

Demonstrate knowledge of concrete materials and the concrete production process

Level 2

Credits 8

Purpose People credited with this unit standard are able to demonstrate knowledge of: cement, aggregates, water, additives, admixtures, and supplementary cementitious materials, as used in concrete; and the concrete production process.

Subfield Concrete

Domain Concrete Core Skills

Status Registered

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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>.

Special notes

- 1 Definitions
Additives refers to materials, such as pigments or fibres that are added to the concrete mix.
Admixtures refers to chemicals added to concrete that modify the hardened or plastic properties of concrete (e.g. a set retarder or a water reducer).
Aggregates includes sand or gravel used to make concrete.
- 2 Reference material relevant to this unit standard includes:
The Guide to Concrete Construction, (Cement and Concrete Association of New Zealand (CCANZ), 1999), available from <https://secure1.iconz.co.nz/cca/shop/index.asp>.

Elements and performance criteria

Element 1

Demonstrate knowledge of cement as used in concrete.

Performance criteria

- 1.1 The role of cement as a component of concrete is described.
- 1.2 The five main ingredients of ordinary portland cement are identified, and cement production is described in terms of process.
- 1.3 The purposes of types of cement are described in terms of end use of concrete.

Range calcium carbonate, silica, aluminium, iron oxide, gypsum.
- 1.4 The transportation and storage of cement is described in terms of maintenance of quality.

Element 2

Demonstrate knowledge of aggregates as used in concrete.

Performance criteria

- 2.1 The role of aggregate as a component of concrete is described.
- 2.2 Aggregate properties are described in terms of the aggregate's application in concrete.

Range size, shape, grading, strength, absorption, basic chemical properties.
- 2.3 Impurities that may be contained in aggregates are described in terms of their potential effect on the concrete described.

Range organic matter, sugar, silt, clay, dust, minerals.

Element 3

Demonstrate knowledge of water as used in concrete.

Performance criteria

- 3.1 The role of water in the production of concrete is described.
- 3.2 Contaminants in water are identified and their effects on concrete are described.

- 3.3 The requirement for control of water quality and quantity in concrete mixtures is explained in terms of usability and strength.

Element 4

Demonstrate knowledge of additives, admixtures, and supplementary cementitious materials as used in concrete.

Performance criteria

- 4.1 The purpose and role for types of additives in concrete are described in terms of plastic properties, hardened properties, and/or colour of concrete.

Range glass fibre, steel, high-performance plastic, fibres, pigments.

- 4.2 The purpose and role for types of admixtures in concrete are described in terms of effect on concrete.

Range air-entraining admixtures (AEA), set-accelerating admixtures, set-retarding admixtures, water-reducing admixtures (WRA), superplasticisers, corrosion inhibitors.

- 4.3 The purpose and role for types of supplementary cementitious materials in concrete are described in terms of effect on concrete.

Range fly ash, blast furnace slag, silica fume.

Element 5

Demonstrate knowledge of the concrete production process.

Performance criteria

- 5.1 Types of equipment used to mix concrete are described in terms of purpose.

Range batching plant, weighing equipment, central plant mixer, truck-mixer, small-scale production.

- 5.2 Types of concrete mixes are described in terms of purpose.

Range normal, special, prescribed.

- 5.3 The concrete production process is described in terms of steps.

Range description includes receipt of incoming materials, weighing, mixing, transporting.

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.

Comments on this unit standard

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