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| Title | Apply design principles in the design of scaffolding | | |
| Level | 5 | Credits | 12 |

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| Purpose | <p>This unit standard is for people who have intermediate scaffolding skills and who want to develop their scaffolding skills to an advanced level.</p> <p>People credited with this unit standard are able to:</p> <ul style="list-style-type: none"> – determine load bearing capacity for scaffolding components; – calculate loads on a cantilever supporting structure on outboard, inboard and fulcrum points; – design support mechanisms for scaffolds supported by an existing structure; – design support mechanisms for scaffolding and scaffold attachments supported by or attached to another scaffold; and – apply regulatory requirements in the design of scaffolding. |
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| Classification | Lifting Equipment > Advanced Scaffolding |
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| Available grade | Achieved |
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| Entry information | |
| Critical health and safety prerequisites | New Zealand Certificate in Scaffolding (Level 4) [Ref: 2362], or demonstrate equivalent knowledge and skills. |

Explanatory notes

- 1 This unit standard has been developed for learning and assessment on-job or off-job in a simulated environment.
- 2 All tasks must be carried out in accordance with the Best Practice Guide (BPG) based on:
 - a quality management systems;
 - b designer’s requirements and manufacturers' operating instructions; and government and local government legislation, regulations, bylaws, Health and Safety in Employment Act 1992, and Health and Safety in Employment Regulations 1995;
 - c the most up to date version of the: <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/scaffolding-best-practice-guideline-for-scaffolding-in-new-zealand>, and all subsequent amendments and replacements.

3 Definitions

Cantilevers: scaffolding structures that project outward at height from an existing structure or scaffold.

Scaffold attachments: items added to a scaffold for specific functions and which materially impact on the forces bearing on it and in particular its loading. Attachments include winches, hoists, gin wheels, catch fans, and barrow ramps.

A *scaffold plan*: key design document prepared by the candidate and used as a basis for the erection of a particular scaffold.

Support mechanisms: a series of ties, beams, bracing, or other arrangements or methods used to support or stabilise an entire scaffold structure.

Scaffolding as defined in the BPG and in the Health and Safety in in Employment Regulations 1995

Types of scaffold: different scaffolds or scaffolding types such as birdcage scaffolds, vessel scaffolds, cantilevers, loading platforms, hanging scaffolds, mobile scaffolds etc.

Outcomes and evidence requirements

Outcome 1

Determine load bearing capacity for scaffolding components.

Evidence requirements

1.1 Determine loads and forces that can be applied to different scaffolding components.

Range includes – tube, fittings, and bracing;
may include but is not limited to – base jacks, base plates, planks, ties.

1.2 Determine ground capacity to take load based on the type of scaffolding and the nature of the ground conditions.

1.3 Determine individual leg loads for different scaffolding structures.

Range at least three scaffolds of different types.

1.4 Determine slip fitting parameters based on fitting types.

Range steel and aluminium for at least three types of fittings across a range of loadings.

Outcome 2

Calculate loads on a cantilever supporting structure on outboard, inboard and fulcrum points.

Range two calculations of outboard and inboard lengths.

Evidence requirements

- 2.1 Determine the live and dead loads on the outboard portion of the cantilever.
- 2.2 Determine the factor of safety and the load required on the inboard portion of the cantilever.
- 2.3 Determine the load on the fulcrum point.

Outcome 3

Design support mechanisms for scaffolds supported by an existing structure.

Range at least three different types of scaffold.

Evidence requirements

- 3.1 Assess the capacity of the supporting structures to support scaffolding.

Range includes but is not limited to – assessment of strength, stability, and rigidity.
- 3.2 Assess the capacity of the supporting structures to support different types of scaffold.

Range includes but is not limited to – suitable tie types and attachment points.
- 3.3 Design ties and bracing.
- 3.4 Design attachment methods and designate attachment points.

Outcome 4

Design support mechanisms for scaffolding and scaffold attachments supported by or attached to another scaffold.

Range at least one cantilever and one other type of scaffold, two different scaffolding attachments.

Evidence requirements

- 4.1 Assess the ability of the existing scaffolding and the structures it is dependent on, to support additional scaffolding or scaffold attachments.

Range includes but is not limited to assessment of – strength, stability, rigidity of the structure relied upon, and suitable tie types, bracing methods, attachment points.
- 4.2 Assess the impact of particular attachments and their operation on the existing scaffolding.

Range includes but is not limited to impact on – loadings, magnitude and direction of forces, attachment bracing requirements.

4.3 Incorporate associated strengthening of the existing scaffolding and/or appropriate stabilising structures into the design.

Range may include but is not limited to – counterweights, raker tubes, raker bays, doubling standards.

4.4 Design ties and bracing.

4.5 Design attachment methods and designate attachment points.

Outcome 5

Apply regulatory requirements in the design of scaffolding.

Evidence requirements

5.1 Determine the duty loading of different types of scaffold and scaffolding structures.

Range at least three different types.

5.2 Identify the requirements of special duty scaffolds.

Range includes but is not limited to – proprietary scaffolds outside the manufacturer’s specifications, scaffold structures exceeding 33 metres, scaffolds susceptible to exceptional environmental loading, any scaffold that falls outside of the general requirements of the BPG in terms of bay specifications, width, length, and duty loadings.

5.3 Determine the need for consultation with a chartered engineer.

5.4 Identify and apply of the requirements of supervisory scaffolders in relation to engineer-designed scaffolds.

5.5 Consult and utilise the BPG, Australian /New Zealand’s Standards, or other international standards appropriately in drawing up scaffold plans and technical specifications for different scaffold types in a variety of applications.

Range at least three different types.

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| Replacement information | This unit standard and unit standard 26597 replaced unit standard 4208 and unit standard 4210. |
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| Planned review date | 31 December 2019 |
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Status information and last date for assessment for superseded versions

| Process | Version | Date | Last Date for Assessment |
|--------------|---------|--------------|--------------------------|
| Registration | 1 | 21 July 2011 | 31 December 2016 |
| Review | 2 | 16 July 2015 | N/A |

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| Consent and Moderation Requirements (CMR) reference | 0183 |
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Please note

Providers must be granted consent to assess against standards (accredited) by NZQA, before they can report credits from assessment against unit standards or deliver courses of study leading to that assessment.

Industry Training Organisations must be granted consent to assess against standards by NZQA before they can register credits from assessment against unit standards.

Providers and Industry Training Organisations, which have been granted consent and which are assessing against unit standards must engage with the moderation system that applies to those standards.

Requirements for consent to assess and an outline of the moderation system that applies to this standard are outlined in the Consent and Moderation Requirements (CMRs). The CMR 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 Skills Organisation at reviewcomments@skills.org.nz if you wish to suggest changes to the content of this unit standard.