

Title	Manufacture prestressed concrete beams and columns		
Level	3	Credits	25

Purpose	People credited with this unit standard are able to: prepare, set up prestressing equipment, moulds and storage areas, carry out the pre-pour process, place and test concrete, and finish concrete; for prestressed concrete beam and column manufacture; and cure, destress and demould, lift and store, carry out post-pour checks and remedial work, and carry out delivery processes; for prestressed concrete beams and columns; and complete work operations.
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Classification	Concrete > Precast Concrete
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Available grade	Achieved
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Guidance Information

- 1 Definitions**

Specifications refers to documented instructions (oral, written, graphic) and may include any of the following – manufacturer’s specifications, recommendations or technical data sheets; material specifications; specifications from a specialist source such as an architect, designer, engineer or a supervisor; site or work specific requirements.

Workplace practice refers to the documented procedures specific to a workplace which set out the standard and required practices of that workplace.
- 2 Credit for this unit standard indicates compliance with industry practice.** *Industry practice* refers to the ability to demonstrate knowledge and skills that reflect the productivity, uniformity, finish quality and material economies currently accepted within industry.
- 3 Legislation and publications relevant to this unit standard include:** Health and Safety in Employment Act 1992 and Health and Safety in Employment Regulations 1995; Building Act 2004; NZS 3109:1997 *Concrete construction*, and NZS 3114:1987 *Specification for concrete surface finishes*, available from Standards New Zealand (<http://www.standards.co.nz>).

Approved Code of Practice for the Safe Handling, Transportation and Erection of Pre-cast Concrete, available from Department of Labour (<http://www.osh.dol.govt.nz/order/catalogue/pdf/concrete-ac.pdf>).

Outcomes and performance criteria

Outcome 1

Prepare to manufacture prestressed concrete beams and columns.

Performance criteria

- 1.1 Job requirements for manufacture of prestressed concrete beams and columns are identified in accordance with specifications and shop drawings.
- 1.2 Job requirements for manufacture of prestressed concrete beams and columns are identified in accordance with production programme, including timeframe of job in relation to rate of manufacture and available labour hours.
- 1.3 Tools and equipment for manufacture of prestressed concrete beams and columns are selected in accordance with job requirements.
- 1.4 Casting area for manufacture of prestressed concrete beams and columns is selected in accordance with job requirements.
- Range considerations – size of work area needed, where units will be stored and/or stockpiled, safety in and around moulds, environmental factors, other work operations.
- 1.5 Strand for manufacture of prestressed concrete beams and columns is selected in accordance with job requirements and specifications.
- Range verification of certification, size, grade.

Outcome 2

Set up prestressing equipment, moulds and storage areas for prestressed concrete beam and column manufacture.

Performance criteria

- 2.1 Prestressing equipment for manufacture of prestressed concrete beams and columns is set up in accordance with job requirements, specifications and workplace practice.
- 2.2 Moulds for prestressed concrete beams and columns are set up in accordance with job requirements, specifications and workplace practice.
- 2.3 Areas for manufacture and storage of prestressed concrete beams and columns are set up in accordance with job requirements, specifications and workplace practice.

Outcome 3

Carry out the pre-pour process for prestressed concrete beam and column manufacture.

Performance criteria

3.1 The pre-pour process for prestressed concrete beams and columns is carried out in accordance with job requirements, specifications and workplace practice.

Range identification of strand type and size, identification of reinforcing type and size, gathering of materials, initial setup of mould, placement of strand in mould, initial placement of reinforcing in the mould, safety devices in place before stressing of strand, pre-loading of strand to specified tension, checking of strand pre-load extension lengths, full specified loading of strand, final check of strand extension lengths, lock off pre-stressing equipment, tying off reinforcing, placement of bar chairs on strand and reinforcing, final setup of mould, securing of remaining bar chairs, placement of cast in items, securing of final mould attachments, pre-pour quality assurance procedures.

Outcome 4

Place and test concrete for prestressed concrete beam and column manufacture.

Performance criteria

4.1 Concrete for prestressed concrete beam and column manufacture is placed in accordance with NZS 3109:1997, job requirements, specifications and workplace practice.

Range factors to consider – segregation, layers, screeding, continuity of supply, vibration method, protection of strand.

4.2 Concrete for prestressed concrete beam and column manufacture is tested in accordance with NZS 3109:1997 and specifications.

Outcome 5

Finish concrete for prestressed concrete beam and column manufacture.

Performance criteria

5.1 Prestressed concrete beams and columns are finished in accordance with NZS 3114:1987 and workplace practice.

Range from NZS 3114:1987 – three of F series, two of U series.

Outcome 6

Cure, destress and demould prestressed concrete beams and columns.

Performance criteria

- 6.1 Prestressed concrete beams and columns are cured in accordance with NZS 3109:1997, specifications and workplace practice.
- Range two different curing methods, including testing procedures related to the curing.
- 6.2 Prestressed concrete beams and columns are destressed in accordance with job and prestressing equipment requirements, and workplace practice.
- 6.3 Prestressed concrete beams and columns are demoulded in accordance with job requirements and workplace practice.

Outcome 7

Lift and store prestressed concrete beams and columns.

Performance criteria

- 7.1 Prestressed concrete beams and columns are lifted safely and in accordance with specifications, workplace practice and manufacturer's specifications.
- Range equipment used, lifting techniques.
- 7.2 Prestressed concrete beams and columns are stored in accordance with specifications and workplace practice.
- Range factors to consider – area suitable for high loadings, height capacity, delivery sequence versus storage sequence, dunnage points, pre-cambre.

Outcome 8

Carry out post-pour checks and remedial work for prestressed concrete beams and columns.

Performance criteria

- 8.1 Prestressed concrete beams and columns are checked for possible defects in accordance with workplace practice.
- Range method, documentation required.
- 8.2 Remedial work on defects in prestressed concrete beams and columns is carried out in accordance with specifications and workplace practice.
- Range three defects.

Outcome 9

Carry out delivery processes for prestressed concrete beams and columns.

Performance criteria

- 9.1 Standard forms associated with delivering prestressed concrete beams and columns are confirmed as completed in accordance with workplace practice.
- 9.2 Loading of prestressed concrete beams and columns for delivery is carried out in accordance with specifications and workplace practice.

Range loading, placement of dunnage, securing load on vehicle.

Outcome 10

Complete work operations.

Performance criteria

- 10.1 All operations are safely completed, workplace and equipment are cleaned in accordance with workplace practice, including environmental safety requirements; and routine maintenance is carried out in accordance with workplace practice.

Replacement information	This unit standard, unit standard 26527, and unit standard 26528 replaced unit standard 12036.
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This unit standard is expiring. Assessment against the standard must take place by the last date for assessment set out below.

Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	20 August 2010	31 December 2023
Review	2	27 January 2022	31 December 2023

Consent and Moderation Requirements (CMR) reference	0048
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.