



Australian Government

MEAMEC0032 Apply basic aircraft design characteristics

Release: 1

MEAMEC0032 Apply basic aircraft design characteristics

Modification History

Release 1. Application changed. Elements and Performance Criteria changed. Foundation Skills made explicit. Assessment Requirements clarified. Supersedes and is equivalent to MEA153 Communicate aviation technical and maintenance management knowledge.

Application

This unit describes the skills and knowledge required to research, evaluate and apply basic knowledge of aerodynamic shape and structural methods to inform design for aeroplanes and rotary wing aircraft.

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.

Pre-requisite Unit

MEA107 Interpret and use aviation maintenance industry manuals and specifications

MEA154 Apply work health and safety practices in aviation maintenance

MEA158 Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

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. Research and evaluate aeroplane aerodynamic shape	1.1 Identify common wing plan forms and evaluate relative advantages and disadvantages for aerodynamic design 1.2 Identify common wing configurations and evaluate relative advantages and disadvantages for aerodynamic design 1.3 Discuss aerofoil characteristics in terms of aircraft performance with design project team 1.4 Discuss aeroplane stability and control in terms of aerodynamic

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	design with design project team 1.5 Identify types of primary and secondary flight control surfaces and discuss control balancing with design project team 1.6 Identify and compare types of lift augmentation device for meeting aerodynamic design requirements 1.7 Identify and show consideration for factors that affect an aircraft in subsonic and high-speed flight as part of design
2. Research and evaluate rotary wing aerodynamic design	2.1 Identify common rotor configurations and discuss their aerodynamic characteristics with design project team 2.2 Discuss rotary wing aircraft control and stability with design project team
3. Research and evaluate basic aircraft structural design	3.1 Identify and show consideration for loads acting on an aircraft structure 3.2 Identify and compare methods of construction of airframes and power plant support structures in meeting aerodynamic design requirements 3.3 Identify materials of construction commonly used in aircraft structures and identify their relative advantages and disadvantages in meeting aerodynamic design requirements 3.4 Identify and discuss fabrication methods commonly used in aircraft structure with design project team 3.5 Identify maintenance requirements for aircraft structure to assist in effective decision-making
4. Research and evaluate basic landing gear design and construction	4.1 Identify and discuss configurations of landing gear in terms of relative advantages and disadvantages with design project team 4.2 Identify and discuss the relative benefits of fixed and retractable landing gear with design project team 4.3 Identify and discuss construction materials used in landing gear components with design project team
5. Apply basic aircraft design characteristics	5.1 Determine an appropriate aerodynamic shape, given required aircraft use and performance characteristics, to meet aerodynamic design requirements 5.2 Propose appropriate method of construction, materials of construction and fabrication method to meet aerodynamic design

Elements	Performance Criteria
Elements describe the essential outcomes.	Performance criteria describe the performance needed to demonstrate achievement of the element.
	requirements 5.3 Propose appropriate landing gear configuration to meet aerodynamic design requirements

Foundation Skills

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

- Reading skills to interpret documentation, procedures and manufacturer's instructions.
- Writing skills to complete documentation.
- Numeracy skills to interpret and communicate data and technical information.

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 MEA341 Apply basic aircraft design characteristics.

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 MEAMEC0032 Apply basic aircraft design characteristics

Modification History

Release 1. Application changed. Performance Criteria changed. Foundation Skills made explicit. Range of Conditions removed, and relevant information moved to Assessment Requirements. Assessment Requirements clarified. Supersedes and is equivalent to MEA341 Apply basic aircraft design characteristics.

Performance Evidence

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

- develop a basic aircraft design or repair proposal that shows consideration of the following areas of aerodynamic design:
 - the effects of aerodynamic shape and types of flight controls on aircraft performance, stability and control
 - the influence of rotor design on rotary wing aircraft stability and control
 - the loads acting on aircraft structure, types of structure and related maintenance requirements
 - the types and designs of landing gear and their applications.
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Knowledge Evidence

There must be evidence the candidate has knowledge of:

- theory of flight, including rotary wing
- loads acting on aircraft structures and structural fatigue, including rotary wing
- aircraft design characteristics, including rotary wing
- common wing plan forms, including
 - straight
 - tapered
 - swept
 - delta
 - variable geometry
 - canard
- common wing configurations, including:
 - mid-wing
 - low wing
 - high wing
- common rotor configurations, including:

- main rotor and tail rotor
- two main rotors
- two blade main rotor
- multiple blade main rotor
- hinged main rotor blades
- types of aircraft structure
- methods of aircraft construction
- materials of construction
- structural maintenance requirements
- use of non-destructive testing (NDT) in structural maintenance
- basic landing gear design characteristics and configurations, including:
 - tricycle
 - tail wheel
 - tail skid
 - floats
 - skis
 - helicopter skids
 - helicopter wheels and brakes
- use of ultra-high strength steels in landing gear design and related maintenance requirements.
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Assessment Conditions

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

Skills must have been demonstrated under routine supervision in the workplace or in a simulated environment that reflects workplace conditions and contingencies encountered, such as a training environment equipped to provide exposure to the relevant aircraft design characteristics and to theory of flight. The following conditions must be met for this unit:

- use of suitable facilities, equipment and resources, including:
 - tools, equipment, materials and documentation
 - workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials relevant to applying basic aircraft design characteristics.

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.

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