



Australian Government

MEAENG0005 Perform aircraft weight control activities

Release: 1

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Modification History

Release 1. Application changed. Elements and Performance Criteria changed. Foundation Skills made explicit. Assessment Requirements clarified. Supersedes and is equivalent to MEA731 Perform aircraft weight control activities.

Application

This unit 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.

The unit is used in workplaces that operate under the airworthiness regulatory systems of the Civil Aviation Safety Authority (CASA) and the Defence Aviation Safety Authority (DASA).

Any other relevant legislation, industry standards and codes of practice within Australia must be applied.

Competency Field

Aeronautical engineering

Elements and Performance Criteria

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
1. Determine requirement to weigh an aircraft	1.1 Determine regulatory, aircraft manufacturer, and organisational requirements for weighing aircraft 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

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
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 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 or 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 or 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

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	5.6 Provide data to designated authority for the amendment of flight manual content relating to aircraft weight and balance

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance but not explicit in the performance criteria.

- Numeracy skills to apply mathematical formulae and calculate and balance loads and weights.

Other foundation skills essential to performance are explicit in the performance criteria of this unit.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEA731 Perform aircraft weight control activities.

Links

Companion Volume implementation guides are found in VETNet -

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

Assessment Requirements for MEAENG0005 Perform aircraft weight control activities

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Performance Evidence

There must be evidence the candidate has completed all the tasks outlined in the elements and performance criteria of this unit, and demonstrated the ability to perform weight control activities for at least one small and one large aircraft in line with regulatory and organisational requirements, including:

- applying the required equipment and weighing method for the specific type of aircraft
- determining the manpower requirements for weighing aircraft.

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

- ensure that scales or load cells to be used are serviceable and that calibration is valid and current
- 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 centre of gravity (CG) data
- use applicable data calculating operating weight of aircraft and operating weight CG
- calculate fleet weight and fleet weight CG.
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Knowledge Evidence

There must be evidence the candidate has knowledge of:

- regulatory requirements associated with aircraft weight and balance
- data and instructions for aircraft weighing and performance of weight and balance calculations, including:
 - 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 aircraft weight control documentation, 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 weight control activities:
 - 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:
 - work health and safety (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 mean aerodynamic chord (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 and requirements for fixed and removable ballast
- purpose of record of alterations form and procedures for completing it
- aircraft reweighing requirements.
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Assessment Conditions

The following conditions of assessment represent the requirements of the regulators Defence Aviation Safety Authority (DASA) and (CASA) and maintenance stakeholders and must be rigorously observed.

Skills must have been demonstrated in the workplace or in a simulated environment that reflects workplace conditions and contingencies encountered when performing aircraft weight control activities. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - workplace procedures, manufacturing specifications, codes, standards, manuals, and reference materials
 - equipment required to perform the tasks outlined.

Evidence of tasks demonstrating competency must be recorded in a log of industrial experience and achievement.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

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