



Australian Government

Department of Education, Employment and Workplace Relations

CPCCBL3010A Construct masonry arches

Release: 1

CPCCBL3010A Construct masonry arches

Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit of competency specifies the outcomes required to construct masonry arches within walls and above columns or attached piers. It includes the preparation, set out and construction of masonry walls and arches.

Application of the Unit

Application of the unit This unit of competency supports achievement of skills for laying bricks or blocks to construct arches, which includes working with others and as a member of a team.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	CPCCOHS2001A Apply OHS requirements, policies and procedures in the construction industry
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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. Prepare for work.	<p>1.1. Work instructions, including plans, specifications, quality requirements and operational details, are obtained, confirmed and applied from relevant information to determine the required brick and blocklaying tasks.</p> <p>1.2. Safety (OHS) requirements are followed in accordance with safety plans and policies.</p> <p>1.3. Signage and barricade requirements are identified and implemented.</p> <p>1.4. Plant, tools and equipment selected to carry out tasks are consistent with job requirements, checked for serviceability, and any faults are rectified or reported prior to commencement.</p> <p>1.5. Material quantity requirements are calculated in accordance with plans, specifications and quality requirements.</p> <p>1.6. Materials appropriate to the work application are identified, obtained, prepared, safely handled and located ready for use.</p> <p>1.7. Environmental requirements are identified for the project in accordance with environmental plans and statutory and regulatory authority obligations, and are applied.</p>
2. Set out first course.	<p>2.1. Location and line of brickwork/blockwork wall are set out on concrete footing/slab to job drawings.</p> <p>2.2. Span of masonry arch is determined from prepared allotted arch centre plus 4mm.</p> <p>2.3. Arch spans are set out to location for first course.</p>
3. Construct wall to arch level.	<p>3.1. Mortar mix is prepared and bricks/blocks are laid to form wall to set out.</p> <p>3.2. All work is carried out to specifications and standards.</p> <p>3.3. Gauge of abutting walls is maintained within standard tolerance at each course level.</p> <p>3.4. Plumb and alignment of vertical wall face are maintained.</p> <p>3.5. Bricks are cut.</p> <p>3.6. Bricks/blocks are laid level and to line over length of wall.</p> <p>3.7. Abutment jambs/piers are laid vertical up to</p>

ELEMENT**PERFORMANCE CRITERIA**

	springing line.
	3.8.Bricks/blocks are laid in stretcher bond to springing line of arch with perpendicular joints maintained in vertical line.
4. Construct arch centre.	4.1.Arch centre is set out and curve is drawn up in accordance with specifications and plan. 4.2.Plan is transferred to material and cut to shape.
5. Set up arch centre.	5.1.Height to springing line is determined and height to crown of arch is confirmed to be within standard tolerance. 5.2.Height of toms and wedges or adjustable metal props are determined to set up and support timber arch centre. 5.3.Supports are adjusted to ensure arch centre is level at right angles to wall face and level across springing line. 5.4.Props, toms, packers and wedges are located for easy removal. 5.5.Position of central key brick/block is established for gauged arch and tape used to mark gauge.
6. Cut and lay bricks/blocks to form arch.	6.1.Bricks and blocks are cut and laid on centre to form arch to specifications. 6.2.Joints are maintained to equal size and parallel on the extrados of an arch. 6.3.Same size wedge shape is maintained on face. 6.4.Centreline of key brick/block wedge is maintained through vertical centre line of arch. 6.5.Even joint thickness is maintained around extrados for cut brickwork and blockwork. 6.6.All bricks are cut and laid to maintain even joints. 6.7.All joints are struck evenly to depth and shape to specifications.
7. Clean up.	7.1.Work area is cleared and materials disposed of, reused or recycled in accordance with legislation, regulations, codes of practice and job specification. 7.2.Plant, tools and equipment are cleaned, checked, maintained and stored in accordance with manufacturer recommendations and standard work practices.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills for this unit are:

- communication skills to:
 - determine requirements
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - follow instructions
 - read and interpret:
 - documentation from a variety of sources
 - plans, specifications and drawings
 - report faults
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals
- numeracy skills to apply measurements and make calculations
- organisational skills, including the ability to plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technological skills to:
 - use a range of mobile technology, such as two-way radio and mobile phones
 - voice and hand signals to access and understand site-specific instructions.

Required knowledge

Required knowledge for this unit is:

- brick and block expansion and growth, control and articulation joints
- brick bond patterns, types of joints and finishing
- characteristics and applications of materials for masonry arch construction
- construction and arch terminology
- geometric calculations and drawing
- job safety analysis (JSA) and safe work method statements
- material safety data sheets (MSDS)
- materials storage and environmentally friendly waste management
- plans, specifications and drawings
- processes for the calculation of material requirements
- quality requirements

REQUIRED SKILLS AND KNOWLEDGE

- types of masonry arches and techniques of construction
- types, characteristics, uses and limitations of plant, tools and equipment
- workplace and equipment safety requirements.

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

This unit of competency could be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- locate, interpret and apply relevant information, standards and specifications
- comply with site safety plan and OHS legislation, regulations and codes of practice applicable to workplace operations
- comply with organisational policies and procedures, including quality requirements
- safely and effectively use tools, plant and equipment
- communicate and work effectively and safely with others
- as a minimum, construct five arches to specification of which three are to be in brick and two in block, including bull's eye, segmental and Gothic with the construction of the arch centre for one of the arches.

Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the

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mandatory task requirements

- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at

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the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

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.

Information includes:

- diagrams or sketches
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions where specified
- memos
- MSDS
- organisation work specifications and requirements
- plans and specifications
- regulatory and legislative requirements pertaining to constructing masonry arches
- relevant Australian standards

RANGE STATEMENT

Bricklaying and blocklaying tasks:

Safety (OHS) is to be in accordance with legislation, regulations, codes of practice, organisational safety policies and procedures, and project safety plan and may include:

- safe work procedures related to constructing masonry arches
- signage
- verbal or written and graphical instructions
- work bulletins
- work schedules.
- include all clay brick (wire cut/pressed) and concrete block (hollow and solid) masonry work
- may be performed on a new construction site, an existing structure being renovated or extended or an existing structure subject to service restoration or maintenance.
- emergency procedures, including emergency shutdown and stopping, extinguishing fires, organisational first aid requirements and evacuation
- handling of materials
- hazard control
- hazardous materials and substances
- safe operating procedures, including the conduct of operational risk assessment and treatments associated with:
 - earth leakage boxes
 - lighting
 - power cables, including overhead service trays, cables and conduits
 - restricted access barriers
 - surrounding structures
 - traffic control
 - trip hazards
 - underground services, including water, gas, electricity and communications
 - work site visitors and the public
 - working at heights
 - working in confined spaces
 - working in proximity to others
 - working with dangerous materials
- organisational first aid
- personal protective clothing and equipment prescribed under legislation, regulations and

RANGE STATEMENT

Tools and equipment:

- workplace policies and practices
- use of firefighting equipment
- use of tools and equipment
- workplace environment and safety.
- include:
 - adjustable metal props
 - bolsters
 - buckets
 - builder's squares
 - builders' lines
 - concrete mixers
 - dumpy levels
 - hammers (brickies, club and scutch)
 - hoses
 - jig saws
 - jointing tools
 - line blocks
 - line pins
 - mason's squares
 - masonry saws
 - measuring tapes and rules
 - mortar boards
 - packers and wedges
 - plumb rules
 - margin or raking tools
 - profiles
 - shovels
 - spirit levels
 - straight edges
 - string lines
 - timber and centre
 - timber toms
 - trowels
 - wheelbarrows
- may include:
 - scaffolds
 - forklifts
 - pallet trolleys

RANGE STATEMENT

	<ul style="list-style-type: none"> • brick buggies • small petrol or diesel engines, compressors or mixers.
<i>Quality requirements</i> include relevant regulations, including:	<ul style="list-style-type: none"> • Australian standards • internal company quality policy and standards • manufacturer specifications, where specified • workplace operations and procedures.
<i>Materials</i> include:	<ul style="list-style-type: none"> • aggregates • cement and lime • clay bricks • masonry blocks • plywood • reinforcing materials • timber • waterproofing materials.
<i>Environmental requirements</i> include:	<ul style="list-style-type: none"> • clean-up protection • noise and dust • vibration • waste management.
<i>Statutory and regulatory authorities</i> include:	<ul style="list-style-type: none"> • federal, state and local authorities administering applicable Acts, regulations and codes of practice.
<i>Masonry arches</i> include:	<ul style="list-style-type: none"> • arch rings gauged and bonded • bull's eye and wheel • camber/square • elliptical • four centred • Gothic (equilateral, Lancet and modified) • multi-ring arches • segmental • Tudor.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area