



Australian Government

MEA339C Inspect, repair and maintain aircraft structures

Release 2

MEA339C Inspect, repair and maintain aircraft structures

Modification History

Release 2 – Bolted composite repairs added to Knowledge, Skills and Range Statement - equivalent.

Release 1 - Knowledge requirements and Range Statement revised to include additional inspection coverage - equivalent to previous version.

Unit Descriptor

This unit of competency is part of the Mechanical Certificate IV (Aircraft Maintenance Stream) training pathway. It covers the competencies required to inspect, repair and maintain aircraft structures.

The competency Elements and Performance Criteria also cover a significant portion of those required for unit MEA311D Inspect and repair/modify aircraft structures. The unit is used in workplaces that operate under the airworthiness regulatory systems of the ADF and CASA. Where a CASA licensing outcome is sought this unit forms part of the CASA requirement for the granting of the chosen maintenance certification licence under CASR Part 66, in accordance with the licensing provisions in Section 3, Assessment Guidelines.

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

Refer to unit descriptor

Pre-Requisites

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

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

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|-------------------------------|---|
| 1 Inspect aircraft structure | <p>1.1 <i>Relevant maintenance documentation</i> is used to identify specific inspection requirements</p> <p>1.2 Appropriate preparation and access to the aircraft structure is undertaken to allow for proper inspection in accordance with maintenance documentation</p> <p>1.3 <i>Aircraft structure</i> is visually or physically checked for signs of deformation defects or damage in accordance with maintenance documentation and approved procedures</p> <p>1.4 <i>Damage or defects</i> are assessed against damage or wear limits specified by structural repair manual or other approved data to determine if repair or replacement is required</p> <p>1.5 Maintenance documentation is completed and processed in accordance with standard enterprise procedures</p> |
| 2 Prepare to undertake repair | <p>2.1 Extent of damage is correctly assessed to assist in determining repair procedure</p> <p>2.2 Appropriate repair scheme is identified in accordance with structural repair manual and/or approved data</p> <p>2.3 <i>Specialist advice</i> is obtained in establishing an approved repair scheme where a standard repair scheme cannot be identified or damage is out of limits</p> <p>2.4 All materials and equipment required are organised</p> |

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

Look for evidence that confirms knowledge of:

- applicable OHS procedures, including the use of 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. safe life, damage tolerant, failsafe, stress, strain, shear and cycles
- inspection requirements for metal and composite structure, including:
 - ageing aircraft inspection requirements
 - safe life structure
 - damage tolerant structure
 - fail safe structure
- potential causes of structural failure
- NDT 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
- bolted 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 requirements
- how to obtain MSDS
- relevant maintenance and structural repair manuals
- relevant regulatory requirements and standard procedures

Look for evidence that confirms skills in:

- applying all relevant OHS procedures, including the use of MSDS and selection and use of applicable items of 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 – 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
 - bolted repairs to composite skin
 - metal to metal and metal to composite bonding
- applying structural corrosion removal/treatment techniques
- restoring aircraft structure sealing and surface finishes

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 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 8 • Recognition of each type of damage in groups 9 to 12 • One repair task from each of groups 13 to 20. 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 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	Individuals being assessed who have already attained MEA311D Inspect and repair/modify aircraft structures, or MEA363B Inspect, repair and maintain structures and related components of non-pressurised small aircraft, will have met the requirements of the Performance Criteria and Range Statement variables for Elements 1 to 3 for common Range Statement variables. Those who have attained MEA401C Maintain aircraft structure/components, will have met the Performance Criteria and Range Statement variables requirements for Element 1. Log of Industrial Experience and Achievement records relating to MEA311D Inspect and repair/modify aircraft structures, MEA363B Inspect, repair and maintain structures and related components of non-pressurised small aircraft, and MEA401C Maintain aircraft structure/components, may be accepted as also meeting the evidence requirements for this unit in the applicable areas.

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 NDT techniques 6. Doors, hinges and locking mechanisms for damage/misalignment 7. Inspections applicable to each of safe life, damage tolerant and fail safe structure relevant to enterprise 8. Ageing aircraft inspection programs
Damage or defects	Damage or defects may include: 9. Impact damage 10. Fatigue cracking 11. Corrosion 12. Delamination of composites and bonded structures
Structural repairs	Structural repairs may include the following: 13. Remove corrosion by chemical and mechanical methods 14. Restore protective coatings 15. Apply sealants and jointing compounds 16. Freehand precision hole generation 17. Remove and install structural hardware and fastening devices

	18. Remove and replace bushes, bearings and bearing surfaces 19. Metal scab patch, flush, splice, lap and formed section repair 20. Composite external patch, scarf, stepped and bolted repairs
Specialist advice	Specialist advice is obtained from: • supervisors • specialist structures personnel
Relevant maintenance 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)

Aviation maintenance

Custom Content Section

Not applicable.