

Title	Apply and analyse mathematical principles, and calculations to timber structure detailing operations		
Level	5	Credits	5

Purpose	<p>This unit standard is intended for those working in timber structure detailing.</p> <p>People credited with this standard are able to apply and analyse mathematical principles, and calculations to timber structure detailing operations to the level of performance required of a professionally competent detailer.</p>
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Classification	Construction Trades > Carpentry
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Available grade	Achieved
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Guidance Information

1 Scope

The context of this unit standard is detailing in a manufacturing environment for the production of pre-nailed timber structures used for the construction of small buildings.

2 Assessment

This unit standard is intended to align with the *New Zealand Diploma in Timber Structure Detailing – Specifications* and the *New Zealand Diploma in Timber Structure Detailing (Level 5)* [Ref: 4377].

Evidence for this standard must reflect professional competence.

Professional competence refers to the ability to work independently in order to meet the ethical and professional expectations of industry and clients on dynamic and varied projects operating in a commercial environment.

Professional competence must be confirmed by a person with current expertise in the timber structure detailing trade.

3 Definitions

Design lead refers to the architect or draftsman responsible for the overall design of the building.

The *Legislative framework* refers to the hierarchy of Acts of Parliament, Regulations, Rules, local by-laws, Codes, Standards, approved codes of practice, and best practice guidelines.

Loads are a weight or force put on a building. There are two types of loads, a static load which is constant/permanent, or a variable load which comes and goes.

Load paths describes the direction of load transfer.

Proprietary design software illustrates the design capacities and compliance with the New Zealand Building Code of pre-nailed timber structures using proprietary fixings and connectors.

Small building is of residential scale with lightweight timber-framing and/or concrete or concrete masonry construction, and generally of non-specific design.

Workplace procedures refers to the documented procedures specific to a work site which set out the standard and required practices of that workplace.

- 4 Legislation, standards and guidance information relevant to this standard includes the following; and any subsequent amendments and replacements.

New Zealand Diploma in Timber Structure Detailing – Specifications, BCITO, August 2021, available from <http://www.waihanga.nz>.

Legislation accessed at www.legislation.govt.nz

- Building Act 2004
- The New Zealand Building Code.

Standards accessed at www.standards.govt.nz

- NZS 3604:2011 *Timber Framed Buildings*
- NZS 3602:2003 *Timber and wood-based products for use in buildings*.

Skill specification and performance level guidance

Skill specification

Apply and analyse mathematical principles, and calculations to timber structure detailing operations.

Knowledge

The requirements for the use of different measurements in timber structure detailing operations to ensure cumulative accuracy of measurements across a small building.

Range length, area, volume, weight, time;
length includes – centres, spacings.

The purpose for and application of 2D geometric, 3D geometric, and trigonometric principles to timber structure detailing operations.

Range area, volume, angles, triangle theorem;
must include – application of geometric principles to roof lines.

The purpose of and application of percentages and ratios to timber structure detailing operations.

The requirements for and methods to calculate loads, and load path distribution for timber structure detailing operations.

Range forces, loadings, tension, compression, frequencies of vibration.

Skills

Calculate and collate prepared site measurements and use technology to accurately apply them to timber structure detailing operations.

Calculate spacings and positioning of members to ensure layout accuracy of timber structure detailing operations.

Calculate and analyse loads, and load paths for timber structure detailing operations to confirm design meets the structural requirements.

Apply 2D geometric, 3D geometric and trigonometric principles to evaluate the effect on the overall building when changes are made to the shape of individual pre-nailed timber structures.

Range may include – load distribution, appearance, manufacturing process, transportation, erection on-site.

Determine material quantities for the manufacture of pre-nailed timber structures, and make the appropriate allowances.

Analyse, correct, and inform design lead of miscalculations identified in provided architectural drawings, and specifications.

Performance level guidance

Performance must reflect accurate calculations in prepared job documentation for the manufacture, transportation, and on-site placement and assembly of pre-nailed timber structures in accordance with legislative frameworks, workplace procedures, and proprietary design software requirements.

Performance must reflect changes in drawings that relate to the shape of individual pre-nailed timber structures as they relate to the dimensions, angles, and size. It does not include changes to overall building design.

Technology used in calculating detailing work may include scientific calculators, Computer-aided Design and Auto Computer-aided Design.

Planned review date	31 December 2026
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	16 December 2021	N/A

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>.

Comments on this unit standard

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihanga.nz if you wish to suggest changes to the content of this unit standard.