

A stylized paper airplane icon in shades of blue and grey is positioned above a dashed grey line that forms a parabolic arc, representing a flight path. The background features large, light grey abstract shapes.

**CIVIL AVIATION DIRECTIVE – 6805**

# **AIRCRAFT + MASS AND BALANCE PROGRAMME**

**CIVIL AVIATION AUTHORITY OF MALAYSIA**

**ISSUE 01**  
REVISION 00 – 1<sup>ST</sup> AUGUST 2021

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## Introduction

In exercise of the powers conferred by section 24O of the Civil Aviation Act 1969 [Act 3], the Chief Executive Officer makes this Civil Aviation Directive (CAD) – Aircraft Mass and Balance Programme pursuant to regulation 43, 43A, 81, 189 and 193 of Malaysia Civil Aviation Regulation (MCA) 2016.

This CAD provides the requirements for mass and balance control of Malaysian aircraft and for any matters connected therewith.

This CAD is published by the Chief Executive Officer under section 24O of the Civil Aviation Act 1969 [Act 3] and come into operation on 1<sup>st</sup> November 2021 for air operator certificate holder and on 1<sup>st</sup> February 2022 for other than air operator certificate holder.

### 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.

**Appendices:** Material grouped separately for convenience, but forms part of the Standards and Recommended Practices stipulated by the CAAM.

**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 CAD 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. This CAD may be cited as the Civil Aviation Directive (CAD) 6805 – Aircraft Mass and Balance Programme.
- 1.1.2. This CAD 6805 Issue 01/Revision 00 will remain current until withdrawn or superseded.

### 1.2 Applicability

- 1.2.1. This CAD shall be applicable to:
- a) the applicant or holder of certificate of airworthiness issued under MCAR Regulation 26;
  - b) holder of permit to fly issued under MCAR Regulation 29;
  - c) the registered owner of an aircraft;
  - d) the operator of an aircraft;
  - e) an organisation that is approved to engage in continuing airworthiness management issued under MCAR Regulation 31; and
  - f) an organisation that is approved to engage in maintenance of aeronautical product issued under MCAR Regulation 31.
- 1.2.2. Malaysian aircraft that are not eligible to be issued with certificate of airworthiness under CAD 8301 are not subjected to the requirement of this CAD.

### 1.3 Definition

- 1.3.1. In this CAD, unless the context otherwise requires:

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

***aeroplane*** means a power-driven heavier-than-air aircraft, deriving its lift in flight chiefly from aerodynamic reactions on surfaces which remain fixed under given conditions of flight;

***AFM*** means the aircraft flight manual, rotorcraft flight manual or pilot's operating handbook;

***aircraft*** means any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface;

**AMO** means a maintenance organisation approved in accordance with CAD 8601 or CAD 8602;

**basic equipment** means the unconsumable fluids (e.g. coolant and hydraulic fluid) and equipment which is common to all roles for which the operator intends to use the aircraft;

**basic equipment list** means the list of basic equipment included in the empty mass;

**empty mass** means the mass of the aircraft and all its basic equipment, plus that of the declared quantity of unusable fuel and unusable oil.

**CAMO** means an organisation that is approved under MCAR to manage continuing airworthiness of the aircraft;

**CG** means centre of gravity;

**crew** means person identified as flight crew, cabin crew or other crew as per operational requirements;

**disposable load** means the mass of all persons and items of load, including fuel and other consumable fluids, carried in the aircraft, other than the Basic Equipment and variable load.

**dry operating mass** means the total mass of the aircraft ready for a specific type of operation, excluding usable fuel and traffic load;

**mass and balance programme** means a programme established for the purpose of mass and balance control of an aircraft in accordance with the requirements specified in this CAD.

**MBR** means mass and balance report;

**MBR signatory** means a person suitably qualified and acceptable to CAAM to certify the MBR who is approved by the CAMO;

**MCGS** means mass and centre of gravity schedule;

**MCGS signatory** means a person suitably qualified and acceptable to CAAM to certify the MCGS who is approved by the CAMO;

**helicopter** means a heavier-than-air aircraft supported in flight chiefly by reactions of the air on one or more power-driven rotors on substantially vertical axes;

**loading data** means loading schedule and MCGS;

**loading schedule** means a document used to determine compliance with the aircraft certificated mass and balance limitations contained in the AFM and aircraft mass and balance manual for every flight;



**loading system** means the loading limitations and distributions for proper loading of an aircraft as per the loading data;

**on-board mass and balance system** means the electronic system inside the aircraft whereby when the aeroplane is on the ground, it provides the flight crew with a continuous indication of the aircraft total mass and the location of the CG;

**operations manual** means a manual containing procedures, instructions and guidance for use by operational personnel in the execution of their duties which approved by the Flight Operations Division of CAAM;

**operator** means a person, organisation or enterprise engaged in or offering to engage in an aircraft operation;

**passenger** means a person other than the crew;

**traffic load** means the total mass of passengers, baggage, cargo and carry-on specialist equipment and, including any ballast;

**variable load** means the mass of the crew, of items such as the crew's baggage, removable units, and other equipment, the carriage of which depends upon the role for which the operator intends to use the aircraft for the particular flight; and

**weight** means a quantity to mean mass (i.e. the SI unit is kilogram).

## 2 Responsibilities

- 2.1 The mass and balance control of all Malaysian aircraft that has been issued or in the process of being issued with a certificate of airworthiness under CAD 8301 shall be performed in accordance with the requirements specified in this CAD.
- 2.2 The owner of an aircraft shall be responsible for the mass and balance control of the aircraft and shall ensure that the tasks associated with mass and balance control of the aircraft are performed by the CAMO appropriately. In the case of lease, the responsibilities of the owner of an aircraft are transferred to the lessee if:
- a) the lessee is stipulated on the registration document; or
  - b) detailed in the leasing contract.
- 2.3 The CAMO shall be responsible to:
- a) develop and maintain a mass and balance programme;
  - b) prepare the aircraft mass and balance programme document; and
  - c) manage the mass and balance control of the aircraft in accordance with this CAD.

- 2.4 The AMO shall be responsible to carry out aircraft weighing activity and issue appropriate release certification;
- 2.5 The operator of an aircraft shall ensure that no flight takes place unless the mass and balance control of the aircraft is performed in accordance with the approved mass and balance programme. This also includes when the aircraft is operated under permit to fly requirements when the certificate of airworthiness is cease to be in force.
- 2.6 By derogation to paragraph 2.5 of this CAD, without prejudice to CAAM's permit to fly requirements, the operator may operate the aircraft under permit to fly with appropriate flight conditions in the event of mass and balance control of the aircraft is not performed in accordance with the approved mass and balance programme.

### **3 General Requirements**

- 3.1 The empty mass and CG of each aircraft shall be determined by weighing the aircraft prior to the initial issuance of the Certificate of Airworthiness and the basic equipment list shall be established.
- 3.2 By derogation to paragraph 3.1 of this CAD, an aircraft may not be required to be weighed by the operator prior to the issuance Certificate of Airworthiness in case of newly manufactured aircraft where the mass and CG has been determined by the manufacturer and recorded.
- 3.3 By derogation to paragraph 3.1 of this CAD, in the case of a used aircraft, the aircraft may not be required to be weighed by the operator prior to the issuance Certificate of Airworthiness aircraft if:
  - a) the operator is able to demonstrate that the aircraft has been last weighed in accordance to procedures equivalent to paragraph 4 of this CAD;
  - b) the aircraft is unmodified or only minimally modified (i.e. where it is explicitly specified in the modification data there is no appreciable effect on aircraft mass and balance); and
  - c) any changes to mass computed and recorded in the previous mass and balance records.
- 3.4 All aircraft shall be reweighed at intervals not exceeding four years, and at such times as CAAM may require. The empty mass and the corresponding CG position shall be determined and entered in the MBR in accordance with paragraph 7 of this CAD.

## 4 Aircraft Weighing

- 4.1 Aircraft weighing shall be performed by a maintenance organisation approved in accordance with CAD 8601 or CAD 8602 as applicable.
- 4.2 Aircraft weighing activity shall be supervised by the personnel defined in paragraph 5.3 of this CAD to ensure compliance to the requirements of this CAD.
- 4.3 Aircraft weighing shall be carried out in accordance with instructions and recommendations of the aircraft type certificate holder, supplemental type certificate holder and weighing scale manufacturer as applicable. If such data is not available, the CAMO shall be responsible for developing appropriate weighing instructions for its particular aircraft as may be agreed by CAAM.
- 4.4 When weighing an aircraft, the CAMO shall ensure normal precautions are taken by the AMO consistent with good practices.
- 4.5 The CAMO shall ensure that the condition of the aircraft (i.e. the equipment and other items of load such as fluids in tanks) is recorded. The equipment installed shall not differ from that included in the declared basic equipment list associated with the MBR.
- 4.6 The CAMO shall ensure any equipment used for weighing shall be properly calibrated, zeroed, and used in accordance with the manufacturer's instructions. Each scale shall be calibrated within two years or within a time period defined by the manufacturer of the weighing equipment, whichever is less.
- 4.7 The CAMO shall ensure that the weighing equipment used will enable the mass of the aircraft to be established accurately.
- 4.8 When an aircraft is weighed, the CAMO shall ensure at least two independent determinations shall be made, and the aircraft longitudinal datum line, unless specified by the aircraft type certificate holder, shall be horizontal. The load shall be completely removed from the weighing equipment between determinations. The aircraft gross mass as determined by the two measurements shall be consistent. If not, the measurements shall be repeated until the gross mass, as determined by two consecutive and independent measurements, are consistent.
- 4.9 It is the responsibility of the CAMO to conduct oversight on the approved maintenance organisation in paragraph 4.1 of this CAD to ensure mass and balance of the aircraft is established correctly.

## **5 Mass and Balance Report (MBR)**

- 5.1 An MBR shall be issued for every aircraft by the CAMO. The MBR shall be completed and certified by an MBR signatory as identified in paragraph 5.3 of this CAD by signing the MBR.
- 5.2 The data recorded in the MBR shall be sufficient to enable the empty mass and empty mass centre of gravity position to be accurately determined.
- 5.3 For a CAMO to issue an MBR in accordance with paragraph 5.1 of this CAD, the CAMO shall approve person suitably qualified and acceptable to CAAM to certify the MBR.
- 5.4 In absence of an MBR signatory, the CAMO may contract another CAMO with appropriate capability to certify the MBR. In such cases, a written agreement shall be made available between the two organisations.
- 5.5 By derogation to paragraph 5.3 of this CAD, in case where a CAMO could not identify a qualified MBR signatory for a particular type of aircraft (e.g. first-of-type aircraft), the CAMO may submit the completed MBR to CAAM for approval. The CAMO shall remain responsible for the supervision of aircraft during weighing and the data recorded and computed in the MBR.
- 5.6 The MBR shall present the derivation of the empty mass and the corresponding CG from the most recent aircraft weighing results and related calculations.
- 5.7 The CAMO shall ensure that the MBR is independently checked prior to certifying it, or submitting for CAAM's approval.
- 5.8 The MBR shall include the current basic equipment list showing the mass and lever arm of each item or make reference to the document in which such a list is included.
- 5.9 The MBR shall be made available to CAAM. Such records shall be retained and produced to CAAM at any material time.
- 5.10 When the aircraft is again weighed, the previous MBR shall be retained with the aircraft records for at least 6 months.

## **6 Mass and Centre of Gravity Schedule (MCGS)**

- 6.1 An MCGS shall be issued for every aircraft by the CAMO based on the empty mass and empty CG position obtained from the most recent aircraft weighing in accordance with Regulation 43 of MCAR. The MCGS shall be completed and certified by an MCGS signatory as identified in paragraph 6.5 of this CAD by signing the MCGS.
- 6.2 The CAMO shall ensure that a current MCGS is kept with the aircraft.

- 6.3 The MCGS shall present the current empty mass, the variable loads and the disposable loads in order to determine the operating mass for which the operator intends to use the aircraft for.
- 6.4 Each MCGS shall be identified by the aircraft designation (make and model), serial number, nationality and registration marks, the date of issue/revision and a statement indicating that the schedule supersedes all earlier issues.
- 6.5 For a CAMO to issue a MCGS in accordance with paragraph 6.1 of this CAD, the CAMO shall approve person suitably qualified and acceptable to CAAM to certify the MCGS.
- 6.6 In absence of an MCGS signatory, the CAMO may contract another CAMO with appropriate capability to certify the MCGS. In such cases, a written agreement shall be made available between the two organisations.
- 6.7 By derogation to paragraph 6.5 of this CAD, in case where a CAMO could not identify a qualified MCGS signatory for a particular type of aircraft (e.g. first-of-type aircraft), the CAMO may submit the completed MCGS to CAAM for approval. The CAMO shall remain responsible for the data presented in the MCGS.
- 6.8 The CAMO shall ensure that the MCGS is independently checked prior to certifying it, or submitting for CAAM's approval.
- 6.9 The MCGS shall be made available to CAAM. Such records shall be retained and produced to CAAM at any material time.
- 6.10 Where the MCGS is reissued/revisioned, the last issue/revision shall be retained with the aircraft records for at least 6 months.
- 6.11 When an MCGS is required to be revised pursuant to paragraph 8.3 of this CAD, the mass changes may be computed provided the mass and CG location of the modifications are known. Otherwise, the aircraft shall be reweighed.
- 6.12 Any revision to the MCGS shall be certified by the MCGS signatory as identified in paragraph 6.5 of this CAD by signing the MCGS.
- 6.13 Notwithstanding paragraph 3.4 of this CAD, when an MCGS is required to be revised pursuant to paragraph 8.3 of this CAD or any other reason, if the aircraft has not been re-weighed, the revised MCGS shall contain a statement that calculations have been based on the last MBR, and the known mass and CG changes.
- 6.14 A statement shall be made in the MCGS to the effect that it is a requirement of the MCAR that the pilot-in-command satisfies himself before take-off that the load is of such mass, and is so distributed and secured, that it may safely be carried on the intended flight.

- 6.15 If an applicable AFM pages are used as the MCGS, the applicable pages shall be submitted to CAAM for approval and incorporation into the aircraft flight manual.

## 7 Loading Schedule

- 7.1 During any phase of operation, the loading, mass and CG of the aircraft shall comply with the limitations specified in the AFM, or the operations manual if more restrictive.
- 7.2 The CAMO shall ensure that a current loading schedule is kept with the aircraft, forming a part of the aircraft flight manual.
- 7.3 The loading schedule shall include instructions on the proper load distribution such as filling of fuel tanks and oil tanks, passenger movement and distribution of cargo.
- 7.4 The loading schedule shall reflect the current aircraft configuration and operational procedures.
- 7.5 The CAMO shall ensure that the loading schedule is prepared and certified by:
- the type certificate holder of an aircraft; or
  - the supplemental type certificate holder (for cargo conversion) of an aircraft; or
  - a competent organisation (including a CAMO) that is acceptable to CAAM upon demonstration of its capability.
- The loading schedule design substantiation report shall be made available to CAAM.
- 7.6 If a CAMO is preparing and certifying a loading schedule, the CAMO shall:
- establish the competency of the personnel preparing and certifying the loading schedule in the MBP document;
  - describe the procedures in the MBP document; and
  - ensure that the design of loading schedule is independently checked prior to certifying it.
- 7.7 By derogation to paragraph 7.5 of this CAD, in case of used aircraft, the CAMO may utilise the loading schedule used by the previous operator if the CAMO has satisfied itself that:
- the loading schedule design substantiation report is available;
  - the design of loading schedule is developed based on acceptable standard;
  - there are no changes to the aircraft configuration; and
  - there are no changes in the assumptions used or the operational procedures when the loading schedule is developed.

- 7.8 In case where a software is used to generate the loading schedule, the software shall be authorised or approved by:
- a) the type certificate holder of the aircraft; or
  - b) other acceptable competent organisation upon CAAM's assessment.

The competency of the CAMO personnel generating the loading schedule from the software shall be established in the mass and balance programme.

- 7.9 The operator of an aircraft shall inform the CAMO in the event of the aircraft is to be loaded in other than the specified conditions shown in the loading schedule. The CAMO shall check and determine if the loading schedule will allow computation of separate loading conditions.
- 7.10 By derogation to paragraph 7.5 of this CAD, in the case of aeroplanes of maximum certified take-off mass not greater than 5700 kg, unless specified otherwise in the Mass and Balance Programme for the aircraft, the AFM page titled "aircraft mass" or equivalent shall be used as the loading schedule.
- 7.11 The operator shall be responsible to prepare a loading system (e.g. unit load devices, bulk loading, passengers' distribution, etc.) for each aircraft based on the current aircraft empty mass and the corresponding CG position unless it can be shown that the aircraft cannot be loaded so that its CG falls outside the approved range.
- 7.12 The loading schedule preparation or usage shall be based on the aircraft current empty mass and empty CG position.
- 7.13 If any applicable AFM pages are used as the loading schedule and to specify any required loading system, the applicable pages shall be submitted to CAAM for approval and incorporation into the aircraft flight manual.

## **8 Mass and Balance Records**

- 8.1 The CAMO shall maintain a complete, current, and continuous record of changes of empty mass, arm and empty centre of gravity limits for each aircraft. Details of modifications, repairs or other changes affecting either the mass and/or CG of the aircraft shall be recorded and listed.
- 8.2 Where a change occurs in the items included in either the empty mass or, if applicable, the operating mass of an aircraft, the appropriate list of equipment associated to the MBR or MCGS, as applicable, shall be amended by the CAMO.
- 8.3 The CAMO shall ensure that a revised MCGS is issued in accordance with paragraph 6.1 when:
- a) the cumulative change to the mass and balance record is more than plus or minus 0.5% of the maximum certified landing mass; or

- b) the cumulative change in the CG position record exceeds 0.5% of the mean aerodynamic chord (MAC). In the case of helicopters and airplanes that do not have a MAC-based CG envelope, whenever the cumulative change in the CG position exceeds 0.5% of the total CG range; or
  - c) prescribed by the type certificate or supplemental type certificate holder of an aircraft (e.g. in the aircraft flight manual or weight and balance manual) if the threshold is lesser than as specified in paragraph a) and b) above.
- 8.4 If CAAM, the CAMO or the operator is of the opinion that adequate mass control has not been exercised over an aircraft during the modification or repair embodiment, a new empty mass and empty centre of gravity position shall be determined for the aircraft.

## **9 On-Board Mass and Balance System**

- 9.1 An operator shall seek operational approval from CAAM via the Flight Operations Division if it wishes to use an on-board mass and balance system as a primary source for dispatch.
- 9.2 The usage of on-board mass and balance system may be acceptable to CAAM when:
- a) CAAM is satisfied with the certification of the system, and accepted the system in the operator's Mass and Balance Programme; and
  - b) CAAM is satisfied that the applicant has developed adequate procedures by taking into account operational considerations in the Mass and Balance Programme and demonstrate the system accuracy.
- 9.3 An operator using an on-board mass and balance system as its primary means of measuring mass and balance may develop a backup system based on a conventional mass build-up provided that the back-up system is identified in the Mass and Balance Programme and received operational approval from CAAM via the Flight Operations Division.
- 9.4 An operator using an on-board mass and balance system shall not use the backup system unless:
- a) The on-board system is inoperative;
  - b) The on-board system has been deferred in accordance with the aircraft MEL; and
  - c) The operator has been approved to use conventional mass build-up method as the back-up system.



## **10 Dry Operating Mass**

- 10.1 The mass of all operating items and crew members included in the aircraft dry operating mass shall be determined by weighing or by using standard masses. The influence of their position on the aircraft's CG shall be determined by the operator.

## **11 Mass of Passengers**

- 11.1 The mass of passengers including hand baggage shall be determined by actual weighing or by determining the mass in accordance with standard passenger masses.

## **12 Mass of Baggage, Cargo and Carry-On Specialist Equipment**

- 12.1 The actual mass shall be used for any baggage, cargo and carry-on specialist equipment with the exception of passenger and crew hand baggage.

## **13 Mass of Fuel**

- 13.1 Mass of the fuel load shall be determined by using the actual density or, if not known, the density calculated in accordance with a method specified in the operator's mass and balance programme.

## **14 Operator's Reporting System**

- 14.1 Each operator shall develop a reporting system and encourage employees to report any discrepancies in MBR, MCGS, loading schedule, aircraft loading or manifest preparation. These discrepancies may include errors in documentation or calculation, or issues with aircraft performance and handling qualities that indicate the aircraft mass or balance is not accurate.
- 14.2 Operators shall attempt to determine the cause of each discrepancy by considering airworthiness and flight operations aspect, and take appropriate corrective action.
- 14.3 The reporting system may be integrated to a reporting system that has been established in operational procedures that has been approved by CAAM (e.g. operations manual).

## **15 Operator's Aircraft Mass and Balance Programme Approval**

- 15.1 Mass and balance control of each aircraft shall be in compliance with an approved operator's aircraft mass and balance programme (MBP) in accordance with this CAD.
- 15.2 The MBP and any subsequent amendments shall be approved by CAAM.

- 15.3 The MBP shall be established in compliance with:
- a) the requirements issued by CAAM; and
  - b) the requirements for mass and balance control:
    - 1) issued by the holders of the type-certificate and supplemental type-certificate; and
    - 2) included in the document containing mass and balance data with acceptable methods, techniques and practices.
- 15.4 Each CAMO shall prepare a MBP document and submit to CAAM for approval.
- 15.5 The MBP document shall contain:
- a) a statement signed by the CAMO managing the aircraft airworthiness to the effect that the specified aircraft will comply to the MBP and that the MBP will be reviewed and updated as required;
  - b) applicable aircraft type, model, serial number, nationality and registration mark;  
*Note. – The list of applicable aircraft details maybe controlled separately and the reference to the list shall be specified in the MBP document. The list shall be approved by the CAMO manager and submitted to CAAM upon each revision.*
  - c) aircraft reweighing intervals;
  - d) aircraft weighing procedures;
  - e) aircraft weighing equipment;
  - f) the approved maintenance organisation engaged for aircraft weighing and the facility where the aircraft weighing activity will be performed;  
*Note. – CAAM may consider to issue one-off authorisation on case by case basis for aircraft weighing to be carried out at approved maintenance organisation that is not specified in the MBP document provided that proper justification is submitted.*
  - g) (reserved);
  - h) the procedure for issuance and certification of MBR for the aircraft;
  - i) the CAMO certifying MBR for the aircraft (if contracted);
  - j) qualification of MBR signatory (if applicable);
  - k) list of MBR signatory and their capability (if applicable);
  - l) the procedure for issuance/revision and certification of MCGS for the aircraft;
  - m) the CAMO certifying MCGS for the aircraft (if contracted);
  - n) qualification of MCGS signatory (if applicable);
  - o) list of MCGS signatory and their capability (if applicable);

- p) the physical loading system for the aircraft;
- q) the loading schedule used for the aircraft, and instruction for its use;
- r) the organisation that prepares the loading schedule;
- s) procedures for preparing or verifying the aircraft loading schedule, as applicable;
- t) mass and balance record system (including procedures to update and maintain a current and continuous record of the mass and CG of the operated aircraft);
- u) on-board mass and balance system hardware and software description and certification status (if applicable);
- v) the procedure to calibrate on-board mass and balance system equipment periodically (if applicable);
- w) training of personnel and operational considerations taken into account when using the on-board mass and balance system (if applicable);
- x) mass values used for crews including hand baggage;
- y) mass values used for passengers including hand baggage;
- z) passenger weighing survey plan and the statistical analysis method (if applicable);
- aa) mass values used for fuel;
- bb) operator mass and balance control reporting system;
- cc) the MBP document amendment procedures; and
- dd) any other information as required by CAAM.

15.6 Where an MBP information is generated by a computerised mass and balance control system, the CAMO shall:

- a) Develop and implement procedures to verify the accuracy of the output data at intervals not exceeding 6 months in the MBP;
- b) ensure that amendments to the input data are validated and incorporated properly into the system; and
- c) ensure the overall system is operating properly and the software updates are current.

15.7 The MBP shall be subject to periodic reviews (not exceeding one year) by the CAMO and amended accordingly.

## 16 Appendices

### 16.1 Appendix 1: Mass Values for Passengers and Crews

1. When determining the actual mass by weighing, passengers' personal belongings and hand baggage should be included. Such weighing should be conducted immediately prior to boarding the aircraft.
2. For aeroplane with a total number of passenger seats of 20 or more, when determining the mass of passengers by using standard mass values, the standard mass values in Table 1 below should be used. The standard mass values include hand baggage and the mass of any infant carried by an adult on one passenger seat. Infants occupying separate passenger seats should be considered as children for the purpose of this CAD.

<b>Passenger seats –</b>	<b>Adult</b>	<b>Children</b>
20 and more	77 kg	35 kg

**Table 1: Standard Mass For Passengers — Aeroplane with a Total Number of Passenger Seats of 20 or More**

3. On any flight identified as carrying a significant number of passengers whose masses, including hand baggage, are expected to significantly deviate from the standard passenger mass, the operator should determine the actual mass of such passengers by weighing or by adding an adequate mass increment.
4. Other standard masses (including when the total number of passenger seats available on an aircraft is 19 or less) may be used provided they are calculated on the basis of a detailed weighing survey plan and a reliable statistical analysis method is applied. The operator should advise CAAM about the intent of the passenger weighing survey and explain the survey plan in general terms. CAAM should be invited to observe the operator's survey plan. The revised standard mass values should only be used in circumstances comparable with those under which the survey was conducted. Where the revised standard masses exceed those in Table 1, then such higher values should be used.
5. The operator should use the following mass values for crew to determine the dry operating mass:
  - a) actual mass including any crew hand baggage; or
  - b) standard mass, including hand baggage, of 85 kg for flight crew members and 75 kg for cabin crew members.
6. For the purpose of this CAD:
  - a) adult means a person of an age of 12 years and above;



- b) child/children means persons who are of an age of two years and above but who are less than 12 years of age; and
- c) infant means a person under the age of two years.

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