



Australian Government

Department of Education, Employment and Workplace Relations

PMC553051B Produce structural precast concrete

Revision Number: 1

PMC553051B Produce structural precast concrete

Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit of competency covers the production of structural precast and prestressed concrete products such as beams and girders. It involves preparing the mould and assembling the reinforcing, ensuring quality of concrete, monitoring the process and removing the work piece from the mould.
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Application of the Unit

Application of the unit	This unit of competency applies to operators in a concrete plant who are responsible for producing precast structural concrete components for a variety of structural uses. This competency includes the operation of all ancillary equipment. It includes reinforcement preparation, and the operation of casting and vibrating equipment. Reinforcement and vibration at this level of competency may be quite complex (e.g. formwork techniques, deflected strands, jig reinforcement, end block reinforcement). This unit of competency includes: • placement of reinforcing, placement and stressing of strands • compaction using form vibrators, vibrating tables and immersion vibrators as appropriate to the enterprise • curing by water, steam, membrane or other heat sources as appropriate to the enterprise • specialised formwork techniques which could involve polystyrene blocks to lighten heavy products • deflected strands • jiggling reinforcement • end block reinforcement • welding. This competency is typically performed by an experienced operator, leading hand or supervisor, and would generally involve engineer consultation.
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Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	
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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 mould for casting	1.1. Check casting schedule and job specification 1.2. Clean and oil moulds according to requirements 1.3. Check for mould damage and repair as necessary
2. Assemble reinforcement cage	2.1. Lift preassembled reinforcing sections into mould using good occupational health and safety (OHS) practice 2.2. Assemble additional steel to complete cage to drawings and job specification 2.3. Fit additional items, such as base plates, tie plates and lifting devices, according to work instructions 2.4. Fit hold-ups and hold-downs as appropriate 2.5. Place voids or ducts according to work specifications 2.6. Run prestressing strands through reinforcing cages as required 2.7. Set up guards and comply with OHS requirements for stressing 2.8. Tension strands to extension dimensions and/or gauge readings according to works or engineer instructions 2.9. Recheck reinforcing cage is in correct position and adjust as necessary
3. Close mould and test vibrators	3.1. Lift mould sides and additional parts into position and secure to specification 3.2. Fit any additional items as required 3.3. Seal mould 3.4. Fit vibrators to start positions 3.5. Test run before casting commences
4. Pour concrete	4.1. Begin casting in accordance with work instructions 4.2. Move vibrators and time vibration as required 4.3. Screed top surface flat in preparation for final finish if required 4.4. Patch product as required 4.5. Clean mould and worksite in accordance with OHS requirements
5. Control concrete quality	5.1. Test raw materials as required 5.2. Prepare test cylinders and samples as required 5.3. Monitor and control concrete mix to keep within

ELEMENT	PERFORMANCE CRITERIA
	specifications 5.4. Update all records and file all records and supplier certificates in appropriate place 5.5. Raise non-conformance reports as required
6. Cure product	6.1. Cover and cure mould and test cylinders in accordance with standard procedures and work instructions 6.2. Monitor curing to achieve specified stripping strength
7. Strip and store product	7.1. Test samples to ensure specific strength has been achieved 7.2. Remove mould sides and store ready for cleaning 7.3. If applicable, de-stress in accordance with work procedures and sequences 7.4. Ensure unit is lifted according to work instructions and moved to store, supported only on points designated on the drawings
8. Respond to problems	8.1. Identify possible routine and non-routine problems in the equipment or process 8.2. Determine problems needing action 8.3. Determine possible fault causes 8.4. Rectify problem using appropriate solution within area of responsibility 8.5. Report problems outside area of responsibility to designated person
9. Control hazards	9.1. Identify hazards from the job to be done 9.2. Identify other hazards in the work area 9.3. Assess the risks arising from those hazards 9.4. Implement measures to control those risks in line with procedures

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Required skills

Required skills include:

- recognising conditions which will lead to out of specification product and taking appropriate action
- implementing the enterprise's procedures within time constraints and in a manner relevant to the correct use of the equipment
- conveying information relevant to the operation clearly and effectively
- maintaining appropriate levels of quality assurance
- reading and numeracy to interpret workplace documents and technical information

Required knowledge

Required knowledge includes:

- principles of concrete mixing (if mixed by operator)
- principles of veneer adhesion
- principles of concrete finishing
- causes of mould wear
- results of using worn moulds
- problems resulting from mould leakage
- reading steel plans
- predicting final shape/dimension based on bar size/type and bend radius
- principles of reinforcing concrete to specification
- principles of fitting accessories to specification
- principles of concrete product finishing
- reinforcing materials
- design factors
- fabrication methodologies
- effect of water-cement ratio on product
- importance of vibration on compaction
- required concrete cover of reinforcing
- hazards from critical stages of prestressing reinforcement (placement, stressing, de-stressing, cutting, etc)
- concrete sampling and testing procedures
- non-conformance procedures
- underlying causes of faults such as precipitated by:
 - material inconsistencies
 - mixing irregularities

REQUIRED SKILLS AND KNOWLEDGE

- application
- finishing difficulties concrete
- mould anomalies
- casting/operating conditions
- concrete mixture errors
- vibration
- aggregate size
- reinforcing design/placement
- setting/curing time/rate

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	The unit will be assessed in as holistic a manner as is practical and may be integrated with the assessment of other relevant units of competency.
Critical aspects for assessment and evidence required to demonstrate competency in this unit	It is essential that the process be understood and that the importance of critical material properties and design characteristics is known. Competence must be demonstrated in the ability to recognise and analyse potential situations requiring action and then in implementing appropriate corrective action. Consistent performance should be demonstrated. In particular look to see that: • products are made consistently in minimum time and with minimum patching • finishing is within specification/example • good OHS practice is used consistently. Competence must be demonstrated in the operation of all ancillary equipment to the level required for this unit of competency.
Context of and specific resources for assessment	Assessment will require access to an operating plant over an extended period of time, or a suitable method of gathering evidence of operating ability over a range of situations. Assessment will occur over a range of situations which will include disruptions to normal, smooth operation. Simulation or case studies/scenarios may be required to allow for timely assessment of parts of this unit of competency. Simulation should be based on the actual plant and will include 'walk-throughs' of the relevant competency components. A bank of scenarios/case studies/what ifs and questions will be required to probe the reasoning behind observable actions.
Method of assessment	Individual enterprises may choose to add prerequisites and co-requisites relevant to their processes.
Guidance information for	Assessment processes and techniques must be culturally

EVIDENCE GUIDE	
assessment	appropriate and appropriate to the language and literacy capacity of the candidate and the work being performed.

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.

Procedures

All operations are performed in accordance with standard procedures and work instructions

Typical problems

Typical problems may include:

- slippage, breaking of tensioned strands
- mould leakage
- compaction in areas with high reinforcement content (end blocks and haunches)
- compact product with tight bends/clearances
- polystyrene blocks (which may be used in formwork to lighten products) may float to surface on vibration
- polystyrene blocks may move sideways undetected, reducing wall thickness
- adjustment to take account of variables such as weather
- variations in cement/water ratio

OHS

All operations are subject to stringent OHS requirements and these must not be compromised at any time. Where there is an apparent conflict between performance criteria and OHS requirements, the OHS requirements take precedence

Unit Sector(s)

Unit sector

Operational/technical

Competency field

Competency field	
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Co-requisite units

Co-requisite units		