to advise the aviation community of the requirements for the control of aircraft identity, aircraft identification plates, applicable technical data, and installation of used parts, as well as documentation and reporting of major repairs during the reconstruction of aircraft, which have suffered substantial structural damage.

1.2 Applicability

- (1) This document applies to Transport Canada Civil Aviation (TCCA) personnel, delegates, and the aviation industry.

1.3 Description of Changes

- (1) This document was formerly Airworthiness Notice No. B070. Edition 1 and has been reissued as an Advisory Circular. With the exception of minor editorial changes and updated references, the content is unaltered.

2.0 REFERENCES AND REQUIREMENTS

2.1 Reference Documents

- (1) It is intended that the following reference materials be used in conjunction with this document:

- (a) *Aeronautics Act* (R.S., 1985, c.A-2);
- (b) Part II, Subpart 01 of the *Canadian Aviation Regulations (CARs)—Identification of Aircraft and Other Aeronautical Products*;
- (c) Subpart 521 of the CARs— *Approval of the Type Design or a Change to the Type Design of an Aeronautical Product*;
- (d) Subpart 571 of the CARs— *Aircraft Maintenance Requirements*; and
- (e) Standard 571 of the CARs—*Maintenance*.

2.2 Cancelled Documents

- (1) As of the effective date of this document, the following document is cancelled:
- (a) Airworthiness Notice No. B070, Edition 1, 2004-03-30—*Major Repair after Substantial Damage*.

2.3 Definitions and Abbreviations

- (1) The following definitions and abbreviations are used in this document:

- (a) **AC:** Advisory Circular;
- (b) **AME:** Aircraft Maintenance Engineer;
- (c) **AMO:** Approved Maintenance Organization;
- (d) **CAR or CARs:** Canadian Aviation Regulations;
- (e) **Major Repair:** a repair to an aeronautical product in respect of which a type certificate has been issued, that causes the aeronautical product to deviate from the type design

defined by the type certificate, where the deviation from the type design has other than a negligible effect on the weight and centre-of-gravity limits, structural strength, performance, power plant operation, flight characteristics or other qualities affecting the aeronautical product's airworthiness or environmental characteristics;

- (f) **Regulation(s):** Canadian Aviation Regulations;
- (g) **RDA:** Repair Design Approval which is a document, including a repair design certificate issued before December 1, 2009 under Sections 513.11 or 513.22 of the CARs, that is issued by the Minister to record the approval of a repair design in respect of a repair to an aeronautical product identified in the document by a serial number, or a repair process in respect of a repair to an aeronautical product or any of its components, identified in the document by a serial number, by a part number or by some other identification unique to the component;
- (h) **STD:** Canadian Aviation Standards;
- (i) **Substantial Damage:** damage that is sufficiently large in size, extensive or significant;
- (j) **TCC:** Transport Canada Center which are the offices located throughout the various Transport Canada regions;
- (k) **TCCA:** Transport Canada Civil Aviation.

3.0 BACKGROUND

- (1) The aircraft identification plate bearing the required information in accordance with Subpart 201 of the CARs, and the associated technical records establish an aircraft's identity. Provided that the aircraft identification plate and the associated technical records are available, all other physical parts of the aircraft may be replaced, subject to compliance with all applicable regulations, including in particular, those related to the approval of data, the performance of work, and the maintenance of the technical records.
- (2) It has become evident to TCCA that there has been inadequate understanding within the industry of the regulations relating to the control of aircraft identification plates. TCCA inspections have revealed that in some cases aircraft identification plates have been lost or stolen, but have not been replaced as required. In other cases, aircraft identification plates have been replaced or altered without authorization from the Minister.
- (3) There have been several cases where two (2) aircraft of the same model have been found to bear the same serial number. This is a result of several factors, but most of all, a failure to ensure that the integrity of the aircraft identity is maintained after a major accident and subsequent repair or during the registration and importation of aircraft with inaccurate or incomplete technical records.
- (4) TCCA has ongoing concerns with the identification of suspected unapproved aircraft identification plates fabricated similar to the original manufacturer's aircraft identification plates. Such aircraft identification plates have been installed on active aircraft without Ministerial approval.
- (5) Furthermore, there is concern that some re-builders have developed the practice of removing aircraft identification plates from aircraft with major structural damage and placing these plates on structures that are more cost effective to repair, but do not have an established identity as required by regulations. This practice would cause the replacement structure to take on the identity of the original aircraft identification plate and therefore the aircraft identity and aircraft technical records would not be accurate. This process is a contravention of CARs.
- (6) As described earlier, it is within the bounds of the regulations, subject to authorization, to transfer an aircraft identification plate from one structure to another. However, the integrity of the aircraft's identity must be retained. This is achieved by ensuring that the technical record of the

replacement fuselage, component or part is inserted into the technical record of the original aircraft and carries forward all times, limiters and maintenance requirements specific to that fuselage, component or part.

- (7) A replacement fuselage that does not have an aircraft identification plate and an associated technical record is not eligible for use unless it complies with the requirements of Section 571.08 of the STD. The fuselage described here is actually an “undocumented part” and is therefore subject to the requirements of Section 571.13 of the STD and Appendix H of Standard 571 of the CARs.
- (8) While some re-builders have opted to replace an entire fuselage, others have also employed the use of salvaged parts from damaged aircraft or surplus parts obtained from various sources. Many of these parts are undocumented but are incorporated into rebuild projects under the assumption that they become legitimate with the maintenance release applied to completed aircraft. This assumption is incorrect. All used parts must comply with the requirements of Section 571.08 of the CARs. The documentation associated with these parts must be retained in the technical record in support of the aircraft maintenance release.
- (9) As stated in section 4.0 of this AC, the Minister may authorize an owner to “attach to an aircraft, an aircraft identification plate that was attached to another aircraft”. However, this is only after review and approval to confirm that the process ensures the integrity of the aircraft identity is maintained, and the source of the replacement parts is adequately documented.

4.0 AIRCRAFT IDENTITY AND IDENTIFICATION PLATES

- (1) Subpart 201 of the CARs establishes the regulatory framework for identification of aircraft and other aeronautical products. The identity of an aircraft is created, established and confirmed by the attachment of an aircraft identification plate and reference to the associated aircraft technical records.
- (2) In the case of an aircraft, the aircraft identification plate shall have the following information permanently etched, engraved or stamped on it, namely:
 - (a) The name of the manufacturer and, if the manufacturer is an entity, its legal name;
 - (b) The manufacturer's model designation described in the type certificate or equivalent document;
 - (c) The type certificate number or equivalent designation; and
 - (d) The aircraft serial number.
- (3) In service, circumstances may cause aircraft identification plates to require replacement due to loss, theft, or damage. Under these circumstances, Subpart 201 of the CARs provides a means by which the Minister may authorize the owner to take corrective action, including provisions for the Minister to authorize the owner to:
 - (a) Attach to an aircraft, an aircraft identification plate that was attached to another aircraft; or
 - (b) Alter the information on an aircraft identification plate.
- (4) An aircraft owner, who wishes to perform one of these actions, must submit a detailed application in writing to the local Transport Canada Center (TCC) office requesting authorization.
- (5) The application package must include evidence that establishes the identity of the aircraft. Upon review and approval, the local TCC office shall issue a written authorization that permits the owner to replace, attach, or alter the aircraft identification plate.

5.0 APPLICABLE TECHNICAL DATA FOR MAJOR FUSELAGE REPAIR/REPLACEMENT

- (1) Repair to an aircraft structure described in Schedule II of Subpart 571 of the CARs, is considered specialized work and must be performed by an authorized individual within an appropriately rated Approved Maintenance Organization (AMO).
- (2) In some cases, the aircraft owner or AMO will consider replacing an entire fuselage or airframe with a different serviceable assembly as an option for repair. This method of repair may not involve specialized work and may be a “simple” case of installing replacement parts. However, in many cases the procedures and methods for this type of repair will not be detailed within manufacturer’s maintenance or repair data, such as maintenance manuals, structural repair manuals or other equivalent publications.
- (3) If the nature and scope of the proposed repair is not described in the manufacturer’s instructions for continued airworthiness, then the AMO will have to acquire a Repair Design Approval (RDA) for the procedure. If the repair is such as to involve a significant deviation from the approved design, an RDA will also have to be obtained in accordance with Subpart 521 of the CARs.
- (4) It is acknowledged that in theory, it is possible to repair an aircraft by replacing all its elements other than the aircraft identification plate. Indeed, subject to the appropriate authorization in accordance with Subpart 201 of the CARs, even the aircraft identification plate itself can be replaced. Such a repair may be performed, provided that:
 - (a) Applicable approved technical data is used to perform the work;
 - (b) The technical records are accurate and complete for all work performed;
 - (c) The replacement parts used are accompanied by a maintenance release, or have been inspected and are airworthy, and of known origin; and
 - (d) The integrity of the aircraft’s identity is maintained.
- (5) Any AMO undertaking the above type of work must ensure that they implement adequate control of technical records to ensure that all work is fully documented and that all installed parts with traceability information is recorded as part of the work record. A copy of the aircraft work package is also retained on file with the AMO.
- (6) A complete rebuild of this kind differs from the creation of a new aircraft in two significant aspects; the end product is not certified as a new aircraft, but as a repaired one, and the aircraft technical records must be clear and contain the full history of the aircraft from new, including details of the rebuilding exercise. The aircraft identity remains entirely unchanged.

6.0 INSTALLATION OF USED PARTS

- (1) The rules controlling the certification of used parts installed during a process such as the one described above are the same as for any other maintenance activity. Section 571.08 of the CARs states that used parts shall be an airworthy part that has been removed from an aircraft for immediate installation on another aircraft, or is an airworthy part that has undergone maintenance for which a maintenance release has been signed pursuant to paragraph 571.11(2)(c) of the CARs, or has been inspected and tested to ensure that the part conforms to its type design and is in a safe condition, and a maintenance release has been signed to that effect. In the case of components removed from an aircraft for repair, overhaul or exchange, traceability to their most recent airworthy installation or to their most recent maintenance action will constitute evidence of conformity to type design. In the case of structural parts traceability, the part is to be inspected and its accompanying documentation verified prior to installation in accordance with a procedure that the Minister finds acceptable, having regard for the safety of the aircraft, to ensure that the part conforms to its type design. One approved process to evaluate these parts is detailed in Appendix H of Standard 571 of the CARs.

- (2) This means that a serviceable fuselage assembly used as a replacement for another damaged fuselage would have to include the identification information of the aircraft from which the part, in this case the fuselage, was removed, and any other details necessary to establish its technical history. If a fuselage is removed from another aircraft that is damaged or permanently withdrawn from service, that fuselage must have a known origin and, as such, be traceable to the manufacturer certificate holder or to another approved aeronautical product.

7.0 DOCUMENTING AND REPORTING OF MAJOR REPAIRS

- (1) Section 571.12 of the CARs requires that major repairs and major modifications must be reported to the Minister in accordance with the procedures in Section 571.12 of the STD and by means of a major repair or major modification report, which is specified in Appendix L of Standard 571 of the CARs. A copy of the report must be completed and forwarded to TCCA within thirty (30) days once the aircraft is returned to service.
- (2) TCCA does not publish a major repair or major modification report form, however the report may be reproduced by the user as a printed form or in a computer-generated format based on the format provided in Appendix L of STD 571 of the CARs.
- (3) The major repair or major modification report is required to contain the name of the person/organization that performed the work and details about the product and of the work performed, however, it does not contain a maintenance release or certification.
- (4) Submission of the major repair or major modification report to TCCA does not negate the requirement for certification and documentation to be retained by the owner to support all parts/materials used in the process of repair. This supporting documentation is critical to validate all aspects of work identified in the report.
- (5) Owners are reminded that they are responsible for the retention of all technical records for their aircraft as long as it is registered in Canada. The AMO that performed the work is responsible for retaining records for work performed for a period of two (2) years in accordance with section 573.15 of the CARs.
- (6) In cases where TCCA inspectors wish to review records associated with any maintenance action, the owner will be requested to produce the applicable documentation. In the case of major repair or major modification reports, this includes all supporting documentation; for example, TCCA authorization to replace, attach or alter the aircraft identification plate.

8.0 RECOMMENDATIONS

- (1) TCCA recommends that owners/Aircraft Maintenance Engineers (AMEs):
 - (a) Inspect the aircraft at each scheduled/annual inspection, for the presence of an aircraft identification plate bearing the required information;
 - (b) Inspect the aircraft identification plate for indications that information has been added, removed, or altered since the plate was originally stamped, engraved, or etched;
 - (c) Inspect the aircraft identification plate for indications that it may not be the original plate such as:
 - (i) The stamped information is incomplete or inaccurate;
 - (ii) Lack of manufacturer's inspector stamp;
 - (iii) The format appears suspect, based on your experience; or

- (iv) The overall condition of the plate appears to be more recent when compared with the vintage of the aircraft.
 - (d) Check the aircraft records for continuity and any indication that raises doubt regarding the aircraft's identity, particularly in the case of an aircraft that has been rebuilt after suffering significant structural damage.
 - (e) Check the technical records for aircraft, which have undergone any major repair and ensure that documentation in support of all parts and materials used during the repair, are retained. If there are any concerns that the records may be incomplete or inaccurate, it is advisable to contact the individual/organization who performed the work and request their assistance to complete a review of your records.
- (2) TCCA also recommends that individuals, who have any concerns about the validity of an aircraft identification plate, or identity of an aircraft after performing the inspections above, contact their local TCC office to obtain assistance in investigating and resolving the issues.
- (3) In many cases, aircraft manufacturers have issued Service Bulletins or other advisory material to assist owners in the replacement of lost aircraft identification plates. The manufacturer is most likely the best source of information to determine whether an aircraft identification plate that appears "unusual" conforms to the approved design data.
- (4) Structures-rated AMOs who intend to reconstruct an aircraft after suffering substantial structural damage are advised to consult with TCCA to determine the best course of action required prior to beginning the project. This will ensure that the completed project is in compliance with the regulatory requirements.

9.0 CONTACT OFFICE

For more information, please contact:

Daniel Haughton, Civil Aviation Safety Inspector,
Operational Airworthiness, Standards, AARTM

Phone: **613-952-0110**
Fax: **613-954-1602**
E-mail: daniel.haughton@tc.gc.ca

[original signed by Jean-François Mathieu for]

Jacqueline Booth
A/Director, Standards
Civil Aviation
Transport Canada