



Australian Government

Department of Education, Employment and Workplace Relations

MEA421A Fabricate advanced structural components for aircraft

Release: 1

MEA421A Fabricate advanced structural components for aircraft

Modification History

New unit.

Unit Descriptor

This unit of competency is part of the Aeroskills Structures Maintenance Certificate IV training pathway. It covers the competencies required to fabricate advanced structural components for aircraft in accordance with specifications and drawings. The unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA.

Application of the Unit

This unit requires application of hand skills and the use of drawings, specifications and maintenance publications to fabricate advanced structural components involving complex and multiple curves and section shapes from aluminium alloys and steel alloys at various temper. Applications include components for fixed and rotary wing aircraft.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

- MEA101B Interpret occupational health and safety practices in aviation maintenance
- MEA103B Plan and organise aviation maintenance work activity
- MEA105C Apply quality standards applicable to aviation maintenance processes
- MEA107B Interpret and use aviation maintenance industry manuals and specifications
- MEA108B Complete aviation maintenance industry documentation
- 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

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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Elements and Performance Criteria

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| 1 Interpret specifications and organise materials | <ul style="list-style-type: none"> 1.1 Specifications and drawings are used to determine material requirements 1.2 Equipment use is planned by determining the procedure for fabricating component 1.3 Material is correctly identified in accordance with specifications 1.4 All materials and equipment are organised |
| 2 Prepare material and tooling | <ul style="list-style-type: none"> 2.1 Dimensions to material is translated in accordance with specifications 2.2 Cutting and forming equipment are prepared and adjusted to ensure accuracy of fabrication 2.3 Material is cut according to specifications ensuring minimisation of wastage and maintenance of surplus material identification 2.4 Material requiring special treatment is prepared for the appropriate processes 2.5 Solution treatment of materials is carried out in accordance with approved procedures and specifications |
| 3 Form material | <ul style="list-style-type: none"> 3.1 Appropriate forming procedure is determined ensuring that specifications are met and the most suitable forming method is selected 3.2 Templates are manufactured, where required, by forming method 3.3 Press tools are designed and manufactured, where required, by forming method |

- 3.4 Forming equipment is operated correctly and safely to form material in accordance with drawings and specifications
- 3.5 Hand forming is performed accurately, where necessary
- 4 Hand correct fabricated components
 - 4.1 Components are checked for irregularities and correction requirements determined
 - 4.2 Irregularities are removed to meet required dimensions and specifications
- 5 Inspect components
 - 5.1 Fabricated components are inspected to confirm dimensional accuracy and specifications are met
 - 5.2 Checking fixtures are used, where appropriate, to ensure requirements are met
 - 5.3 Components requiring special or further treatment are prepared for the appropriate processes
 - 5.4 Completed components are tagged or identified, as required

Required Skills and Knowledge

Look for evidence that confirms knowledge of:

- aircraft construction principles
- causes of structural fatigue and preventative measures
- structural corrosion and preventative measures
- aircraft structural drawings and repair scheme drawings
- material specifications for aluminium alloys and steel alloys used in aircraft structure
- structural material identification by markings and numbering systems
- material identification by chemical, electrical and mechanical methods
- material storage requirements
- hardware types and specifications
- identification of hardware
- sealants used in aircraft structure
- chemical surface treatments
- electroplating
- paints and finishes
- flat pattern development
- design and manufacture of templates
- design and manufacture of press tools
- methods for folding complex and nested sections
- machinery used for stretching, shrinking, bending, cutting, drilling, rolling, wheeling and folding
- use of forming blocks, templates and press tools to form components
- OHS precautions associated with fabrication of aircraft structural components
- MSDS
- PPE

Look for evidence that confirms skills in:

- applying relevant OHS procedures, including the use of MSDS and applicable items of PPE
- the use of approved maintenance documentation and aircraft publications relating to aircraft structure
- identifying various aircraft metals and their basic metallurgy properties by interpretation of markings, numbering systems or visual, chemical or mechanical means
- handling and storing aircraft metals to industry standards
- identifying aircraft structural assembly fasteners by interpretation of markings, numbering systems, size, shape and colour
- fabrication of aircraft structural components and parts by:
 - correctly interpreting drawings (including third angle projection, isometric, sectional formats and hand sketches)
 - developing component flat pattern using basic drawing tools, geometric drawing processes, parallel, radial and triangulation methods, calculating and applying bend allowance/deduction/setback (an understanding of flat pattern development)

terminology is required)

- using appropriate hand tools, machines (stretching, shrinking, bending, cutting, drilling, rolling, wheeling and folding), forming blocks, templates and presses to form/produce dished, domed, curved components, bent/angled (L, Z, U, hat) sections and lightening holes, flanges and joggles
- assembling component parts using appropriate hand and machine tools and standard aircraft fasteners to industry standards
- applying appropriate metal heat treatment processes
- applying appropriate metal surface treatments

Evidence Guide

<p>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.</p>	
<p>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to apply hand skills and use drawings, specifications, maintenance publications and applicable machinery to fabricate advanced structural components from a range of aircraft metals while applying all relevant safety precautions.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>The underlying skills inherent in this unit should be transferable across a range of aircraft applications. It is essential that procedures take into account all safety precautions and quality requirements. Skill and knowledge application must include flat pattern development and other standard practices associated with forming of material.</p> <p>Evidence of knowledge and skills associated with the broad range of structural fabrication techniques and their application to different materials used in aircraft manufacture will be required to supplement evidence of ability to fabricate components.</p> <p>A person cannot be assessed as competent until it can be demonstrated to the satisfaction of the workplace assessor that the relevant elements of the unit of competency are being achieved under routine supervision on a representative range of structural fabrication tasks. This shall be established via the records in the Log of Industrial Experience and Achievement or, where appropriate, an equivalent Industry Evidence Guide.</p>
<p>Context of and specific resources for assessment</p>	<p>Competency should be assessed in the work environment, or simulated work environment, using tools and equipment specified by aircraft maintenance manuals. It is expected that general purpose tools and test equipment found in most routine situations would be used where appropriate.</p>
<p>Method of assessment</p>	
<p>Guidance information for assessment</p>	

Range Statement

<p>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.</p>	
<p>Components</p>	<p>Components are to be fabricated:</p> <ul style="list-style-type: none"> using materials comprising various types of sheet metal used in aircraft manufacture, including aluminium alloys and structural steel alloys across a range of temper
<p>Machinery processes</p>	<p>Machinery processes are to include:</p> <ul style="list-style-type: none"> bending, cutting, rolling, shrinking and stretching
<p>Procedures and requirements</p>	<p>Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise</p>

Unit Sector(s)

Aviation maintenance

Custom Content Section

Not applicable.