



Australian Government

CPCCB6014 Apply structural principles to the construction of large, high-rise and complex buildings

Release: 2

CPCBC6014 Apply structural principles to the construction of large, high-rise and complex buildings

Modification History

Release 2 Updated reference to general construction induction training program.

Release 1 This version first released with CPC Construction, Plumbing and Services Training Package Release 5.0.

Supersedes and is equivalent to CPCBC6014A Apply structural principles to the construction of large, high rise and complex buildings. Updated to meet the Standards for Training Packages 2012.

Application

This unit of competency specifies the skills and knowledge required to apply structural principles to the construction of large, high-rise and complex buildings.

The design and construction of large buildings requires the input of a range of skilled professionals, including architects and engineers. Building and construction professionals require the ability to identify a range of factors that impact on structural principles within the building design and collaborate with other professionals to reach consensus.

This unit of competency applies to builders, project managers and related construction industry professionals responsible for ensuring the structural integrity of materials and building and construction work so that site safety and quality control measures are maintained during residential and commercial projects.

Completion of the general construction induction training program specified by the model Code of Practice for Construction Work is required for any person who is to carry out construction work. Achievement of *CPCWHS1001 Prepare to work safely in the construction industry* meets this requirement.

Licensing, regulatory or registration requirements apply to this unit of competency in some jurisdictions. Relevant state and territory regulatory authorities should be consulted to confirm these requirements.

Pre-requisite Unit

Nil.

Unit Sector

Building and Construction

Elements and Performance Criteria

Elements describe the essential outcomes.	Performance criteria describe what needs to be done to demonstrate achievement of the element.
1 Apply structural principles to the planning of a construction project.	1.1 Identify main structural principles that apply to the construction of large, high-rise and complex structures.
	1.2 Identify, analyse and apply performance characteristics of structural elements.
	1.3 Apply the performance of materials in the building plan to the planning of the construction work.
2 Coordinate and manage the site assessment and job set-up.	2.1 Implement processes to analyse stability of soils and capacity of the site to support the construction loads.
	2.2 Identify and apply requirements for retaining walls to the planning process in conjunction with related industry professionals.
	2.3 Analyse and apply structural function and requirements for temporary structural elements to the planning process.
3 Coordinate and manage construction of footing systems.	3.1 Undertake coordination of the set-out of the building in accordance with documented building plans, following the full assessment of the site.
	3.2 Assess structural performance of the footings specified in the building plan for compliance with relevant codes and accepted industry construction structural principles.
	3.3 Lay footings, as specified in the building plan, and check for compliance with standards and accepted industry construction principles.
	3.4 Plan, implement and check damp coursing and the provision of termite barriers and other relevant techniques in accordance with codes, standards and industry practice.
4 Coordinate and manage structural	4.1 Identify and analyse technical construction principles and performance characteristics of construction materials in

elements of the construction process.		the planning of project.
	4.2	Identify, implement and check processes for construction of all structural elements for compliance with manufacturer specifications and relevant Australian Standards and codes.
	4.3	Identify and implement building plans and relevant standards to ensure appropriate allowances have been made for plumbing, electrical conduits and other services to be installed.
5 Analyse and plan for structural integrity of buildings.	5.1	Consult relevant industry professionals to provide advice regarding the structural integrity of proposed buildings.
	5.2	Assess structural requirements and loads of the building design.
	5.3	Conduct analysis of the effects of force and movements on structural elements.
	5.4	Conduct analysis of properties and behaviours of structural materials.
	5.5	Conduct analysis of section properties of structural elements using standard industry formulas and performance comparisons.
	5.6	Evaluate performance characteristics of columns using standard industry techniques.
	5.7	Assess methods used for stress distribution in connections between structural elements.
	5.8	Assess impact of various loads on the building structure.
	5.9	Consider design impact of high-performance structural elements.

Foundation Skills

As well as the foundation skills explicit in the performance criteria of this unit, candidates require:

- communication skills to:

- consult effectively with industry professionals, and use relevant industry terminology and concepts
- technology skills to:
 - use digital tools and devices to communicate and collaborate effectively with others
 - use equipment and programs to access, extract information and develop relevant documentation.

Unit Mapping Information

Supersedes and is equivalent to CPCCB6014A Apply structural principles to the construction of large, high rise and complex buildings.

Links

Companion volumes to this training package are available at the VETNet website - <https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad>

Assessment Requirements for CPCCB6014 Apply structural principles to the construction of large, high-rise and complex buildings

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Performance Evidence

To demonstrate competency, a candidate must meet the elements and performance criteria of this unit by applying structural design principles to the construction planning for a large, high-rise, or complex building project.

In doing this, the candidate must:

- coordinate professional input to evaluate structural integrity of large and complex buildings
- select, position and size all structural members that form fixed or temporary building structures
- clearly analyse structural impact of design decisions
- apply design principles relating to performance
- identify typical faults and problems and the action required to rectify such faults.

Knowledge Evidence

To be competent in this unit, a candidate must demonstrate knowledge of:

- government building legislation and regulation
- building codes, specifications and standards:
 - the National Construction Code (NCC)
 - Australian Standards
 - project specifications
- design principles and behaviour of structural members undergoing stress, strain, tension, compression, bending or combined actions
- structural design:
 - aesthetics

- economy
- equilibrium
- functionality
- stability
- strength
- properties, characteristics and limitations of structural materials:
 - reinforced and pre-stressed concrete and tilt-up panels
 - composite steel and concrete
 - masonry
 - steel (cold-formed steel) and aluminium
- performance characteristics of columns analysis:
 - bending behaviour and performance of loaded support beams
 - eccentric and axial load effect
 - load spanning elements for bending moments, shear forces, deflection and torsion
 - effect of connections
 - effect of slab behaviour in relation to spans and stress distribution
 - effect of slenderness ratio
- high performance structural elements:
 - castellated beams
 - connections
 - fire resistance
 - laminated beams
 - pre-stressed beams
 - slabs
 - trusses
 - use of steel to reinforce concrete
 - waffle slabs
- application of structural principles in buildings:
 - dead and live load calculations and characteristics
 - fire resistance of materials
 - impact of thermal effects
 - impact of time-dependent effects, including creep and shrinkage
 - impact of wind, snow, groundwater, earthquake, liquid pressure, rainwater and earth pressure actions
 - structural resistance of forms of construction
 - structural resistance of materials
- project working drawings and specifications
- work health and safety (WHS) and organisational quality procedures and processes
- temporary structural elements:
 - bracing

- close sheeting
- formwork props
- pressure resistant formwork
- scaffolding sole plates
- shields
- shoring collar sets
- soldier sets
- ties.

Assessment Conditions

Assessors must meet the requirements for assessors contained in the Standards for Registered Training Organisations.

Assessment can be undertaken in the workplace or in a simulated workplace environment.

A simulated environment is one that realistically replicates workplace conditions, materials and equipment, interactions with others and workplace irregularities, and which meets industry standards for safety and environmental practices.

Candidates must have access to:

- relevant current government building and construction and WHS legislation
- the NCC, and other relevant industry and Australian codes and standards
- environmental requirements and sustainability principles
- manufacturer's materials and product specifications and installation instructions for building materials in the project specifications
- project plans, design brief, working drawings and specifications.

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