



Australian Government

Department of Education, Employment and Workplace Relations

CPCBC5018A Apply structural principles to the construction of medium rise buildings

Release: 1

CPCBC5018A Apply structural principles to the construction of medium rise buildings

Modification History

Not Applicable

Unit Descriptor

Unit descriptor	This unit of competency specifies the outcomes required to apply structural principles to the building of medium rise buildings. The design and construction of medium rise buildings require 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 communicate effectively with building design professionals, and develop sound and safe practices in relation to structural procedures on site.
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Application of the Unit

Application of the unit	This unit of competency supports builders, project managers and related construction industry professionals responsible for ensuring the structural integrity of materials as well as building and construction work so that site safety and quality control measures are maintained during residential and commercial projects.
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Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units	CPCBC5001B Apply building codes and standards to the construction process for medium rise building projects
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Employability Skills Information

Employability skills	This unit contains employability skills.
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Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Apply structural principles to planning the erection or demolition of a structure.	1.1. Main <i>structural principles</i> that apply to the erection of <i>medium rise buildings</i> are identified. 1.2. Performance characteristics of the structural elements, including <i>materials</i> identified in the building's plan, are identified, analysed and applied to the planning of the construction work. 1.3. Demolition of existing structures is undertaken in accordance with legislative and planning requirements and safe work practices.
2. Coordinate and manage site and job set-up assessment.	2.1. Processes are put in place to analyse the stability of soils and capacity of the site to support the construction loads. 2.2. Structural requirements for retaining walls are identified in conjunction with related industry professionals and applied to the planning process. 2.3. Structural function and requirements for <i>temporary structural elements</i> are analysed and applied to the planning process.
3. Coordinate and manage construction of footing systems.	3.1. Set-out of building is checked for compliance with documented building plans. 3.2. Structural performance of footings specified in the building plan is assessed for compliance with relevant codes and accepted industry construction principles. 3.3. Footings specified in the building plan are laid and checked for compliance with relevant codes and accepted industry construction principles. 3.4. Damp coursing and provision of termite barriers and other relevant techniques are planned, implemented and checked in accordance with codes, standards and industry practice.
4. Coordinate and manage structural elements of the construction process.	4.1. Technical construction principles and performance characteristics of the construction materials are identified and analysed in the planning of project. 4.2. Building plans and relevant standards and codes are identified and implemented to ensure appropriate allowances have been made for plumbing, electrical conduits and other services to be installed. 4.3. Processes for the construction of structural elements are identified and confirmed as compliant with relevant Australian standards and codes and manufacturer specifications, with reference to specialists as required, and then implemented.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

Required skills for this unit are:

- application of design concepts and principles
- communication skills to:
 - consult with industry professionals
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - read and interpret:
 - codes and standards
 - legislative and planning requirements
 - plans, specifications and drawings
 - other relevant documentation from a wide range of sources
 - use and interpret non-verbal communication
 - use language and concepts appropriate to cultural differences
- numeracy skills to apply measurements and calculations.

Required knowledge

Required knowledge for this unit is:

- applications of structural principles in buildings
- Building Code of Australia (BCA) and Australian standards
- design principles and behaviour of structural members undergoing stress, strain, compression, bending or combined actions
- interpretation and analysis of work drawings and specifications
- nature of materials and the effect on performance
- OHS and organisational quality procedures and processes.

Evidence Guide

EVIDENCE GUIDE	
<p>The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.</p>	
<p>Overview of assessment</p>	<p>This unit of competency could be assessed by the application of structural design principles to a medium rise building and construction project, including demolition of existing buildings and communication of the selection, positioning and sizing of all structural members that form fixed or temporary building structures for the project.</p> <p>This unit of competency can be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>A person who demonstrates competency in this unit must be able to provide evidence of the ability to:</p> <ul style="list-style-type: none"> • plan and implement the erection or demolition of buildings in compliance with relevant legislation • interpret and apply relevant documentation and codes • accurately apply design principles relating to performance • identify typical faults and problems and the action required to rectify them.
<p>Context of and specific resources for assessment</p>	<p>This unit of competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints. Assessment of essential underpinning knowledge will usually be conducted in an off-site context. Assessment is to comply with relevant regulatory or Australian standards' requirements.</p> <p>Resource implications for assessment include:</p> <ul style="list-style-type: none"> • documentation, including design brief drawings, specifications, codes, design concepts, construction schedules and other necessary supporting documents

EVIDENCE GUIDE	
	<ul style="list-style-type: none"> • research resources, including timber product information and samples • access to relevant legislation, regulations and codes of practice, including the BCA • relevant computer software package and suitable hardware. <p>Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.</p>
Method of assessment	<p>Assessment methods must:</p> <ul style="list-style-type: none"> • satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package • include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application • reinforce the integration of employability skills with workplace tasks and job roles • confirm that competency is verified and able to be transferred to other circumstances and environments. <p>Validity and sufficiency of evidence requires that:</p> <ul style="list-style-type: none"> • competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace • where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability and applied knowledge • all assessment that is part of a structured learning experience must include a

EVIDENCE GUIDE	
	<p>combination of direct, indirect and supplementary evidence.</p> <p>Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.</p> <p>Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.</p>

Range Statement

RANGE STATEMENT	
<p>The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.</p>	
<p><i>Structural principles</i> relate to factors that include:</p>	<ul style="list-style-type: none"> • 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.
<p><i>Medium rise buildings</i> as described within the BCA are:</p>	<ul style="list-style-type: none"> • Classes 1 and 10 • Classes 2 and 3 to a maximum of 3 storeys • Classes 4 to 9 to a maximum of 3 storeys, not including Type A construction.
<p><i>Materials</i> include:</p>	<ul style="list-style-type: none"> • aluminium • composite steel and concrete • concrete, including reinforced, pre-stressed

RANGE STATEMENT	
	concrete and tilt-up panels <ul style="list-style-type: none"> • masonry • steel, including cold-formed steel.
<i>Temporary structural elements</i> include:	<ul style="list-style-type: none"> • bracing • close sheeting • formwork props • pressure-resistant formwork • scaffolding sole plates • shields • shoring collar sets • soldier sets • ties.

Unit Sector(s)

Unit sector	Construction
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Co-requisite units

Co-requisite units	
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Competency field

Competency field	Building services
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