



Australian Government

MEA731 Perform aircraft weight control activities

Release: 1

MEA731 Perform aircraft weight control activities

Modification History

Release	Comments
1	New unit of competency.

Application

This unit of competency describes the skills and knowledge required to perform aircraft weight control activities. Activities include weighing aircraft and calculating the centre of gravity (CG), developing and maintaining weighing records, and developing and updating applicable loading systems.

The unit applies to weight control activities for large and small aeroplanes and helicopters.

The unit involves activities associated with the privileges and responsibilities of an aircraft weight control authority appointed by the Civil Aviation Safety Authority (CASA) in accordance with Civil Aviation Order (CAO) 100.28.

This unit forms part of the CASA requirement for maintenance certification licences under Civil Aviation Safety Regulation (CASR) Part 66. Where a CASA licensing outcome is sought, users must refer to the licensing provisions in the MEA Aeroskills Companion Volume Implementation Guide.

Pre-requisite Unit

Nil.

Competency Field

Aeronautical engineering

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1. Determine requirement to weigh an aircraft

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

1.1 Determine regulatory, aircraft manufacturer, and organisational requirements for weighing aircraft

ELEMENTS**PERFORMANCE CRITERIA**

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| | 1.2 Identify modifications or repairs that necessitate the weighing of aircraft |
| | 1.3 Identify regulatory requirements for weighing the aircraft, and required time intervals for re-weighing it |
| | 1.4 Identify regulatory requirements for establishing fleet weight values, and required time intervals for re-establishing them |
| 2. Weigh aircraft | 2.1 Determine applicable weighing procedure |
| | 2.2 Assemble required support equipment and scales or load cells, and personnel qualified to perform the weighing activity |
| | 2.3 Ensure aircraft is prepared for weighing according to aircraft maintenance manuals, applicable data, and work health and safety (WHS) requirements |
| | 2.4 Ensure aircraft is placed on weighing equipment and set up in required weighing attitude while observing WHS requirements |
| | 2.5 Weigh aircraft according to specified procedure |
| | 2.6 Ensure aircraft is restored to operating configuration |
| 3. Calculate and assess centre of gravity | 3.1 Determine aircraft empty weight from weighing results |
| | 3.2 Use required moment arm data and mathematical formulas to calculate empty weight CG |
| | 3.3 Initiate remedial action according to regulatory requirements and organisational procedures if CG is outside certificated limits for aircraft type |
| 4. Update aircraft weighing record | 4.1 Update aircraft weighing summary with revised aircraft empty weight and empty weight CG data according to regulatory requirements and organisational procedures |
| | 4.2 Revise load data sheet as required to align with revised aircraft weighing summary weight and balance data |
| 5. Develop or update an aircraft loading system | 5.1 Determine fore and aft CG weight and balance extreme conditions, and revise load data sheet and loading system as required |

ELEMENTS**PERFORMANCE CRITERIA**

- 5.2 Calculate aircraft operational weight and operational weight CG for entry on to load data sheet and for use in developing or revising aircraft loading system
- 5.3 For small aircraft, develop/revise loading system using placards placed in aircraft or information in Aircraft Flight Manual
- 5.4 For large aircraft, calculate weight and balance data for required passenger and cargo loading requirements/configurations, and present data in a form that meets regulatory and organisational requirements for a system that guides and controls aircraft loading
- 5.5 Update or provide data for updating computers used for aircraft loading and weight and balance computations
- 5.6 Provide data to designated authority for the amendment of flight manual content relating to aircraft weight and balance

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Release 1. No equivalent unit.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=ce216c9c-04d5-4b3b-9bcf-4e81d0950371>

Assessment Requirements for MEA731 Perform aircraft weight control activities

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Performance Evidence

There must be evidence the candidate has completed the tasks outlined in the elements and performance criteria of this unit, which must include the ability to:

- perform weight control activities for at least one small and one large aircraft in line with regulatory and organisational requirements, including:
 - determining the requirements for weighing aircraft, including:
 - required equipment and weighing method for specific type of aircraft
 - manpower requirements
 - applying required regulations and manufacturer's data when weighing aircraft
 - using weighing results to calculate aircraft centre of gravity (CG)
 - performing calculations to provide data for the compilation of an aircraft weighing summary and load data sheet
 - compiling aircraft weighing summary with revised aircraft empty weight and empty weight CG
 - preparing or revising aircraft load data sheet
 - developing a loading system that meets regulatory and enterprise requirements
 - meeting the requirements of Civil Aviation Order (CAO) 100.28 for the grant of an aircraft weight control authority.

In the course of the above work, the candidate must:

- supervise configuration of aircraft for weighing while observing work health and safety (WHS) procedures and requirements
- ensure that scales or load cells to be used are serviceable and that calibration is valid and current
- supervise set-up of aircraft on scales or load cells in specified weighing attitude
- supervise restoration of aircraft to operational configuration after weighing is completed, while observing WHS procedures and requirements

- use the weight data and moment arm data in mathematical formula to calculate the empty weight CG
- review weighing summaries and load data sheets where weighing is not required to ensure that repair and modification weights and moments have been correctly used to update the aircraft weight and CG data
- use applicable data calculating operating weight of aircraft and operating weight CG
- calculate weight and balance extreme conditions
- determine the requirement for fixed ballast
- calculate fleet weight and fleet weight CG
- develop a loading system that meets regulatory and organisational requirements
- determine the requirement for removable ballast
- provide weight and balance data required to update flight manuals to designated authority.

Knowledge Evidence

There must be evidence the candidate has knowledge of:

- *regulatory requirements associated with aircraft weight and balance found in:*
 - Civil Aviation Regulation (CAR) 5 – Civil Aviation Orders – subregulation (1)
 - CAR 235 – Take-off and landing of aircraft – subregulations (1) and (7)
 - CAR 33B – Airworthiness authorities
 - CAO 100.7 Aircraft weighing requirements
 - CAO 100.28 Aircraft weight control authority
 - CAO 20.16.1 Air service operations – loading – general
- *data and instructions for aircraft weighing and performance of weight and balance calculations found in:*
 - CAO 100.7 Aircraft weighing requirements
 - FAA-H-8083-1B (or later revisions) Aircraft Weight and Balance Handbook
 - CASA Weight Control of Aircraft booklet
 - FAA-H-8083-30 Aviation Maintenance Technician Handbook – General, Chapter 4 – Aircraft Weight and Balance
 - aircraft maintenance manuals
 - manuals provided by the manufacturers of weighing equipment
 - enterprise aircraft weighing procedures
- *flight manual data related to aircraft weight and balance, including:*
 - stabiliser trim settings
 - fuel dump timing
 - maximum payload
- regulatory and organisational requirements and procedures for:
 - weighing aircraft
 - determining weight and balance extreme conditions
 - using plumb-bobs and levels, including serviceability checks

- compiling aircraft weighing summaries and load data sheets
- initiating remedial action if CG is outside certificated limits for aircraft type
- updating aircraft weighing summary with revised aircraft empty weight and empty weight CG data
- presenting weight data
- key features and requirements of documentation required to perform the work described in the performance evidence, including:
 - civil aviation orders
 - aircraft weighing summary
 - flight manuals
 - load data sheets
 - loading systems
 - certificates of airworthiness
 - aircraft manufacturer's data relative to weight control and preparation of aircraft for weighing
 - record of alterations
- weight control officer:
 - responsibilities and privileges
 - appointment by Civil Aviation Safety Authority (CASA)
 - preparation and approval of loading data
 - procedure for preparing data for amendment of flight manual loading information
- terminology required to perform tasks described in the performance evidence above:
 - datum
 - empty weight
 - maximum takeoff weight
 - ramp weight
 - maximum landing weight
 - zero fuel weight
 - specific gravity
 - loading system
 - fixed equipment
 - removable equipment
 - centre of gravity
 - centre of gravity limits
 - mean aerodynamic chord
 - unusable fuel
- principles and purpose of weight control and periodic re-weighing of aircraft
- principle of moments:
 - arm
 - moment

- moment index
- constant
- conversion factors:
 - imperial to SI units for length and mass
 - imperial and USA to SI units for liquid volume
- mechanical and electronic scales and electronic load cells:
 - accuracy
 - repeatability and calibration requirements
 - precautions during transport and operation
- preparation of aircraft for weighing:
 - WHS procedures and requirements
 - jacking and slinging
 - fuel tank draining
 - equipment lists
- consecutive and independent weighing requirements, including permissible discrepancies between weighings, and factors that affect accuracy of weighing
- basic principles of calculations involving plus and minus quantities
- empty weight:
 - method of determination
 - typical deductions and additions
 - standard weights for fuel, engine oil, passengers and crew
- moment index – calculations for weights fore and aft of the datum
- empty weight CG:
 - method of determination
 - conversion of CG position expressed in distance from datum to a percentage of MAC and vice versa
 - moment index
 - constant
- loading system:
 - cockpit and compartment placards
 - loading graphs and tables for disposable load
 - allowable weight – moment or weight-centre of gravity graphs and tables
 - floor plans
 - use of computers in loading systems
- uses of fixed and removable ballast
- purpose of record of alterations form and procedures for completing it
- aircraft reweighing requirements.

Assessment Conditions

The following conditions of assessment represent the requirements of the regulators (Australian Defence Force [ADF] and CASA) and maintenance stakeholders, and must be rigorously observed.

This unit may be assessed on the job, off the job, or a combination of both. Where assessment occurs off the job, the simulated working environment must reflect realistic workplace situations and conditions encountered when performing aircraft weight control activities.

Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

Candidate capability of providing the required performance and knowledge evidence must be established via the records in the Maintenance Management Competency Log. Where the individual does not have a Competency Log, evidence of capability can be gathered through direct observation, supervisor's reports, project work, samples and questioning.

Assessors of this unit must satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards.

Where the unit is to be used for CASA licensing purposes the assessor must also meet the criteria specified in the Civil Aviation Safety Regulation (CASR) Part 147 Manual of Standards.

Links

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