CPCCBC4010 Apply structural principles to residential and commercial constructions

Application

This unit of competency specifies the skills and knowledge required to apply structural principles to the construction of residential or commercial structures. This unit includes applying structural principles to footing, floor, wall and roof systems.

It applies to National Construction Code (NCC) classifications:

- Residential – Class 1 and 10 buildings, maximum two storeys
- Commercial – Class 2 to 9, Type C only constructions.

This unit of competency applies to builders, site managers, forepersons and other managers in the building and construction industry who apply structural principles to the demolition or construction of structures.

This unit of competency is suitable for those using specialised knowledge to complete routine and non-routine tasks and using their own judgement to deal with predictable and sometimes unpredictable problems relating to building application approvals.

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 *CPCCWHS1001 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.

Prerequisite Unit

CPCCBC4053 Apply building codes and standards to the construction process for Class 2 to 9 Type C buildings

CPCCBC4001 Apply building codes and standards to the construction process for Class 1 and 10 buildings

Unit Sector

Construction.

Elements and Performance Criteria

1. Analyse the structural integrity of building project.	1.1	Determine the class of building, intended use of building and climate zone from the NCC.
	1.2	Analyse project for compliance with NCC bushfire, high wind, earthquake and alpine environment requirements.
	1.3	Analyse building design and structural integrity from project plans

		and specifications, building standards and codes.
	1.4	Determine the effect of section properties on various materials.
	1.5	Determine if structural performance meets the General Requirements and Performance Requirements of NCC.
	1.6	Confirm analysis with relevant industry professionals.
	1.7	Conduct pre-commencement site inspection to confirm analysis.
	1.8	Assess new and emerging building technologies for application to the construction process and their compliance with NCC requirements and relevant Australian Standards.
2. Plan, coordinate and manage the laying of footings.	2.1	Identify earthworks and footing or slab configuration from project plans and specifications.
	2.2	Establish cut and fill, excavation and compaction compliance with geotechnical report.
	2.3	Assess performance of reinforcement, concrete and other elements which contribute to structural integrity of specified footings.
	2.4	Determine compliance with building and construction regulations, standards and codes.
	2.5	Set out footings in accordance with project plans and specifications.
3. Plan, coordinate and manage laying of flooring systems.	3.1	Identify flooring systems materials, components and configuration from project plans and specifications.
	3.2	Establish footing type and tie-down details.
	3.3	Assess suspended flooring system component sections' compliance with standards and codes' span requirements.
	3.4	Determine if floor framing and flooring is compliant with NCC Performance Requirements for climate zone, fire resistance and rising damp requirements.
	3.5	Supervise and check laying of specified floor system complies with project documentation.
4. Plan, coordinate and manage the building of wall systems.	4.1	Identify and analyse structural and non-structural wall systems used in the planning of the building and construction project.
	4.2	Determine materials used for timber and steel framing and structural steel members meet the Performance Requirements of the NCC and timber framing complies with *AS 1684 Residential timber-framed construction.*
	4.3	Identify, implement and check processes for erecting structural and non-structural wall systems comply with manufacturer's specifications and building and construction standards and codes.
	4.4	Plan, implement and check requirements for application of bracing, tie-downs, tolerances, allowances, and fixing and installation of wall frame components for compliance with relevant Australian Standards, codes and manufacturer specifications.
	4.5	Manage processes to ensure quality of the frame, whether factory pre-cut and pre-nailed, factory pre-cut and assembled on site, or cut and assembled on site.
	4.6	Identify and implement allowances for services to be installed.
	4.7	Check compliance of installation of windows and doors with building

		and construction standards and code and manufacturer's specifications.
5. Plan, coordinate and manage the building of structural roof systems.	5.1	Identify type of structural roof system and components and determine compliance with Performance Requirements of NCC.
	5.2	Plan, implement and check erection of structural roof, roof trusses or hand cut roof members comply with building and construction standards and codes and accepted industry construction practices.
	5.3	Plan, implement and check installation of roof sarking and cladding, skylights, roof ventilators and service penetrations comply with building standards, codes and manufacturer specifications.
	5.4	Manage processes to ensure roof systems' quality finish.
6. Plan, coordinate and manage wall cladding.	6.1	Assess structural performance of cladding to be used for bracing in the frame construction for compliance with building and construction standards, codes and manufacturer specifications.
	6.2	Determine cladding, vapour permeable sarking or waterproof membrane and components meet the Performance Requirements of NCC.
	6.3	Supervise and check installation of specified cladding complies with building and construction standards, codes and industry-accepted industry practices.

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Unit Mapping Information

Supersedes and is not equivalent to CPCCBC4010B Apply structural principles to residential low rise constructions

Supersedes and is not equivalent to CPCCBC4011B Apply structural principles to commercial low rise constructions.

Links

Companion Volume Implementation Guide:
https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad

Assessment Requirements for CPCCBC4010 Apply structural principles to residential and commercial constructions

Performance Evidence

To demonstrate competency, a candidate must meet the elements and performance criteria of this unit by applying structural principles to the construction of one building project.

In doing this, the candidate must:

- assess the structural integrity of the construction project
- apply technical construction principles and concepts to the appropriate selection, integration and building of construction elements and components
- coordinate, plan, implement and check the construction of the structure
- plan and document the structural principles of the construction of a building.

Knowledge Evidence

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

- government building and construction legislation and regulations
- industry building and construction standards and codes
- the NCC
- classes of buildings described in the NCC
- standards and codes for timber framing
- structural principles:
    - behaviour of structural materials
    - dead, live and wind loads
    - performance of beams
    - performance of columns
    - performance of roof trusses
    - section properties
    - solution of force systems
    - wind bracing
- project documentation:
    - approval project plans and specifications
    - structural designs and specifications
    - engineer's footing design and specifications
    - registered plans
    - contour site plan
    - geotechnical report
    - underpinning, rock anchors and shoring design and specifications
    - retaining wall and tanking design and specifications
    - structural, floor, wall and roof systems
- organisational quality documentation:

    - policies and procedures
    - workplace procedures, workplace safety and environmental requirements
    - various construction contracts
- footing systems:
    - bored pier footings
    - columns or stumps
    - concrete slab floors
    - reinforced piers and beams
    - drilled and driven piles
    - mass concrete piers
    - screw piles
    - waffle pod slabs
    - brick bases
- floor system and components:
    - suspended and slab on ground concrete floors
    - suspended timber, metal and steel floor frames
    - engineered floor joists
    - platform floor construction
    - fitted (cut-in) floors
    - compressed sheet wet area flooring
    - sheet flooring
    - tongue and groove flooring
    - autoclaved aerated concrete (AAC) panel systems
- structural wall systems:
    - composite walls featuring tilt-up slab, engineered timber products and lightweight AAC
    - framed walls incorporating timber, engineered timber products and lightweight section steel
    - masonry walls incorporating cavity brick, single-leaf masonry and AAC
- wall cladding:
    - weather boards
    - coatings over base materials
    - corrugated metal sheeting
    - fibre cement and compressed wood panelling
    - tilt-up slab
    - unfired and fired AAC masonry
- structural roof systems:
    - timber and metal pre-fabricated trusses
    - hand cut timber
- roof types:
    - box gable
    - dual pitch
    - Dutch gable and Dutch hip
    - gable end
    - hip and valley
    - north light
    - skillion

    - rafter and purlin
- roof cladding:
    - concrete, clay and metal tiles
    - shakes and shingles
    - short and long run, various profile and metal sheeting
- AAC floor and wall systems
- causes and implications of structural detects related to failure of applying structural principles to residential and commercial buildings
- extent of remedial work required for various defects cause by inadequate design and application of structural principles.

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 government building and construction legislation
- current building and construction codes and standards
- the NCC
- material manufacturer's specifications
- construction drawings and specifications and other quality documentation required to undertake the performance criteria and assessment requirements
- digital devices, applications and software to obtain and research information electronically and exchange information with other stakeholders.

Links

Companion Volume Implementation Guide:
https://vetnet.education.gov.au/Pages/TrainingDocs.aspx?q=7e15fa6a-68b8-4097-b099-030a5569b1ad