

## Achievement Standard

<b>Subject Reference</b>	Construction and Mechanical Technologies 2.24		
<b>Title</b>	Demonstrate understanding of advanced concepts related to structural frameworks		
<b>Level</b>	2	<b>Credits</b>	3
		<b>Assessment</b>	Internal
<b>Subfield</b>	Technology		
<b>Domain</b>	Construction and Mechanical Technologies		
<b>Status</b>	Registered	<b>Status date</b>	17 November 2011
<b>Planned review date</b>	31 December 2019	<b>Date version published</b>	17 November 2016

This achievement standard involves demonstrating understanding of advanced concepts related to structural frameworks.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>Demonstrate understanding of advanced concepts related to structural frameworks.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate in-depth understanding of advanced concepts related to structural frameworks.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate comprehensive understanding of advanced concepts related to structural frameworks.</li> </ul>

### Explanatory Notes

- This achievement standard is derived from Level 7 of the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education at <http://seniorsecondary.tki.org.nz>.

Further information can be found at <http://www.technology.tki.org.nz/>.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools*, Ministry of Education at <http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education>, and the Health and Safety at Work Act 2015.

This standard is also derived from *Te Marautanga o Aotearoa*. For details of *Te Marautanga o Aotearoa* achievement objectives to which this standard relates, see the [Papa Whakaako](#) for the relevant learning area.

- 2 *Demonstrate understanding of advanced concepts related to structural frameworks involves:*
- describing where pin and moving joints are used
  - describing the effects of load on fixed joints
  - explaining types of framework members and how members combine to resist loads and transfer forces
  - explaining how safety factors are determined.

*Demonstrate in-depth understanding of advanced concepts related to structural frameworks involves:*

- explaining forces that exist within framework members
- explaining framework member profiles, and forms and where they are used.

*Demonstrate comprehensive understanding of advanced concepts related to structural frameworks involves:*

- discussing how safety factors have been applied to ensure framework integrity.

- 3 Structural frameworks are made up of combinations of pin jointed members acting as struts and/or ties.
- 4 Framework member profiles may include but are not limited to: I-beam, channel, round, and rectangular.
- 5 Framework member forms may include but are not limited to: solid, tube, linked, and multi-strand cable.
- 6 Forces are limited to tension, compression, torsion and shear forces.
- 7 Loads acting on a framework are limited to static point loads.
- 8 Explanation of forces that exist within framework members includes calculation of the forces acting in members using vector diagrams.
- 9 Safety factors may include but are not limited to considerations due to static and dynamic loadings, and the effects of wind and earthquake.
- 10 The integrity of a framework is reliant on but is not limited to the form and profile of framework members, and the combination and means by which framework members are joined.
- 11 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-Internally-Assessed-Achievement-Standards>.

**Quality Assurance**

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233