



Australian Government

Department of Education, Employment and Workplace Relations

CPCCSV6004A Apply footing and geomechanical design principles to buildings up to three storeys

Release: 1

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Modification History

Not Applicable

Unit Descriptor

Unit descriptor This unit of competency specifies the outcomes required to apply footing and geomechanical design principles to buildings up to three storeys and not exceeding a maximum floor area of 2000 square metres. It includes the identification, classification, calculated positioning and sizing of all structural footing that form foundation components of the project.

Application of the Unit

Application of the unit This unit of competency supports the attainment of the understanding and skills to apply footing and geomechanical design principles to buildings up to three storeys within the context of relevant legislation, the Building Code of Australia (BCA) and Australian standards.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units Nil

Employability Skills Information

Employability skills This unit contains employability skills.

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.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Evaluation of slope instability.	<p>1.1. Effect of soil and rock strength on slope instability is evaluated and recorded.</p> <p>1.2. Modes and mechanics of slope instability are researched and documented.</p> <p>1.3. Methods to stabilise slopes are researched and documented according to <i>standard specifications</i>.</p>
2. Analyse retaining wall requirements according to the structure.	<p>2.1. Retaining structures and systems suitable for various situations and <i>soil types</i> are identified adhering to <i>legislative requirements</i> and the <i>application of footings and geomechanical principles</i>.</p> <p>2.2. Active and passive earth pressure and water pressure applicable to various retaining structures is determined.</p> <p>2.3. Earth pressures on a gravity retaining wall are determined and analysed according to required structure for stability.</p>
3. Determine footing design requirements according to situation.	<p>3.1. Net safe bearing pressure for a <i>footing</i> on a clay soil is calculated without error.</p> <p>3.2. Allowable bearing pressures for footings on granular soil from in-site penetration test results are calculated without error.</p> <p>3.3. Long-term consolidation effects for footings on clay soils are analysed and recorded.</p> <p>3.4. Behaviour of footings on soils under earthquake conditions is researched and documented.</p>
4. Determine requirements for compaction of soil fill.	<p>4.1. Maximum <i>soil properties</i>, including dry density and moisture content relationship, for a soil is analysed and recorded.</p> <p>4.2. Techniques for compaction control and performance of compaction plant in consideration of <i>maintenance requirements</i> are identified and documented.</p>

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:

REQUIRED SKILLS AND KNOWLEDGE

- ability to recognise procedures, follow instructions, respond to change and contribute to workplace responsibilities, such as current work site environmental and sustainability frameworks or management systems
- communication skills to:
 - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
 - evaluate own actions to make judgements about performance and necessary improvements
 - read and interpret:
 - BCA
 - reports
 - specifications
 - working drawings
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication
 - written skills to report evaluations
- numeracy skills to interpret and apply complex mathematical information
- teamwork skills to work effectively with others.

Required knowledge

Required knowledge for this unit is:

- design principles and concepts for footings
- geomechanical engineering principles
- nature of materials and effect on performance
- nature of soil mechanics and effect of performance in problem soils
- processes for the interpretation of working drawings and specifications
- processes for the preparation of documentation
- relevant federal, state or territory legislation and local government policy and procedures
- research methods
- structural design principles in buildings.

Evidence Guide

EVIDENCE GUIDE

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.

Overview of assessment

This unit of competency could 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.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- comply with OHS regulations applicable to workplace operations
- apply organisational management policies and procedures, including quality assurance requirements where applicable
- assess footing requirements, for at least one commercial building project or equivalent, which includes advice on positioning and sizing
- analyse and report on the soil types and properties for at least two building projects or equivalent
- provide reports to appropriate body/individual as determined by the project brief.

Context of and specific resources for assessment

This 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.

Resource implications for assessment include:

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices

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- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

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.

Method of assessment

Assessment methods must:

- 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.

Validity and sufficiency of evidence requires that:

- 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

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learning experience must include a combination of direct, indirect and supplementary evidence.

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. Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

Range Statement

RANGE STATEMENT

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.

Standard specifications include industry-standard specifications and may be:

- detailed specifications, addressing specific components such as structural or other requirements
- developed specifications
- preliminary and outline specifications.

Soil types include:

- clay soils
- rock
- saturated granular soils.

Legislative requirements are limited to:

- buildings up to three storeys and not exceeding a maximum floor area of 2000 square metres
- adhering to legislative requirements for BCA relating to Class 2 and 9 buildings.

Application of footings and geomechanical principles includes:

- assessment of geomechanical and footing design for residential and commercial buildings
- identification of the nature, composition, classification and distribution of soil type.

RANGE STATEMENT

- Footing*** must be suitable for:
- building type
 - site conditions.
- Soil properties*** include:
- bulk density
 - degree of saturation
 - dry density
 - moisture content
 - porosity
 - void ratio.
- Maintenance requirements*** include identification of:
- ground water
 - surface water
 - tree root systems.

Unit Sector(s)

Unit sector Construction

Co-requisite units

Co-requisite units Nil

Functional area

Functional area