Draft 0.1

This is our work-in-progress update to CPCCBC6014A Apply structural principles to the construction of large, high rise and complex buildings: https://training.gov.au/Training/Details/CPCCBC6014A.

We are working with industry experts to ensure the updated unit:

- meets current and anticipated industry needs
- complies with current Standards for Training Packages
- is written in clear understandable English.

Information on our training package review and development process is available here: http://www.artibus.com.au/project-stage.

Summary of changes from current endorsed unit

Re-templated to meet Standards for Training Packages 2012.

Sequenced Elements and Performance Criteria.

Specified what and how performance is demonstrated in Performance Evidence.

Captured critical Range Statement items and included industry relevant knowledge in Knowledge Evidence.

Stated mandatory conditions and specific requirements for assessment.

CPCCBC6014A
Apply structural principles to the construction of large, high rise and complex buildings

Application

This unit of competency specifies the skills and knowledge required to apply structural principles to the construction and demolition 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. The building and construction professional plays a significant role within this project team and requires 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.

Prerequisite Unit

Nil.

Unit Sector

Construction.

Elements and Performance Criteria

1. Apply structural principles to the erection or demolition of a structure.	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 the structural elements, including materials identified in the building plan, to the planning of the construction work.
	1.3	Apply the structural principles to the planning of the demolish of existing high-rise structures in accordance with legislative requirements.
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 to the planning process, requirements for retaining walls in conjunction with related industry professionals.
	2.3	Analyse and apply to the planning process, structural function and requirements for temporary structural elements.

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 elements of the construction process.	4.1	Identify and analyse technical construction principles and performance characteristics of construction materials in 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 building.
	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:

- 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 equivalent to CPCCBC6014A Apply structural principles to the construction of large, high rise and complex buildings.

Links

Companion Volume Implementation Guide: to be added.

Assessment Requirements for CPCCBC6014 Apply structural principles to the construction of large, high rise and complex buildings

Performance Evidence

To demonstrate competency, a candidate must meet the performance criteria of this unit by applying structural design principles to the construction of a high rise building and apply the structural principles in the planning of dismantling and demolition of a high rise building.

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:
    - 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
- applications 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, ground water, 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 of performance must be undertaken in the workplace or in a simulated workplace environment.

Candidates must be provided with:

- relevant state and territory building legislation codes and standards
- environmental requirements and sustainability principles

- manufacturer's specification and installation instructions
- organisational policies, procedures and workplace safety requirements
- project plans and specifications
- sufficient equipment and materials to apply structural principles to the construction of large, high rise and complex buildings.

Links

Companion Volume Implementation Guide: to be added.