

## Demonstrate knowledge of concrete materials technology

**Level** 4

**Credits** 8

**Purpose** People credited with this unit standard are able to demonstrate knowledge of: New Zealand Standards applicable to materials used in concrete production; concrete mix design principles; and tests for concrete and raw materials.

**Subfield** Concrete

**Domain** Concrete Technology

**Status** Registered

**Status date** 11 December 2009

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**Planned review date** 31 December 2014

**Entry information** Open.

**Accreditation** Evaluation of documentation and visit by NZQA and industry.

**Standard setting body (SSB)** Building and Construction Industry Training Organisation

**Accreditation and Moderation Action Plan (AMAP) reference** 0048

This AMAP can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

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### Special notes

- 1 Definition  
*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 that reflects the productivity, uniformity, finish quality and material economies currently accepted within industry.
- 3 Publications relevant to this unit standard include:  
AS 1478.1-2000 *Chemical admixtures for concrete, mortar and grout – Admixtures for concrete*, available from Standards Association of Australia  
(<http://www.saiglobal.com/shop/Script/search.asp>);

NZS 3101 Parts 1 and 2:1995 *Concrete structures standard – The design of concrete structures*, NZS 3104:2003 *Specification for Concrete Production*, NZS 3109:1997 *Concrete construction*, NZS 3111:1986 *Methods of test for water and aggregate for concrete*, NZS 3112.1:1986 *Methods of test for concrete – tests relating to fresh concrete*, NZS 3121:1986 *Specification for water and aggregate for concrete*, NZS 3122:2009 *Specification for Portland and blended cements (General and special purpose)*, NZS 3604:1999 *Timber Framed Buildings*, and NZMP 4212:1998 *Glossary of building terminology*, available from Standards New Zealand (<http://www.standards.co.nz>).

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## Elements and performance criteria

### Element 1

Demonstrate knowledge of standards applicable to materials used in concrete production.

#### Performance criteria

- 1.1 Standards applicable to concrete production are identified in terms of their relationship to specific areas of production.
- Range AS 1478.1-2000, NZS 3101, NZS 3104, NZS 3109, NZS 3111, NZS 3112, NZS 3121, NZS 3122, NZS 3604.
- 1.2 Industry terminology is defined in accordance with NZS 3101, NZS 3104, NZS 3109, NZS 3112, and NZS 3604.
- Range compressive strength, flexural and indirect tensile strength, durability, workability, cohesiveness, bleeding, setting time, slump at plant, slump target, slump actual, admixture, agitator, nominal maximum aggregate size, batching plant, sampling representative, sampling snatch, sampling random, sampling selected, compaction, curing.

### Element 2

Demonstrate knowledge of concrete mix design principles.

#### Performance criteria

- 2.1 Description outlines the properties of concrete in accordance with NZS 3112.
- Range properties – plastic, hardened.
- 2.2 Description outlines the relationship between water:cement ratio and the strength of hardened concrete.
- 2.3 Description outlines the impact of ratios of materials on properties of the mix.

- 2.4 Description outlines the purpose, application and effects of admixtures in concrete in accordance with AS 1478.1-2000.
- Range air entrainers, water reducers, set controllers (accelerators and retarders), plasticisers, shrinkage inhibitors.
- 2.5 Description outlines the relationship between workability and aggregate size and shape in terms of effect on mix design.
- 2.6 Mix proportions for specific concrete applications are described in accordance with workplace practice.
- Range standard, structural, block fill, flowable fill, pump, self-compacting, kerb mix, decorative (coloured and exposed aggregate).

### Element 3

Demonstrate knowledge of tests for concrete and raw materials.

#### Performance criteria

- 3.1 Description outlines methods for testing materials used in the production of concrete in accordance with NZS 3111 to ensure compliance with NZS 3121.
- 3.2 Description outlines methods for testing concrete in accordance with NZS 3112.

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#### Please note

Providers must be accredited by NZQA, or an inter-institutional body with delegated authority for quality assurance, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be accredited by NZQA before they can register credits from assessment against unit standards.

Accredited providers and Industry Training Organisations assessing against unit standards must engage with the moderation system that applies to those standards.

Accreditation requirements and an outline of the moderation system that applies to this standard are outlined in the Accreditation and Moderation Action Plan (AMAP). The AMAP also includes useful information about special requirements for organisations wishing to develop education and training programmes, such as minimum qualifications for tutors and assessors, and special resource requirements.

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#### Comments on this unit standard

Please contact the Building and Construction Industry Training Organisation [national.office@bcito.org.nz](mailto:national.office@bcito.org.nz) if you wish to suggest changes to the content of this unit standard.