



Australian Government

Department of Education, Employment and Workplace Relations

MEA341A Apply basic aircraft design characteristics

Revision Number: 2

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Modification History

Minor formatting and editorial changes made. Prerequisite unit version codes updated.

Unit Descriptor

This unit of competency is part of Diploma and Advanced Diploma training pathways. It covers the aerodynamic shape and structure of aircraft.

Application of the Unit

This unit requires application of basic knowledge of aerodynamic shape and structural methods.

Applications include aeroplanes and rotary wing aircraft

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEA101B	Interpret occupational health and safety practices in aviation maintenance
MEA107B	Interpret and use aviation maintenance industry manuals and specifications
MEA109B	Perform basic hand skills, standard trade practices and fundamentals in aviation maintenance

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

1. Research and evaluate aeroplane aerodynamic shape
 - 1.1. **Common wing plan forms** are identified and relative advantages and disadvantages are evaluated
 - 1.2. **Common wing configurations** are identified and relative advantages and disadvantages are identified
 - 1.3. Aerofoil characteristics are discussed in terms of aircraft performance
 - 1.4. Aeroplane stability and control is discussed in terms of aerodynamic design
 - 1.5. Types of primary and secondary flight control surfaces are identified and control balancing is discussed
 - 1.6. Types of lift augmentation device are identified and compared
 - 1.7. Factors that affect an aircraft in subsonic and high speed flight are identified
2. Research and evaluate rotary wing aerodynamic design
 - 2.1. **Common rotor configurations** are identified and their aerodynamic characteristics discussed
 - 2.2. Rotary wing aircraft control and stability are discussed
3. Research and evaluate basic aircraft structural design
 - 3.1. The loads acting on an aircraft structure are identified
 - 3.2. The methods of construction of airframes and power plant support structures are identified and compared
 - 3.3. The materials of construction commonly used in aircraft structures are identified and their relative advantages and disadvantages are discussed
 - 3.4. Fabrication methods commonly used in aircraft structure are identified and discussed
 - 3.5. Maintenance requirements for aircraft structure are identified
4. Research and evaluate basic landing gear design and construction
 - 4.1. The **configurations of landing gear** are identified and discussed in terms of relative advantages and disadvantages
 - 4.2. The relative benefits of fixed and retractable landing gear are identified and discussed
 - 4.3. Construction materials used in landing gear components are identified and discussed
5. Apply basic aircraft design characteristics
 - 5.1. Given required aircraft use and performance characteristics, an appropriate aerodynamic shape is determined
 - 5.2. An appropriate method of construction, materials of construction and fabrication method are proposed

5.3. An appropriate landing gear configuration is proposed

Required Skills and Knowledge

Required skills

Look for evidence that confirms skills in:

- applying basic aircraft design characteristics

Required knowledge

Look for evidence that confirms 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
- types of aircraft structure
- methods of aircraft construction
- materials of construction
- structural maintenance requirements
- use of NDT in structural maintenance
- basic landing gear design characteristics
- use of ultra high strength steels in landing gear design and related maintenance requirements

Evidence Guide

The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment	A person who demonstrates competency in this unit must be able to identify and apply basic aircraft design characteristics. Competency in this unit cannot be claimed until all prerequisites have been satisfied.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	Assessors must be satisfied that the candidate can competently and consistently perform all elements of the unit as specified by the criteria, including required knowledge, and be capable of applying the competency in new and different situations and contexts. Assessors should gather a range of evidence that is valid, sufficient, current and authentic. Evidence can be gathered through a variety of ways including direct observation, teacher's reports, project work, samples and questioning. Questioning techniques should not require language, literacy and numeracy skills beyond those required in this unit of competency.
Context of and specific resources for assessment	This unit may be assessed off the job in a training environment equipped to provide exposure to the relevant aircraft design characteristics and to theory of flight. The candidate must have access to all tools, equipment, materials and documentation required and must be permitted to refer to any relevant workplace procedures, product and manufacturing specifications, codes, standards, manuals and reference materials. The assessment environment should not disadvantage the candidate.
Method of assessment	
Guidance information for assessment	

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Application	Application of this unit may relate to: individual or team-related activities
Common wing plan forms	Common wing plan forms may include: - straight - tapered - swept - delta - variable geometry - canard
Common wing configurations	Common wing configurations may include: - mid-wing - low wing - high wing
Common rotor configurations	Common rotor configurations may include: - main rotor and tail rotor - two main rotors - two blade main rotor - multiple blade main rotor - hinged main rotor blades - rigid rotor
Configurations of landing gear	Configurations of landing gear may include: - tricycle - tail wheel - tail skid - floats - skis - helicopter skids - helicopter wheels and brakes

Unit Sector(s)

Aeronautical engineering

Competency field

Co-requisite units

Not applicable