

A stylized paper airplane icon in shades of blue and grey is positioned above a dashed grey line that represents a flight path, curving upwards and then downwards.

CIVIL AVIATION DIRECTIVE – 8106

DESIGN OF⁺ REPAIRS

CAAM PART 21 SUBPART M

CIVIL AVIATION AUTHORITY OF MALAYSIA

ISSUE 01
REVISION 00 – 1ST MAY 2021

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Introduction

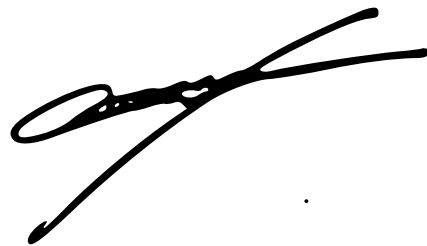
In exercise of the powers conferred by regulations 24O of the Civil Aviation Act 1969 [Act 3], the Chief Executive Officer Makes this Civil Aviation Directive (CAD) 8106 – Design of Repairs (CAAM Part 21 Subpart M), pursuant to Regulation 21, 23, 24, 163, 189 and 193 of the Malaysia Civil Aviation Regulation (MCAIR) 2016.

This CAD provides the requirement and establishes the procedure for the approval for the design of repairs of aircraft, engine, propeller or associated part and establishes the rights and obligations of the applicants for, and holders of, those approvals and for any matters connected therewith.

This CAD 8106 - Design of Repairs (CAAM Part 21 Subpart M) is published by the Chief Executive Officer under section 24O of the Civil Aviation Act 1969 [Act 3] and come into operation on 1st May 2021.

Non-compliance with this CAD

Any person who contravenes any provision in this CAD commits an offence and shall on conviction be liable to the punishment under section 24O of the Civil Aviation Act 1969 [Act 3] and/or under Malaysia Civil Aviation Regulation 2016.



(Captain Chester Voo Chee Soon)
Chief Executive Officer
Civil Aviation Authority of Malaysia

Civil Aviation Directive components and Editorial practices

This Civil Aviation Directive is made up of the following components and are defined as follows:

Standards: Usually preceded by words such as “*shall*” or “*must*”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where uniform application is necessary for the safety or regularity of air navigation and to which Operators must conform. In the event of impossibility of compliance, notification to the CAAM is compulsory.

Recommended Practices: Usually preceded by the words such as “*should*” or “*may*”, are any specification for physical characteristics, configuration, performance, personnel or procedure, where the uniform application is desirable in the interest of safety, regularity or efficiency of air navigation, and to which Operators will endeavour to conform.

Definitions: Terms used in the Standards and Recommended Practices which are not self-explanatory in that they do not have accepted dictionary meanings. A definition does not have an independent status but is an essential part of each Standard and Recommended Practice in which the term is used, since a change in the meaning of the term would affect the specification.

Tables and Figures: These add to or illustrate a Standard or Recommended Practice and which are referred to therein, form part of the associated Standard or Recommended Practice and have the same status.

Notes: Included in the text, where appropriate, Notes give factual information or references bearing on the Standards or Recommended Practices in question but not constituting part of the Standards or Recommended Practices;

Attachments: Material supplementary to the Standards and Recommended Practices or included as a guide to their application.

It is to be noted that some Standards in this Civil Aviation Directive incorporates, by reference, other specifications having the status of Recommended Practices. In such cases, the text of the Recommended Practice becomes part of the Standard.

The units of measurement used in this document are in accordance with the International System of Units (SI) as specified in CAD 5. Where CAD 5 permits the use of non-SI alternative units, these are shown in parentheses following the basic units. Where two sets of units are quoted it must not be assumed that the pairs of values are equal and interchangeable. It may, however, be inferred that an equivalent level of safety is achieved when either set of units is used exclusively.

Any reference to a portion of this document, which is identified by a number and/or title, includes all subdivisions of that portion.

Throughout this Civil Aviation Directive, the use of the male gender should be understood to include male and female persons.



Record of revisions

Revisions to this CAD shall be made by authorised personnel only. After inserting the revision, enter the required data in the revision sheet below. The *'Initials'* has to be signed off by the personnel responsible for the change.

Rev No.	Revision Date	Revision Details	Initials



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1 General

1.1 Citation

1.1.1 These Directives are the Civil Aviation Directives 8106 – Design of Repairs (CAAM Part 21 Subpart M) [CAD 8106], Issue 01/Revision 00, and comes into operation on 1st May 2021.

1.1.2 This CAD 8106 – Design of Repairs (CAAM Part 21 Subpart M), Issue 01/Revision 00 will remain current until withdrawn or superseded.

1.2 Applicability

1.2.1 This CAD shall be applicable to—

- a) a holder of certificate of approval issued under regulation 21 of the MCAR and CAD 8401;
- b) a holder of type certificate issued under regulation 23 of the MCAR;
- c) an applicant for an approval for the design of repairs under regulation 24 of the MCAR; or
- d) a holder of an approval for the design of repairs under regulation 24 of the MCAR.

1.3 Revocation

1.3.1 This CAD read together with CAD 8110 – Installation of Repairs revokes Airworthiness Notice 78 issue 2 dated 15 May 2005.

1.4 Definition

1.4.1 In this CAD, unless the context otherwise requires:

Aeronautical product means any aircraft, aircraft engine, aircraft propeller or a part to be installed thereon;

APU mean Auxiliary Power Unit;

MCAR means Civil Aviation Regulations 2016;

repair means the restoration of an aircraft, engine, propeller or associated part to an airworthy condition in accordance with the appropriate airworthiness requirements after it has been damaged or subjected to wear;

type certificate means a Type Certificate issued by the director General under regulation 23; and

type design means set of data and information necessary to define an aircraft, engine or propeller type for the purpose of airworthiness determination.

2 (Reserved)

3 Eligibility [21.432A]

- 3.1 Any person that has demonstrated its capability in accordance with paragraph 4 of this CAD may apply for the approval of design of major repair in accordance with the conditions laid down in this CAD.
- 3.2 The applicant for the approval of design of minor repair shall demonstrate to CAAM that it has –
- a) comprehensive knowledge, experience and capabilities in the applicable technologies, such that in-depth analyses can be performed where required;
 - b) information on prior repairs in the area where approval is sought; and
 - c) sufficient information on the type design of the aircraft involved.

4 Demonstration of capability [21.432B]

- 4.1 An applicant for the approval of design of major repair shall demonstrate its capability by holding a design organisation approval, issued by CAAM in accordance with CAD 8401.

5 Application for a Repair Design Approval [21.432C]

- 5.1 An application for a repair design approval shall be made in a form and manner established by CAAM.
- 5.2 An application for the approval of design of major repair shall include, or be supplemented after the initial application, a certification programme containing:
- a) a description of the damage and repair design identifying the configuration of the type design upon which the repair is made;
 - b) an identification of all areas of the type design and the approved manuals that are changed or affected by the repair design;
 - c) an identification of any reinvestigations necessary to demonstrate compliance of the repair design and areas affected by the repair design with the type certification basis incorporated by reference in, as applicable, either the type-certificate or the supplemental type certificate;

- d) any proposed amendments to the type certification basis incorporated by reference in, as applicable, either the type certificate or the supplemental type certificate;
- e) a proposal for a breakdown of the certification programme into meaningful groups of compliance demonstration activities and data, including the means and process proposed to be followed to demonstrate compliance with paragraph 6.1(a) of this CAD and references to related compliance documents;
- f) a proposal for the assessment of the meaningful groups of compliance demonstration activities and data, addressing the likelihood of an unidentified non-compliance with the type certification basis and the potential impact of that non-compliance on product safety. The proposed assessment shall take into account at least the following elements:
 - 1) novel or unusual features of the certification project, including operational, organisational and knowledge management aspects;
 - 2) complexity of the design and/or demonstration of compliance;
 - 3) criticality of the design or technology and the related safety and environmental risks, including those identified on similar designs; and
 - 4) performance and experience of the design organisation of the applicant in the domain concerned.
- g) Based on this assessment, the application shall include a proposal for CAAM's involvement in the verification of the compliance demonstration activities and data; and
- h) the specification whether the certification data is prepared completely by the applicant or on the basis of an arrangement with the type certificate holder.

6 Requirements for Approval of a Repair Design [21.433]

6.1 A repair design shall only be approved:

- a) when it has been demonstrated, following the certification programme referred to in paragraph 5.2 of this CAD, that the repair design complies with the type certification basis incorporated by reference in, as applicable, either the type certificate or the supplemental type certificate, as well as with any amendments established and notified by CAAM;
- b) when compliance with the type certification basis that applies in accordance with paragraph 6.1(a) of this CAD has been declared and the justifications of compliance have been recorded in the compliance documents;
- c) when no feature or characteristic has been identified that may make the product unsafe for the uses for which certification is requested; and



d) where the applicant has specified that it provided certification data on the basis of an arrangement with the type certificate holder in accordance with paragraph 5.2(g) of this CAD:

- 1) when the holder has indicated that its concurrence to the information submitted under paragraph 6.1(b) of this CAD and
- 2) when the holder has agreed to collaborate with the repair design approval holder to ensure discharge of all obligations for continued airworthiness of the changed product through compliance with paragraph 14 of this CAD.

6.2 The applicant shall submit to CAAM the substantiation data for the repair and a statement that compliance has been demonstrated in accordance with paragraph 6.1(b) of this CAD.

7 Classification and Approval of Repair Designs [21.435]

7.1 A repair design shall be classified as either “major” or “minor” in accordance with the criteria set out in paragraph 3 of CAD 8104 for a modification.

7.2 A repair design shall be classified and approved by:

- a) CAAM; or
- b) an approved design organisation within the scope of its privileges provided for in paragraph 15.3 (a) and 15.3 (b) of CAD 8401, as recorded in the terms of approval.

8 Production of Repair Parts [21.439]

8.1 Parts and appliances to be used for the repair shall be manufactured in accordance with paragraph 3 of CAD 8110.

9 Repair embodiment [21.441]

9.1 The embodiment of a repair shall be performed in accordance with paragraph 4 of CAD 8110.

10 Limitations [21.443]

10.1 A repair design may be approved subject to limitations, in which case the repair design approval shall include all necessary instructions and limitations. These instructions and limitations shall be transmitted by the repair design approval holder to the operator in accordance with a procedure agreed with CAAM.

11 Unrepaired Damage [21.445]

11.1 When a damaged product, part or appliance, is left unrepaired, and is not covered by previously approved data, the evaluation of the damage for its airworthiness consequences may only be made;

- a) by CAAM; or
- b) by an appropriately approved design organisation under a procedure agreed with CAAM.

Any necessary limitations shall be processed in accordance with the procedures of paragraph 10.1 of this CAD.

11.2 Where the organisation evaluating the damage under paragraph 11.1 of this CAD is neither CAAM nor the type certificate or supplemental type certificate holder, this organisation shall justify that the information on which the evaluation is based is adequate either from its organisation's own resources or through an arrangement with the type certificate or supplemental type certificate holder, or manufacturer, as applicable.

11.3 An unrepaired damage shall be subjected to same evaluation as design of repair in accordance with the procedures laid out in this CAD.

12 Record Keeping [21.447]

12.1 For each repair, all relevant design information, drawings, test reports, instructions and limitations possibly issued in accordance with paragraph 10.1 of this CAD, justification for classification and evidence of the design approval, shall:

- a) be held by the repair design approval holder at the disposal of CAAM; and
- b) be retained by the repair design approval holder in order to provide the information necessary to ensure the continued airworthiness of the repaired products, parts or appliances.

12.2 The records of design of repairs are permanent and shall not be destroyed without written permission from CAAM.

13 Instructions for continued airworthiness [21.449]

- 13.1 The holder of the repair design approval shall furnish at least one complete set of those changes to the instructions for continued airworthiness which result from the design of the repair, comprising descriptive data and accomplishment instructions prepared in accordance with the applicable requirements, to each operator of aircraft incorporating the repair. The repaired product, part or appliance may be released into service before the changes to those instructions have been completed, but this shall be for a limited service period, and in agreement with CAAM. Those changes to the instructions shall be made available on request to any other person required to comply with any of the terms of those changes to the instructions. The availability of some manual or portion of the changes to the instructions for continued airworthiness, dealing with overhaul or other forms of heavy maintenance, may be delayed until after the product has entered into service, but shall be available before any of the products reaches the relevant age or flight - hours/cycles.
- 13.2 If updates to those changes to the instructions for continued airworthiness are issued by the holder of the repair design approval after the repair has been first approved, these updates shall be furnished to each operator and shall be made available on request to any other person required to comply with any of the terms of those changes to the instructions. A programme showing how updates to the changes to the instructions for continued airworthiness are distributed shall be submitted to CAAM.

14 Obligations and Marking [21.451]

- 14.1 Each holder of a major repair design approval shall:
- a) undertake the obligations:
 - 1) laid down in paragraphs 2, 3 and 4 of CAD 8101, paragraphs 8, 9, 10, 12 and 13 of this CAD;
 - 2) implicit in the collaboration with the type certificate and supplemental type certificate holder under paragraph 6.2 of this CAD, as appropriate.
 - b) specify the marking, in accordance with paragraph 4.1 of CAD 8206.
- 14.2 Except for type certificate holders or APU authorisation holders for which paragraph 16 of CAD 8102 applies, the holder of a minor repair design approval shall:
- a) undertake the obligations laid down in paragraph 4 of CAD 8101, paragraphs 12 and 13 of this CAD; and
 - b) specify the marking, in accordance with paragraph 4.1 of CAD 8206.