



Australian Government

Department of Education, Employment and Workplace Relations

MEA363A Inspect, repair and maintain structures and related components of non- pressurised small aircraft

Release: 1

MEA363A Inspect, repair and maintain structures and related components of non-pressurised small aircraft

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency is part of the Mechanical Certificate IV AME training pathway. It covers the competencies required to inspect, repair and maintain small aircraft structure and the removal and installation of related non-structural components such as internal trim, seats and emergency equipment. The competency elements and performance criteria also cover a significant portion of those required for units MEA304C Remove and install non-pressurised aircraft structural and non-structural components, MEA311C Inspect and repair/modify aircraft structures and MEA339B Inspect, repair and maintain 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.
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Application of the Unit

Application of the unit	This unit requires application of procedures and techniques associated with the inspection and maintenance of aircraft structures, and with the performance of a limited range of metal and composite repairs. Also required is an application of procedures and techniques associated with the removal and installation of related structural and non-structural components. Applications include the performance of structural maintenance activities and component removal and installation on non-pressurised fixed or rotary wing aircraft on the flight line or in the hangar.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units		
	MEA101B	Interpret occupational health and safety practices in aviation maintenance
	MEA103B	Plan and organise aviation maintenance work activity
	MEA105B	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

Employability skills	This unit contains employability skills.
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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

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
4. Remove components	4.1. Structure is supported and prepared in accordance with the applicable maintenance manual to ensure personnel safety and freedom from damage to aircraft or component during component removal 4.2. Component removal is carried out in accordance with the applicable maintenance manual

ELEMENT	PERFORMANCE CRITERIA
	4.3. Required maintenance documentation is completed and processed in accordance with standard enterprise procedures 4.4. Where applicable, removed components are tagged and prepared for transport in accordance with specified procedures
5. Install components	5.1. Structural and/or non-structural components to be installed are checked to confirm correct part numbers, serviceability and modification status 5.2. Component installation is carried out in accordance with the applicable maintenance manual 5.3. Support/safety equipment is removed at an appropriate time to ensure personnel safety and freedom from structural damage 5.4. 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 selection and use of material safety data sheets (MSDS) and applicable items of personal protective equipment
- demonstrating appropriate cleaning procedures to enable structure inspection
- demonstrating correct inspection procedures 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 - hillocks and 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
- using relevant maintenance documentation and aircraft manuals to:
 - remove and install structural and non-structural components
 - remove and install aircraft interior fittings

REQUIRED SKILLS AND KNOWLEDGE

- remove and install doors, door seals, windows and transparent panels
- checking and adjusting all doors and access panels including locking mechanisms
- removing and installing emergency equipment

Required knowledge

Look for evidence that confirms knowledge of:

- applicable OHS procedures, including the use of personal protective equipment and MSDS
- construction methods and materials used in:
 - fuselage sections
 - wing sections
 - engine nacelles and mounts
 - windows and window frames
 - doors, locks and access panels
- definition of structural terms, i.e. failsafe, stress, strain, shear and 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 and types of 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
- structural and non-structural component methods of attachment, faying surface treatment and fuel tank sealing
- non-pressurised fuselage aircraft doors, related seals and window and transparent panel attachment methods and sealing
- aircraft interior fittings (trim, linings, seats and floor panels) construction and attachment methods
- the location and attachment or stowage methods for emergency equipment
- assessment of structural damage:
 - types and classes of mechanical damage
 - types of corrosion and determining the extent of damage
 - relevant documentation and manuals

REQUIRED SKILLS AND KNOWLEDGE

- 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 personal protective equipment requirements
- surface finishes and methods of restoration, including specific OHS and personal protective equipment 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, perform a range of metal and composite structural repair tasks and remove and install structural and non-structural components that are representative of the scope of the listed variables in accordance with relevant maintenance documentation while applying all relevant OHS 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 in Groups 7 to 10
- one repair task from each of Groups 11 to 18
- one removal and installation task from each of Groups 19 to 23.

This shall be established via the records in the Log of Industrial Experience and Achievement.

Context of and specific resources for

Competency should be assessed in the work environment

EVIDENCE GUIDE	
assessment	or simulated work environment using tools and 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 and sealants
4. Glass and moulded plastics
5. Application of non-destructive testing (NDT) 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 bearing surfaces
17. Metal scab patch, flush, splice, lap and formed section repair
18. Composite external patch, scarf and stepped repairs

RANGE STATEMENT	
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
Removable components of structure	Removable components of structures are those that are installed using bolts and/or screws. Where component removal and installation requires the removal and installation of rivets the applicable unit is MEA311C Inspect and repair/modify aircraft structures Components may include: 19. Removable components of wings, tail booms, pylons, empennage, skids, fairings and nacelles 20. Removable components or sections of non-pressurised fuselages 21. Non-pressurised fuselage entry, cargo, access doors and associated seals (including checking and adjustment of all doors and access panels and associated locking mechanisms) 22. Non-pressurised fuselage windows and transparent panels 23. Floor panels
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	
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Competency field

Competency field	Aviation maintenance
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Co-requisite units

Co-requisite units		