

40142 Describe how common structural systems used in construction respond to loads

Kaupae Level	4
Whiwhinga Credit	5
Whāinga Purpose	<p>This standard recognises knowledge of the common structural systems, components and connections and how these are used in construction and how they respond to loads.</p> <p>This skill standard aligns with the New Zealand Diploma in Detailing (Structural) (Level 5) with strands in Light Steel Frame, Reinforcing Steel, Structural Steel, and Precast Concrete [Ref: 4515], and the New Zealand Diploma in Timber Structure Detailing (Level 5) [Ref: 4377].</p>

Hua o te ako me Paearu aromatawai | Learning outcomes and assessment criteria

Hua o te ako Learning outcomes	Paearu aromatawai Assessment criteria
1. Describe structural systems commonly used in construction.	a. Structural systems commonly used in construction are described according to industry standards.
2. Describe the components and connections and their applications in common structural systems.	a. Components and connections in common structural systems are described according to industry standards.
	b. Application of each component and connection is described according to industry standards.
3. Explain how structural systems respond to applied forces and stresses under a range of loading conditions.	a. How structural systems respond to load combinations and resultant load paths are explained according to structural principles.

Pārongo aromatawai me te taumata paearu | Assessment information and grade criteria

Assessment specifications:

A structural system is the arrangement and configuration of structural components that work together to support loads, resist forces, and provide stability in a building or structure.

Common structural systems include steel frame, reinforced concrete, precast concrete, composite, shear wall, post and beam or braced frame.

Common structural systems, components and connections described must adhere to established guidelines to ensure structures meet safety and performance criteria and reflect agreed industry terminology.

Ngā momo whiwhinga | Grades available

Achieved.

Ihirangi waitohu | Indicative content

Structural principles

- Load resistance
- Gravity loads – dead and live
- Lateral loads
- Safety and reliability
- Efficiency and economy
- Appropriate structural member selection and application.
- Vertical and horizontal load resisting systems.

Basic theory of structures

- Forces.
- Loadings.
- Design philosophy.
- Design features report.
- Common industry terminology.

Common structural systems type and application

- Steel frame.
- Reinforced concrete.
- Precast concrete.
- Composite.
- Shear wall.
- Post and beam.
- Braced frame.

Structural components type and function

- Primary versus secondary structural components.
- Member/component categories and classifications.

Structural connections type and use

- Mechanically fastened.
- Welded connections.

Rauemi | Resources

Refer to the Structural Detailing Programme Guidance available from qualifications@waihanga.govt.nz.

[NZS 3101.1&2:2006 \(Inc A1, A2, A3\) Concrete structures standard](#)

[NZS 3109:1997 Concrete construction](#)

[AS NZS 4600:2018 Cold-formed steel structures](#)

[AS/NZS 4672.1:2007 Steel prestressing materials - General requirements](#)

[AS/NZS 5131:2016 Structural steelwork - Fabrication and erection](#)

[NZCIC Guidelines 2022 New Zealand Construction Industry Council Design Guidelines](#)

Pārongo Whakaū Kounga | Quality assurance information

Ngā rōpū whakatau-paerewa Standard Setting Body	Waihanga Ara Rau Construction and Infrastructure Workforce Development Council
Whakaritenga Rārangi Paetae Aromatawai DASS classification	Planning and Construction > Construction > Core Planning and Construction
Ko te tohutoro ki ngā Whakaritenga i te Whakamanatanga me te Whakaōritenga CMR	0048

Hātepe Process	Putanga Version	Rā whakaputa Review Date	Rā whakamutunga mō te aromatawai Last date for assessment
Rēhitatanga Registration	1	26 September 2024	N/A
Kōrero whakakapinga Replacement information	N/A		
Rā arotake Planned review date	31 December 2029		

Please contact Waihanga Ara Rau Construction and Infrastructure Workforce Development Council at qualifications@waihangaarau.nz to suggest changes to the content of this skill standard.