DCSBSE612: Use Basic Soils in Engineering

UNIT CODE		**DCSBSE612**	
UNIT TITLE		**Use basic soils in engineering**	
APPLICATION		This unit describes the performance outcomes, skills and knowledge required to interpret the engineering properties of soils and to carry out appropriate soil tests. The unit of competency is applied by technicians who work in a civil and structural engineering environment in analysing soils. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.	
ELEMENTS		**PERFORMANCE CRITERIA**	
Elements describe the essential outcomes.		Performance criteria describe the performance needed to demonstrate achievement of the element.	
1	Classify soils.	1.1	Use standard industry symbols to identify soil types.
		1.2	Describe in detail a sieve analysis test on a gravel soil.
		1.3	Outline the outcome of a sieve analysis test as well as any other phenomena observed during the test.
		1.4	Identify of at least five typical soil types.
2	Analyse soil compaction.	2.1	Describe soil index properties.
		2.2	Outline compaction theory, including the concept of dry density.
		2.3	Describe in detail a standard compaction test.
		2.4	Outline the outcome of a compaction test as well as any other phenomena observed during a test.
3	Examine soil plasticity.	3.1	Explain the concepts of: (a) liquid limit (b) plastic limit (c) plasticity index
		3.2	Describe in detail a liquid limit test.
		3.3	Outline the outcome of a liquid limit test as well as any other phenomena observed during the test.
		3.4	Describe in detail a plastic limit test.
		3.5	Outline the outcome of a plastic limit test as well as any other phenomena observed during the test.
		3.6	Determine the plasticity index of a clay.
4	Classify soil permeability and subsurface	4.1	Explain Darcy's equation for permeability.

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	water.	4.2	Describe and define key aspects of subsurface water flow in soils.
		4.3	Describe in detail a constant-head permeability test.
		4.4	Outline the outcome of a permeability test as well as any other phenomena observed during the test.

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

UNIT MAPPING INFORMATION
No equivalent units.

TITLE	**Assessment requirements for DCSBSE612 Use basic soils in engineering**
PERFORMANCE EVIDENCE	To achieve competency in this unit, a person must satisfy the requirements of the elements and performance criteria, foundation skills and range of conditions included in the unit. The person must also: • record the results of at least one test series on a soil sample including a sieve analysis, compaction, liquid limit, plastic limit, and constant head permeability tests. • correctly describe a sieved soil from the particle size distribution graph. • calculate, graph and explain dry density of a soil versus the percent moisture. • draw graphs to scale • classify soil types • describe soil type from graphed data Note: If a specific volume or frequency is not stated, then evidence must be provided at least once for each criterion.
KNOWLEDGE EVIDENCE	To achieve competency in this unit, a person must demonstrate knowledge of: • common tests used to identify soil properties – visual examination – soil/water properties, including moisture content; liquid, dispersion and permeability – material density tests – particle size and shape tests – soil deformation characteristics – soil strength tests

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ASSESSMENT CONDITIONS	**Assessment Conditions:** All assessment must be completed in accordance with work health and safety standards. When assessments are conducted remotely, invigilation software must be used to ensure authenticity of work completed. Model answers or marking guides must be provided for all assessments to ensure reliability of assessment judgements when marking is undertaken by different assessors. Assessors must gather a range of evidence that is valid, sufficient, authentic, and current. Questioning techniques must not require language, literacy and numeracy skills beyond those required in this module. The candidate must have access to all tools, equipment, materials and documentation required. **Assessor Requirements:** Assessment must be conducted only by persons who: • hold vocational competencies at least to the level being delivered and assessed • maintain current industry skills directly relevant to the training and assessment being provided • hold a tertiary qualification in engineering or a related field • meet the assessor requirements specified in the current Standards for Registered Training Organisations (RTOs) • undertake ongoing professional development in vocational training, learning, and assessment, including competency-based training and assessment, as required by their RTO. The RTO must also ensure that trainers and assessors keep their industry knowledge up to date through ongoing professional development. The RTO must take appropriate steps, as an ongoing procedure, to verify information about trainer and assessor's qualifications.