



Australian Government

PMBTECH405 Repair damaged fibre-composites structures

Release: 1

PMBTECH405 Repair damaged fibre-composites structures

Modification History

Release 1. Supersedes and is equivalent to PMBTECH405B Repair damaged fibre-composites structures

Application

This unit of competency covers the skills and knowledge required to repair composite products with cosmetic or structural damage.

This unit of competency applies to advanced operators, technicians or those in similar roles who are required to identify, diagnose, and make repairs to products and solve process and materials and problems.

This unit of competency applies to a person applying specialised theoretical and technical knowledge and well developed skills in situations that require autonomy, discretion and judgement. The person may work alone or as a member of a team or group and will work in liaison with other shift team members, team leader and supervisor, as appropriate.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

PMBPROD247 Hand lay up composites

Competency Field

Technical

Unit Sector

Not applicable

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | |
|--|--|
| 1 Assess the product and damage | 1.1 Determine scope of repair required, such as either to original manufacturer specifications or other needs |
| | 1.2 Select appropriate repair technique |

- | | | | |
|---|----------------------------|-----|--|
| | | 1.3 | Consult testing reports giving recommended areas to be repaired and extent of damage if available |
| 2 | Make repairs | 2.1 | Examine the accessibility of the damaged section(s) |
| | | 2.2 | Identify cosmetic repair areas and structural repair areas |
| | | 2.3 | Consult original manufacturer's manual or structural repairs manual where available |
| | | 2.4 | Consult product release documentation and insurance company requirements if available |
| | | 2.5 | Prepare and clean up the product prior to commencing the actual repair |
| | | 2.6 | Make partial mould or prepare insert moulding as required for the type of repair |
| | | 2.7 | Expose bonding surfaces, and/or structural anchor points, using tapered sanding techniques as determined |
| | | 2.8 | Rebuild the damaged area and finish surfaces to required standard |
| | | 2.9 | Take samples for testing and inclusion with documentation as required |
| 3 | Document the repair | 3.1 | Raise repair documentation for costing, legal and insurance requirements as required |
| | | 3.2 | Complete other documentation and records required |

Foundation Skills

This section describes those required skills (language, literacy and numeracy) that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Regulatory framework The latest version of all legislation, regulations, industry codes of practice and Australian/international standards, or the version specified by the local regulatory authority, must be used.

Applicable legislation, regulations, standards and codes of practice include:

- health, safety and environmental (HSE) legislation, regulations and codes of practice relevant to the workplace, manual handling, hazardous materials
- Australian/international standards relevant to the materials being used and products being made
- any relevant licence and certification requirements.

All operations to which this unit applies are subject to stringent HSE requirements, which may be imposed through state/territory or federal legislation, and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and such requirements the legislative requirements take precedence.

Procedures All operations must be performed in accordance with relevant procedures.

Procedures are written, verbal, visual, computer-based or in some other form, and include one or any combination of:

- manufacturer supplied structural repair manuals
- release documentation, legal and insurance procedures for fibre reinforced plastic
- technical specifications
- technical drawings
- emergency procedures
- work instructions
- standard operating procedures (SOPs)
- safe work method statements (SWMS)
- formulas/recipes
- batch sheets
- temporary instructions
- any similar instructions provided for the smooth running of the plant.

Tools and equipment

Tools and equipment include:

- hand tools used in the process
- hoists/lifting equipment not requiring any special permits or licences
- manual handling aids, such as hand carts and trolleys
- relevant personal protective equipment (PPE).

Hazards

Hazards must be identified and controlled. Identifying hazards requires consideration of:

- fumes/vapours
- weight, shape, volume of materials to be handled
- hazardous products and materials
- rotational equipment or vibration
- sharp edges, protrusions or obstructions
- slippery surfaces, spills or leaks
- smoke, dust or other atmospheric hazards
- high temperatures
- electricity
- gas
- gases and liquids under pressure
- structural hazards
- equipment failures
- machinery, equipment and product mass
- other hazards that might arise.

Unit Mapping Information

Release 1. Supersedes and is equivalent to PMBTECH405B Repair damaged fibre-composites structures

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090>

Assessment Requirements for PMBTECH405 Repair damaged fibre-composites structures

Modification History

Release 1. Supersedes and is equivalent to PMBTECH405B Repair damaged fibre-composites structures

Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and demonstrate the ability to:

- read and interpret insurance documentation, technical information, product specifications, material labels and safety data sheets (SDS)
- assess product damage, accessibility repair options and costs
- determine materials and process that will meet repair requirements, including:
 - cosmetic damage
 - structural damage
- confirm suitability of combination of materials and process to meet requirements
- prepare for and make repairs
- apply technical knowledge to recognise, anticipate and rectify quality, materials and process problems within area of responsibility
- make adjustments to remedy faults and non-conformity
- identify hazards and apply relevant hazard controls
- communicate effectively with team/work group and supervisors
- take samples
- complete workplace records.

Knowledge Evidence

Must provide evidence that demonstrates knowledge relevant to their job sufficient to fulfil their job role, including knowledge of:

- repair techniques, including:
 - surface and part preparation
 - laminating, reinforcing and strengthening techniques
 - filling and joining techniques
 - surface preparation for paint, gelcoat and flowcoat
 - detailing for customer delivery
- rectification procedures for repair of marine, automotive, aerospace, industrial and architectural mouldings
- factors which may affect product quality or production output and appropriate remedies

- characteristics of materials and their behaviour in relation to process conditions and stages of production
- critical materials properties and process variables in relation to the process requirements and the end product
- material and equipment conditions which may lead to out-of-specification production
- impact of variations in raw materials and equipment operation in relation to final product
- changes to materials at various stages of production
- quality requirements at each production stage
- routine and non-routine problems that may arise, the range of possible causes and appropriate actions
- organisation procedures relevant to the work environment/job role
- hierarchy of control
- hazards that may arise in the job/work environment and:
 - their possible causes
 - potential consequences
 - appropriate risk controls.

Assessment Conditions

- The unit should be assessed holistically and the judgement of competence shall be based on a holistic assessment of the evidence.
- In all plants it may be appropriate to assess this unit concurrently with units such as:
 - teamwork
 - communication
- Where the assessee does not currently possess evidence of competency in *PMBPROD247 Hand lay up composites*, it may be co-assessed with this unit.
- The collection of performance evidence:
 - should occur over a range of situations which include typical disruptions to normal, smooth operation of an operating plant
 - will typically include a supervisor/third-party report or other evidence, focusing on consistent performance and problem recognition and solving. A supervisor/third-party report must be prepared by someone who has a direct, relevant, current relationship with the person being assessed and who is in a position to form a judgement on workplace performance relevant to the unit of competency
 - must include the use of an appropriate industrial item of equipment requiring demonstration of operation, start and stop procedures and responding to problems
 - may use industry-based simulation for all or part of the unit particularly where safety, lack of opportunity or significant cost is an issue.
- Assessment should occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions. This must cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

- Assessment in a simulated environment should use evidence collected from demonstration of skills and one or more of:
 - walk-throughs
 - pilot plant operation
 - industry-based case studies/scenarios
 - ‘what ifs’.
- Knowledge evidence may be collected concurrently with performance evidence or through an independent process, such as workbooks, written assessments or interviews.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required, including relevant workplace procedures, product and manufacturing specifications associated with this unit.
- The regulatory framework will be reflected in workplace policies and procedures and is not required to be independently assessed.
- Foundation skills are integral to competent performance of the unit and should not be assessed separately.
- Assessors must satisfy the assessor competency requirements that are in place at the time of the assessment as set by the VET regulator.
- In addition the assessor or anyone acting in subject matter expert role in assessment shall demonstrate both technical competency and currency. If the assessor cannot demonstrate technical competency and currency they shall assess with a subject matter expert who does meet these requirements.
- Technical competence can be demonstrated through one or more of:
 - relevant VET or other qualification/Statement of Attainment
 - appropriate workplace experience undertaking the type of work being assessed under routine and non-routine conditions
 - appropriate workplace experience supervising/evaluating the type of work being assessed under routine and non-routine conditions
- Currency can be demonstrated through one or more of:
 - being currently employed undertaking the type of work being assessed
 - being employed by the organisation undertaking the type of work being assessed and having maintained currency in accordance with that organisation’s policies and procedures
 - having consulted/had contact with an organisation undertaking the type of work being assessed within the last twelve months, the consultation/contact being related to assessment
 - conducting on the job training/assessments of the type of work being assessed
 - being an active member of a relevant professional body and participating in activities relevant to the assessment of this type of work.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=932aacef-7947-4c80-acc6-593719fe4090>