



GOVERNMENT OF INDIA
CIVIL AVIATION DEPARTMENT
DIRECTOR GENERAL OF CIVIL AVIATION

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AIRWORTHINESS ADVISORY CIRCULAR

Subject: Procedure for approval of Modification and Repair

1. INTRODUCTION

- 1.1 Rule 52 of Aircraft Rules, 1937 describes the requirement for approval of modification or repair affecting safety of any aircraft in respect of which there is a valid certificate of airworthiness.
- 1.2 CAR M (M.A.304) states that “Damage is assessed and modification and repair are carried out using data approved by the DGCA or by an approved CAR 21/EASA Part 21/FAA Part 21 Design organization, as appropriate”.
- 1.3 This circular stipulates the procedure to be adopted by the owners/operators for approval for carrying out modification and/or repair on an Indian registered aircraft, aircraft component and item of equipment of that aircraft.
- 1.4 It is important to note that this Airworthiness Advisory Circular (AAC) on its own does not change, create, amend or permit deviations from regulatory requirements, nor does it establish minimum standards.

2. DEFINITION

Repair: The restoration of an aeronautical product to an airworthy condition to ensure that the aircraft continues to comply with the design aspects of the airworthiness requirements used for the issuance of a Type Certificate for respective aircraft type after it has been damaged or subjected to wear.

Major repair: Any repair of an aeronautical product that might appreciably affect the structural strength, performance, engine, operation flight characteristics or other qualities affecting airworthiness or environmental characteristics.

Minor repair: A repair other than a major repair.

Modification: A change to the type design of an aeronautical product which is not a repair.

Major Modification: In respect of an aeronautical product for which a type certificate has been issued, a change in the type design that has an appreciable effect, or other than a negligible effect, on the mass and balance limits, structural strength, engine operation, flight characteristics, reliability, operational characteristics, or other characteristics or qualities affecting the airworthiness or environmental characteristics of an aeronautical product.

Minor Modification: A modification other than a major modification.

Note. The term “alteration” is also used instead of modification. These terms, wherever used are intended to be synonymous.

3 Modification

3.1 Modification covered in Airworthiness Directives, DGCA Mandatory Modification and Service Bulletins do not require DGCA approval.

3.2 Modification which is not covered in Airworthiness Directives, DGCA mandatory modification and service bulletin require approval of the State of Registry (DGCA).

3.3 Classification of Modification

3.3.1 The modification shall be classified as ‘Minor’ or ‘Major’ by either by DGCA, or by an appropriately approved design organization under a procedure agreed with DGCA.

3.4 Minor modification

3.4.1 Minor modification is a design change that has negligible or no appreciable effect on the mass, balance, structural strength, and reliability, operational characteristics affecting the airworthiness of the aeronautical product and normally accomplished using standard or generally accepted practices.

3.4.2 Minor modification approved by appropriately CAR 21/ EASA Part 21/ FAR Part 21 approved design organization may be accomplished by the Approved Maintenance Organization following documented procedures approved by DGCA. Procedures for accomplishment of modification shall be established by operator/ maintenance organisation and documented in CAME/ MOE. Accomplishment of modification shall be intimated to the local Airworthiness Office.

3.5 Major Modification

- 3.5.1 Major Modification which is not covered in Airworthiness Directives, DGCA mandatory modification and service bulletin require approval of DGCA (AED).
- 3.5.2 For approval of major modification, the owner/operator shall apply to the concerned Regional Airworthiness Office (RAO) along with evidences and data relating to the intended modification and its effect on the airworthiness of aircraft, as per details given in para- 5.
- 3.5.3 The modification design data and documents prepared by the aircraft, components/equipment manufacturer, which are duly approved by State of Design or the data certified by Authorized Representative (AR)/ Designated Engineering Representative (DER) of the State of Design of the aircraft are acceptable for use in modification of aircraft, components/equipment.
- 3.5.4 The person responsible for the modification design shall state any particular requirements to be observed when the modification is completed and before an aircraft, component or equipment is released for service. The following aspects shall be considered:
 - a) Whether tests or inspections during the progress or after the completion of the modification are necessary to ensure it complies with the specified requirements.
 - b) The qualifications of persons who may be required to assess completed work and certify that it complies with the approved design.
 - c) Whether significant changes in the weight and centre of gravity position of the aircraft will occur and if re-weighing or preparation of a new weight and balance report is necessary.
 - d) Whether the flight or operating characteristics of an aircraft may have been affected by the work and the necessity to have the aircraft inspected and certified as fit for flight and flight tested.
 - e) Whether amendments of particulars in the Certificate of Airworthiness or associated documents are required.
 - f) Whether amendments are necessary to the approved maintenance schedule or other data or documents approved for maintenance or other work on the aircraft.
 - g) Whether amendments are necessary to any data specified in the flight crew operating manual.
- 3.5.5 Where a modification affects the instrument panel, it shall be ensured that instruments which are used by any one pilot are so arranged as to permit the pilot to see their indications clearly from his or her station, with the minimum practicable deviation from the position and line of vision normally assumed when looking forward along the flight path.
- 3.5.6 Where a modification affects equipment required for communications or navigation purposes, or both, it shall be ensured that the failure of any single

unit required for communications or navigation, or both, will not result in the failure of another unit required for communications or navigation.

- 3.5.7 Modification documents shall bear a modification reference number, title, issue number and date and shall indicate the reason for modification, modification instructions, any limitations and inspection requirements, manuals affected and references to other documents or design data, together with a list of parts and assemblies affected by the modification and, where necessary, drawings or sketches giving particulars of parts before and after modification.

3.6 Approval of a major modification

- 3.6.1 Approval of a major modification will only be granted when the DGCA is satisfied that in respect of the design:

- a) The drawings, documents, reports, calculations, etc., are adequate to establish that the design complies with the appropriate airworthiness requirements.
- b) Any tests or inspections considered necessary for the approval have been completed satisfactorily.
- c) The drawings and other documents required for the work are of a satisfactory standard and in accordance with acceptable aeronautical practices.

- 3.6.2 DGCA may require compliance checks after the completion of the modification and before any aircraft component or equipment is released for service.

- 3.6.3 All changes to an approved drawing or document will require re-approval of the original. The issue or revision number shall be raised following re-approval.

4 Repair

- 4.1.1 Repair covered in the Structural Repair Manual (SRM) do not require DGCA approval. The repair may be carried out by Approved Maintenance Organisation as per data available in SRM.

- 4.2 Repair which are not covered in SRM shall require DGCA approval.

4.3 Classification of Repair

- 4.3.1 The repair shall be classified as 'Minor' or 'Major' by either by DGCA, or by an appropriately approved design organization under a procedure agreed with DGCA.

4.3.2 For classification of the repair, as major or minor, the Owner/Operator/ Aircraft Maintenance Organisation will submit details of damage to an appropriately CAR 21/ EASA 21/ FAR 21 approved design organization or DGCA.

4.3.3 Once a repair has been classified as major or minor, the owner/operator/ AMO shall submit the repair scheme to the appropriately CAR 21/ EASA 21/ FAR 21 approved design organization/ manufacturer for their review or request for repair scheme by providing the details of damage. Details forwarded may include photographs, sketches, relevant pages of maintenance data specifying the area of damage etc. for obtaining the feedback from the approved design organisation/ manufacturer.

4.4 Minor Repair

4.4.1 A repair which has been classified as minor, has negligible effect on the airworthiness of the affected aeronautical product. The accomplishment of minor repairs normally involves use of standard or generally accepted practices. Repairs that are classified as Minor and approved by appropriately CAR 21/ EASA 21/ FAR 21 approved design organization may be accomplished by the Approved Maintenance Organization following documented procedures approved by DGCA. Procedures for accomplishment of minor repair shall be established by operator/ maintenance organisation and documented in CAME/ MOE. Accomplishment of such repair shall be intimated to the local Airworthiness Office.

4.5 Major Repair

4.5.1 For approval of major repair, the owner/operator/ AMO shall apply to the concerned Regional Airworthiness Office (RAO) along with evidences and data relating to the intended major repair and its effect on the airworthiness of aircraft, as per details given in para- 5.

4.5.2 Repair scheme and approved data received from the appropriately CAR 21/ EASA 21/ FAR 21 approved design organization/ manufacturer shall be forwarded to the regional Airworthiness office for obtaining approval. Copy of Repair and Deviation Record (RDR), Repair Design Approval Sheet (RDAS), as applicable shall also be attached along with the repair data along with the application for approval.

4.5.3 The repair scheme and approved data prepared by the aircraft, components/equipment manufacturer, which are duly approved by State of Design or the repair scheme certified by Authorized Representatives (AR)/ Designated Engineering representatives (DER) of the State of Design of the aircraft are acceptable for use in repair of aircraft, components/equipment.

5 Application for Approval of Major Modification/ Repair

5.1.1 The owner/operator shall submit a duly completed application as per Form CA 2 (MR), in duplicate, for carrying out major modification and/or major repair to the concerned Regional Airworthiness Office. The following modification or repair documents should be attached along with the application:

- a) Detailed description of the proposed modification or repair, including initial damage detail, related correspondence with manufacturer/DOA.
- b) A master documentation list detailing the individual drawings and specifications which define the modification or repair;
- c) Drawings and instructions necessary for incorporation of the modification or repair;
- d) Testing procedures or methods to meet certification and operating rules, such as flammability, carbon monoxide, and noise requirements;
- e) Test procedures that are appropriate to the modification or repair and to verify that the modification or repair meets applicable certification requirements;
- f) Detailed design standards, to ensure that the operator has considered all applicable design requirements and acceptance engineering reports including expected test results to be used in determining the compliance of the modified or repaired product;
- g) A record of the change in mass and moment arm when the modification or repair is installed in the aeronautical product;
- h) A record of the change in electrical load when the modification or repair is installed in an aircraft;
- i) Supplements to:
 - (i) The approved flight manual
 - (ii) Maintenance instructions;
 - (iii) Instructions for continuing airworthiness
 - (iv) repair instructions,
- j) Any other factors that may affect safety or Airworthiness.

6 General Requirements

- 6.1 The Authorized Representatives/ Designated Engineering Representatives responsible for certifying modification/repair approved data shall be an employee of the organization holding DOA. Certifications by independent representative shall not be acceptable.
- 6.2 Recommendation or No Technical Objection (NTO) from the manufacturer shall not be acceptable for grant of approval.
- 6.3 The following data sources are considered as Approved Sources:

The data sources defined in Para 3.5.3 and Para 4.5.3 are considered as Approved Sources.

7. Accomplishment of modification and repair.

7.1 **Procedure for Approval of accomplishment of Modification/Repair, where design data are received from approved sources:**

- 7.1.1 When the owner / operator has submitted the data received from the approved sources as per Para 6.3, the RAO may permit to carry out the modification/repair on the basis of the repair proposal and the design data submitted by the operator/owner.
- 7.1.2 The formal approval shall be granted on FORM CA-2(MR) to the owner/operator by RAO, after ensuring the following:

- a) Modification/Repair has been completed as per the approved data.
- b) Conformity statement certifying that the repair or modification is in compliance with current guidance and regulatory requirements. Completion date of the repair/ modification along with full signature and authorisation reference of the authorised individual should be entered.
- c) If there are any deviations during the practical implementation of the Modification/ Repair, they are duly authenticated by the manufacturer/ organisation holding DOA approval of the state of design.
- d) The modification/repair completion report has been accepted by the DOA / manufacturer.
- e) The accomplishment of major repair/modification should be verified/accepted by the Regional Airworthiness Office (RAO).
- f) RAO may schedule a physical inspection, demonstration, testing, BITE check etc. on aircraft with the applicant prior to acceptance in order to verify workmanship and conformance to the data submitted.

7.2 Procedure for Approval of Modification/Repair, where design data are not from approved sources:

7.2.1 If the design data submitted by the operator did not meet the requirements mentioned in para 6.3, then the Regional Airworthiness Office will examine the proposal and forward the same to the Airworthiness Directorate at DGCA Headquarters. The Airworthiness Directorate at DGCA Headquarters will review the case and forward the same for detailed analysis and approval of the modification/repair scheme data to the Aircraft Engineering Directorate (AED). The operator/owner may have to provide necessary data to AED in line with requirements stipulated in Part-3 of AED Hand Book of Procedures (available on DGCA website at www.dgca.gov.in). On receipt of approval from the AED, the same shall be conveyed to the Regional Airworthiness Office.

7.3 Owner/operator shall include the above procedure in the Maintenance Organisation Exposition (MOE), Maintenance Organisation Manual (MOM) Continuing Airworthiness Management Exposition (CAME), as applicable.

7.4 Maintenance of Records

7.4.1 The Owner/ Operator shall ensure that aircraft-wise record of all modification and/or repair is maintained.

7.4.2 A monthly statement of modification and repair accomplished on the aircraft shall be forwarded to DGCA as a part of Engineering Statistics Report.

7.4.3 The Regional/ Sub regional office and DGCA (AED) should keep a record of approvals granted for repair designs. This should include the supporting documents submitted with the application.

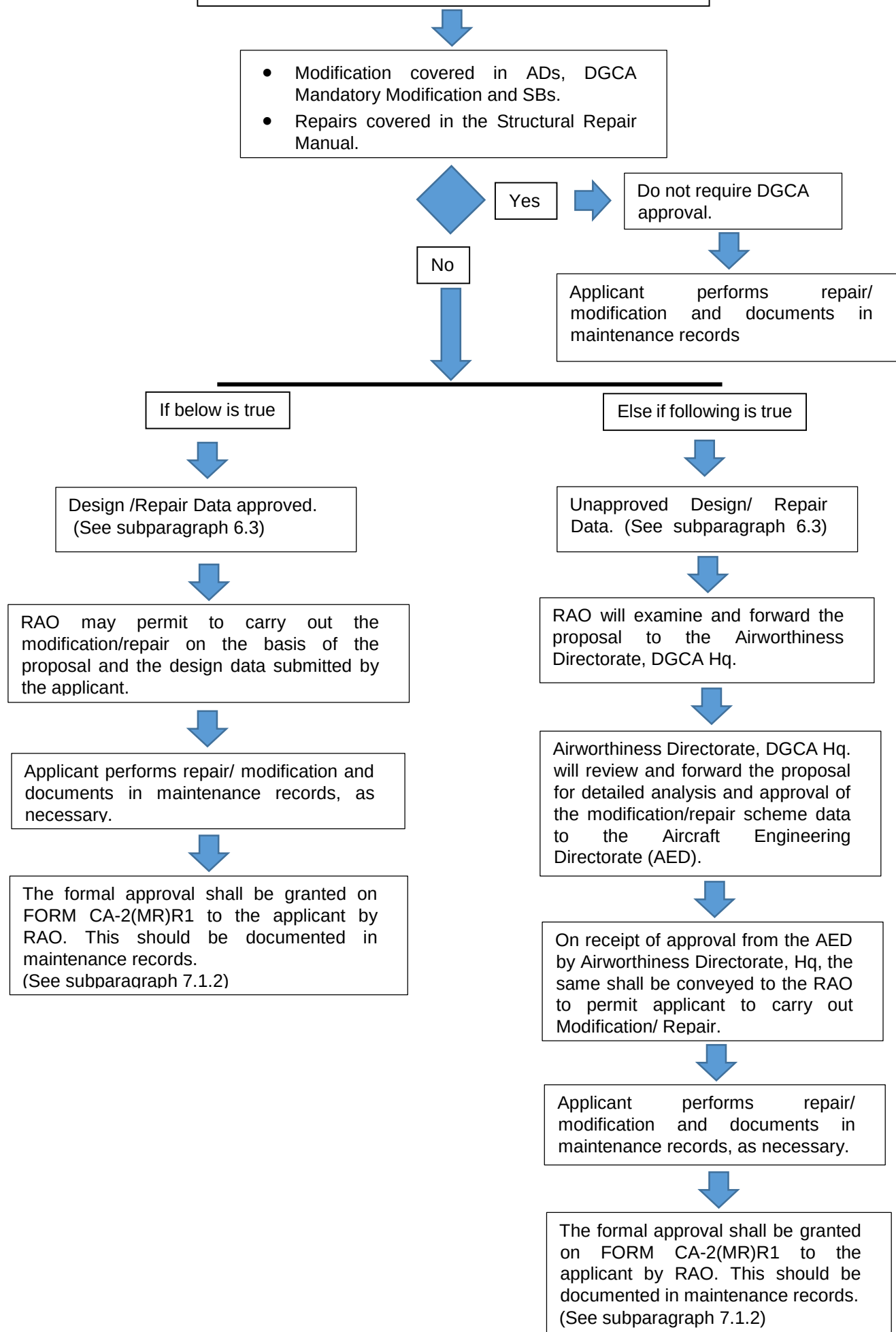
8. Surveillance of Major Modification and Major Repair

8.1 Surveillance of major modifications/ repair are conducted as part of ARC, ACAM and annual surveillance.



(Arun Kumar)
Director General of Civil Aviation

Major Modification/Repair Approval Process



DIRECTORATE GENERAL OF CIVIL AVIATION

FORM CA-2(MR) R1

APPLICATION FOR APPROVAL OF MAJOR MODIFICATION AND REPAIR

1. Aircraft	Make:		Model:	
	Serial No.:		Registration Mark:	
2. Owner/Operator	Name:			
	Address:			
3. Unit Identification:				
Unit	Make	Model	Serial No.	Mod ☐ / Repair ☐
				Major Minor
Airframe				
Power plant				
Propeller				
Component				
4. Description of work:				
5. Assessments and Attachments :				
6. Details of organisation (intending to carry out repair/ modification):				
A. Organisation Name and Address		B. Kind of Organisation:		
		☐ Manufacturer ☐ Approved Maintenance Organisation Approval Reference No.: _____		
7. Owner/ Operator's Name and signature	Name	Signature	Date	
FOR DGCA USE ONLY				
8. Approval for Return to Service				
Pursuant to the authority given to the person specified below, the unit(s) identified in item 3 above was inspected in the manner prescribed and is (Tick option as applicable):				
DGCA	Approved ☐	Rejected ☐	Remarks	
	Name: Designation:		Signature	Date

FORM CA-2 (MR)R1 FILLING INSTRUCTIONS

- Item 1:** **Aircraft.** The “Nationality and Registration Mark” is the same as shown on Certificate of Registration. Information to complete the “Make,” “Model,” and “Serial Number” blocks can also be found on Certificate of Registration.
- Item 2:** **Owner/Operator.** Enter the aircraft Owner’s/ Operator’s complete name and address as shown on Certificate of Registration.
- Item 3:** **Unit Identification.** Use the information blocks under Item 3 to identify the airframe, powerplant, propeller, or component that has to be repaired or modified. It is only necessary to complete the blocks for the unit required to be repaired or modified.
- Item 4:** Enter a clear, concise, and legible statement describing the work to be accomplished.
- Item 5:** Assessments of Modification/ Repair to be undertaken and details of enclosures/ attachments
- Item 6: Details of Organisation:**
- “A” – Organisation Name and Address.** Enter the name and address of the organisation intending to carry out the repair or modification.
- “B” – Kind of Organisation.** Tick the appropriate organisation to indicate the type of organization that will be performing the work and mention Approval Reference no.
- Item 7:** **Owner/Operator/Signature.** Enter Name, signature, date of owner/operator
- Item 8:** **Approval for Return to Service.** This portion of the form is for DGCA and is used to indicate approval or rejection of the repair or modification.