Australian Government

Department of Education, Employment and Workplace Relations

MEA339B Inspect, repair and maintain aircraft structures

Revision Number: 1

MEA339B Inspect, repair and maintain aircraft structures

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit is part of the Mechanical Certificate IV AME training pathway. It covers the competencies required to inspect, repair and maintain aircraft structure. The competency elements and performance criteria also cover a significant portion of those required for Unit MEA311B Inspect and repair/modify aircraft structures. Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen Aircraft Maintenance Engineer Licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines

Application of the Unit

Application of the unit	This unit requires application of procedures and techniques associated with the inspection and maintenance of aircraft structure, and with the performance of a limited range of metal and composite repairs. Applications include the performance of structural maintenance activities on fixed or rotary wing aircraft on the flight line or in the hangar.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MEA304C	Remove and install non-pressurised aircraft structural and non-structural components
	OR	
	MEA317C	Remove and install pressurised aircraft structural and non-structural components

Employability Skills Information

Employability skills	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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Inspect aircraft structure	1.1. ***Relevant maintenance documentation*** is used to identify specific inspection requirements. 1.2. Appropriate preparation and access to the aircraft structure is undertaken to allow for proper inspection in accordance with maintenance documentation. 1.3. ***Aircraft structure*** is visually or physically checked for signs of deformation defects or damage in accordance with maintenance documentation and approved procedures. 1.4. ***Damage or defects*** are assessed against damage or wear limits specified by structural repair manual or other approved data to determine if repair or replacement is required. 1.5. Maintenance documentation is completed and processed in accordance with standard enterprise procedures.
2. Prepare to undertake repair	2.1. Extent of damage is correctly assessed to assist in determining repair procedure. 2.2. Appropriate repair scheme is identified in accordance with structural repair manual and/or approved data. 2.3. ***Specialist advice is obtained*** in establishing an approved repair scheme where a standard repair scheme cannot be identified or damage is out of limits. 2.4. All materials and equipment required are organised.
3. Repair and maintain aircraft structure	3.1. ***Structural repairs*** are performed, in accordance with approved repair scheme, ensuring that aircraft standard practices are used and process requirements are carried out. 3.2. Preventative maintenance techniques are employed to preserve the integrity of aircraft structure. 3.3. Work area is cleaned of all waste material or contaminants. 3.4. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Look for evidence that confirms skills in:

- Applying all relevant occupational health and safety (OHS) procedures including the use of Material Safety Data Sheets (MSDS) and selection and use of applicable items of personal protective equipment (PPE)
- Demonstrating appropriate cleaning procedures to enable structure inspection.
- Demonstrating correct inspection procedures, in particular pressurised aircraft, in accordance with aircraft and procedures manuals.
- Identifying damage to aircraft metallic (ferrous and non-ferrous) structures and/or components by way of impact, fatigue or the various types of corrosion.
- Inspecting damage and assessing composite components/structures.
- Identifying various aircraft metals and their basic properties.
- Identifying composite materials used in aircraft construction, associated safety precautions and hazards.
- Correctly interpreting repair scheme drawings (including third angle projection, isometric, sectional formats and hand sketches).
- Using appropriate hand tools and machines including riveting equipment, drilling equipment, aligning tools and material fasteners (grip pins).
- Applying correct removal, installation and repair techniques for:
  - a range of rivets (blind and solid) using hand, squeeze and pneumatic situations
  - a range of close tolerance fasteners (standard and oversize - hilocks, taper locks), including hole preparation
  - threaded devices including internal and external thread cutting, Helicoil inserts and damaged stud replacement
  - hardware assembled by close tolerance fits using heat, cooling and force methods, including bearings, bushes and inserts
- Performing a range of metal structure and composite material repair techniques including:
  - metal scab patch, flush, splice, lap and formed section repair
  - composite external patch, scarf and stepped repairs
  - metal to metal and metal to composite bonding
- Applying structural corrosion removal/treatment techniques.
- Restoring aircraft structure sealing and surface finishes.

Required knowledge

Look for evidence that confirms knowledge of:

- Applicable occupational health and safety (OHS) procedures, including the use of

REQUIRED SKILLS AND KNOWLEDGE

MSDS and PPE

- Construction methods and materials used in:
  - fuselage sections
  - wing sections
  - engine nacelles and mounts
  - windows and window frames
  - doors, locks and access panels in pressurised and non-pressurised aircraft
- Definition of structural terms, i.e. failsafe, stress, strain, shear, cycles
- Potential causes of structural failure.
- Non-destructive inspection methods and application of the various techniques.
- Construction methods of, and assessing common defects in, aircraft plastic transparencies.
- Basic constructional features of, and assessing common defects in, glass windscreens.
- The various forms of structural corrosion, stating the causes and structural effects of corrosion on aircraft.
- The terms associated with composite materials.
- Requirements for handling and storing aircraft metals and composite materials including sealing agents, to industry standards.
- Means of identifying aircraft structural assembly fasteners (metal and composite) by interpretation of markings, numbering systems, size, shape and colour.
- Assessment of structural damage:
  - types and classes of mechanical damage
  - types of corrosion and determining the extent of damage
  - relevant documentation and manuals
  - damage limits and repair schemes for metallic and non-metallic structure
- Procedures for the fabrication and fitment of metal repairs:
  - scab patch
  - flush patch
  - splice
  - lap
  - formed section
- Corrosion removal and passivation
- Procedures for performing composite repairs:
  - external patch
  - scarf patch
  - stepped repairs
- Repair of integral fuel tanks and sealing of faying surfaces including specific OHS and PPE requirements
- Surface finishes and methods of restoration including specific OHS and PPE

REQUIRED SKILLS AND KNOWLEDGE
requirements • How to obtain MSDS • Relevant maintenance and structural repair manuals • Relevant regulatory requirements and standard procedures

Evidence Guide

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 inspect and maintain aircraft structure and perform a range of metal and composite structural repair tasks that are representative of the scope of the listed variables in accordance with relevant maintenance documentation while applying all relevant OH&S procedures and standard processes.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	The underlying skills inherent in this unit should be transferable across a range of inspection, testing and repair applications associated with aircraft maintenance. It is essential that the procedures take into account all aircraft and personal safety precautions relating to aircraft structure. Evidence of transferability of skills and knowledge related to inspection, testing and repair of aircraft structure is essential. This may be demonstrated through application across a number of aircraft systems or aircraft types. Ability to interpret inspection and repair procedures and specifications and apply them in practice is critical. The application of the procedures should also clearly indicate knowledge of structural flight loads and aerodynamic requirements. 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 across the variables in the Range Statement as follows: • Inspection and/or testing of at least one item from each of groups 1 to 6 • Recognition of each type of damage 7 to 10 • One repair task from each of groups 11 to 18 This shall be established via the records in the Log of Industrial Experience and Achievement.
Context of and specific resources for assessment	Competency should be assessed in the work environment or simulated work environment using tools and

EVIDENCE GUIDE	
	equipment specified in maintenance documentation. It is also expected that general purpose tools and test equipment found in most routine situations would be used where appropriate.
Method of assessment	
Guidance information for assessment	

Range Statement

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.	
Note	Range statements listed below are numbered to facilitate specification of the assessment requirements included in the Evidence Guide.
Inspection and repair of aircraft structure	*Inspection of aircraft structure includes*: 1. Non-ferrous and ferrous alloys and composite (FRP) materials used in aircraft construction 2. Structural fastening and attachment hardware and/or devices 3. Seals, sealants 4. Glass, moulded plastics 5. Application of NDI techniques 6. Doors, hinges and locking mechanisms for damage/misalignment. *Damage or defects may include*: 7. Impact damage 8. Fatigue cracking 9. Corrosion 10. Delamination of composites and bonded structures *Structural repairs may include the following*: 11. Remove corrosion by chemical and mechanical methods 12. Restore protective coatings 13. Apply sealants and jointing compounds 14. Freehand precision hole generation 15. Remove and install structural hardware and fastening devices 16. Remove and replace bushes, bearings and

RANGE STATEMENT	
	bearing surfaces 17. Metal scab patch, flush, splice, lap and formed section repair 18. Composite external patch, scarf and stepped repairs.
Specialist advice	*Specialist advice is obtained from*: • Supervisors • Specialist structures personnel
Documentation	*Relevant maintenance documentation includes*: • Servicing Schedules • Maintenance manuals • Applicable Defence regulations and instructions
Application	Application of this unit may relate to: • Scheduled or unscheduled maintenance including special inspections required after events such as heavy landings, overstress or flight through heavy turbulence. • Individual or team related activities
Procedures and requirements	Refer to industry standard procedures specified by manufacturers, regulatory authorities or the enterprise

Unit Sector(s)

Unit sector	

Competency field

Competency field	Aviation maintenance

Co-requisite units

Co-requisite units		