



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **MSL975007A Supervise sampling, inspections and testing at construction sites**

**Revision Number: 1**

## **MSL975007A Supervise sampling, inspections and testing at construction sites**

### **Modification History**

Not applicable.

### **Unit Descriptor**

<b>Unit descriptor</b>	This unit of competency covers the ability to supervise and direct the placement of materials such as soil, concrete and asphalt at a construction site. The unit involves confirming the requirements of the inspection and testing plans, liaising with site personnel and organising sampling and testing activities, collecting reliable data and reporting results. Personnel are also expected to interpret results in the field, provide reliable advice to construction personnel, recognise and rectify obvious errors or unexpected results and troubleshoot common problems.
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### **Application of the Unit**

<b>Application of the unit</b>	This unit of competency is applicable to technical officers working in the construction materials testing sector. This unit of competency is typically performed by experienced technicians or engineering paraprofessionals, who often supervise or direct less experienced technical personnel. Industry representatives have provided case studies to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting. These can be found at the end of this unit of competency under the section 'This competency in practice'.
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### **Licensing/Regulatory Information**

Not applicable.

## Pre-Requisites

Prerequisite units		
	<i>MSL954001A</i>	<i>Obtain representative samples in accordance with sampling plan</i>
	<i>MSL973009A</i>	<i>Conduct field-based acceptance tests for construction materials</i>

## 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. Prepare for on-site operations	1.1. Identify the job, consult with the client and obtain relevant information, including the level of supervision required, drawings and specifications 1.2. Select equipment and materials required for the job 1.3. Identify site hazards and the personal protective equipment and safety procedures specified for job 1.4. Organise site induction for self and support personnel as required 1.5. Record description of the job to be undertaken, compare with specification and resolve any variations 1.6. Select suitable transport for site access 1.7. Brief support personnel on job-specific requirements
2. Establish on-site operations	2.1. Consult with the site superintendent to determine methods of communication, roles, responsibilities and expectations of each party, including identification of potential problems and conflicts 2.2. Set up facilities for supervision, testing and sample storage 2.3. Inspect the site to determine the characteristics of the project, including survey control points 2.4. Design inspection, sampling and testing program in accordance with specifications
3. Supervise materials placement	3.1. Conduct inspection, sampling and testing in accordance with project requirements 3.2. Direct and advise the site superintendent based on test results and observations 3.3. Record test data and observations in accordance with enterprise practices 3.4. Remit samples to the base laboratory for testing as required 3.5. Ensure cleaning of equipment does not cause environmental damage 3.6. Supervise the removal of equipment and materials from site
4. Analyse project data and report to client	4.1. Report test results to site superintendent at specified intervals 4.2. Analyse project data and provide reports to client in the agreed format and at agreed times
5. Maintain enterprise records	5.1. Ensure site results are documented in accordance with enterprise practices 5.2. Maintain security and confidentiality of enterprise

ELEMENT	PERFORMANCE CRITERIA
	information 5.3. Prepare and issue a final project report detailing supervision and testing carried out, statement of compliance and relevant tables and plans as required
6. Promote a safe work environment	6.1. Promote the use of safe work procedures and protective equipment 6.2. Minimise environmental impacts of testing/sampling and generation of waste 6.3. Promote the collection and disposal of all waste in accordance with enterprise procedures

## Required Skills and Knowledge

Required skills include:

- identifying and describing materials used in civil construction
- directing materials placement operations
- reading and interpreting site plans, specifications and codes to determine sampling locations and frequencies
- identifying and locating sampling and testing sites and taking representative samples
- setting up and maintaining tools and equipment
- measuring and estimating elevations, lengths, areas and volumes
- observing and recording project information in writing, by sketching and photography
- using tools and equipment to perform required sampling and insitu testing
- working safely with equipment and around civil construction plant and sites
- driving safely on and off-road
- cleaning equipment before leaving site in compliance with environmental authority requirements
- handling, transporting and storing samples
- comparing test results with specifications
- resolving problems appropriately
- seeking advice about problems beyond technical competence from appropriate personnel
- report writing
- using computer software to create/maintain databases and produce detailed reports

### Required knowledge

Required knowledge includes:

- engineering properties of civil construction materials relevant to job role
- techniques used in civil construction
- plant and equipment used in civil construction
- insitu and laboratory test methods and their application to various materials
- roles and responsibilities for different levels of supervision
- relevant health, safety and environment requirements

## 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

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

Assessors should ensure that candidates can:

- direct sampling and testing in accordance with inspection and testing plans
- compare test results with specifications and draw valid conclusions on compliance
- communicate problems to appropriate personnel and resolve problems constructively.

#### Context of and specific resources for assessment

This unit of competency is to be assessed in the workplace or simulated workplace environment. It is strongly recommended that assessment is conducted through observation over time. The timeframe must allow for adequate assessment of operation under all normal and a range of abnormal conditions. Where this is not practical, additional assessment techniques must be used.

This unit of competency may be assessed with:

- *MSL915001A Provide information to customers*
- *MSL915002A Schedule laboratory work for a small team*
- *MSL925001A Analyse data and report results.*

Resources may include:

- access to construction sites, tools, equipment and materials
- enterprise procedures, sampling plans, test methods and equipment manuals.

#### Method of assessment

The following assessment methods are suggested:

- inspection of workplace documents completed by the candidate
- review of work outputs over a period of time to ensure accuracy, consistency and timeliness
- feedback from peers and supervisors
- use of suitable simulation and/or a range of case studies/scenarios.

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	<p>In all cases, practical assessment should be supported by questions to assess underpinning knowledge and those aspects of competency which are difficult to assess directly.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</p> <p>Access must be provided to appropriate learning and/or assessment support when required.</p> <p>The language, literacy and numeracy demands of assessment should not be greater than those required to undertake the unit of competency in a work like environment.</p>
<p><b>This competency in practice</b></p>	<p>Industry representatives have provided the case studies below to illustrate the practical application of this unit of competency and to show its relevance in a workplace setting.</p> <p><b>Construction materials (1)</b></p> <p>A geotechnical consultancy company has been contracted to provide level-one supervision for a commercial development in accordance with AS3798 - <i>Guidelines on earthworks for commercial and residential developments</i>. This will involve the construction of roadways, building pads and parking areas for heavy vehicles. A senior technician has been placed in charge of the project with an experienced tester to assist with routine testing and supervision. The principal contractor has provided copies of specifications, drawings and local authority requirements for this type of project. The project will involve clearing and stripping, setting-out (by contract surveyors), cut-to-fill, drainage, sewer lines and other services and construction of roadways and building pads. The supervision will be carried out in accordance with local authority requirements. Testing will involve measuring insitu densities of fill (including trench backfill) and road base materials. California Bearing Ratio (CBR) tests will be used as an aid in determining pavement thicknesses. Additional tests will be used to monitor the quality of pavement materials supplied from a local quarry. This will involve both on-site and off-site testing and require liaison with off-site personnel to ensure that the testing is timely and as specified. Based on test results and direct observations, the technician is able to direct and advise the contractor's</p>



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operators so that the materials are correctly placed and compacted. Test locations are marked on drawings and sketches and photographs used to record details of the project. Detailed daily records are used to prepare monthly reports for the contractor, accompanied by test certificates. Office staff use this information to invoice the client. The technician monitors the project to avoid exceeding the project budget. When the project is finished, the technician prepares a completion report, including all test results, site observations and a scale drawing showing all filled areas and reviews the information as a guide to planning and costing future projects.

**Construction materials (2)**

A concrete supply company has been contracted to provide supervision and technical support for a high-rise commercial development. This will involve pumping concrete for placement up to forty floors. A senior technician has been placed in charge of the project with an experienced tester to assist with routine testing and supervision. The principal contractor has provided copies of specifications and drawings. The project will involve supervising the placement of concrete. Testing for consistency will be required for each truckload.

Compressive strength cylinders and a flexure beam will be required for every fifth truckload and a shrinkage bar for each day's production. This will involve both on-site and off-site testing and require liaison with off-site personnel to ensure that the testing is timely and as specified. Based on test results and direct observations, the technician is able to direct the batch plant how to adjust the mix to improve its pumpability and advise the contractor's operators so that the materials are correctly placed and compacted.

**Construction materials (3)**

An asphalt supply company has been contracted to provide supervision and technical support for a runway upgrade at a major regional airport. This will involve laying asphalt so that airport operations are not impeded. A senior technician has been placed in charge of the project with an experienced tester to assist with routine testing and supervision. The principal contractor has provided copies of specifications and drawings and a Gantt chart showing the critical stages of the project. Testing for asphalt temperature will be required for each truckload. Nuclear density tests and core samples will be

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required for each lot. This will involve both on-site and off-site testing and require liaison with off-site personnel to ensure that the testing is timely and as specified. Based on test results and direct observations, the technician is able to advise the contractor's operators so that the materials are correctly placed and compacted.

## 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.

#### Codes of practice

Where reference is made to industry codes of practice, and/or Australian/international standards, it is expected the latest version will be used

#### Standards, codes, Procedures and/or enterprise requirements may include:

- Australian and international standards, such as:
  - AS ISO 1000-1998 The international system of units (SI) and its application
  - AS ISO 17025-2005 General requirements for the competence of testing and calibration laboratories
  - AS/NZS ISO 14000 Set:2005 Environmental management standards set
  - AS/NZS ISO 9000 Set:2008 Quality management systems set
- calibration and maintenance schedules
- enterprise recording and reporting procedures
- environmental legislation and regulations
- equipment manuals
- equipment startup, operation and shutdown procedures
- industry codes of practice
- material, production and product specifications
- National Association of Testing Authorities (NATA) documents regarding construction materials testing
- occupational health and safety (OHS) national standards and codes of practice
- production and laboratory schedules
- quality manuals
- standard operating procedures (SOPs)

#### Tools and equipment

Tools and equipment used may include:

- sampling equipment including moulds and coring equipment
- hand tools, including shovels, crowbars,

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	<p>scoops, spanners, wrenches and tape measure</p> <ul style="list-style-type: none"><li>• consumables, including sample bags and labels</li><li>• documentation, including maps, plans, contract documents and worksheets</li><li>• field test equipment, including nuclear moisture/density gauge, dynamic cone penetrometers and slumping equipment</li><li>• still/video camera</li><li>• two-way radio and mobile telephone</li><li>• levelling equipment and global positioning system (GPS) receiver</li></ul>
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<b>RANGE STATEMENT</b>	
<b>Site hazards</b>	<p>Site hazards may include:</p> <ul style="list-style-type: none"> <li>• solar radiation, dust and noise</li> <li>• manual handling of heavy materials and equipment</li> <li>• falling objects, slips, trips and fall hazards</li> <li>• vehicular and pedestrian traffic</li> </ul>
<b>Safety procedures</b>	<p>Safety procedures may include:</p> <ul style="list-style-type: none"> <li>• use of material safety data sheets (MSDS)</li> <li>• use of personal protective equipment, such as hard hats, hearing protection, sunscreen, gloves, masks, goggles, coveralls, safety boots and high visibility clothing</li> <li>• handling, and storage of hazardous materials and equipment in accordance with labels, MSDS, manufacturer's instructions, enterprise procedures and regulations</li> <li>• regular cleaning of equipment and vehicles</li> <li>• machinery guards</li> <li>• signage, barriers, flashing lights and traffic control</li> </ul>
<b>Typical problems</b>	<p>Typical problems include:</p> <ul style="list-style-type: none"> <li>• uncooperative site personnel</li> <li>• non-conformances leading to confrontation with other personnel</li> <li>• delays in obtaining test results</li> <li>• damage to services, materials and site conditions</li> <li>• displaced, missing and inaccurate survey markers</li> <li>• misidentification of samples and sampling locations</li> <li>• equipment breakdown and breakage</li> <li>• environmental problems and issues, including site access, inclement weather, traffic, wildlife, vegetation and construction activities</li> </ul>
<b>Occupational health and safety (OHS) and environmental management requirements</b>	<p>OHS and environmental management requirements:</p> <ul style="list-style-type: none"> <li>• all operations must comply with enterprise OHS and environmental management requirements, which may be imposed through</li> </ul>

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	<p>state/territory or federal legislation - these requirements must not be compromised at any time</p> <ul style="list-style-type: none"> <li>• all operations assume the potentially hazardous nature of samples and require standard precautions to be applied</li> <li>• where relevant, users should access and apply current industry understanding of infection control issued by the National Health and Medical Research Council (NHMRC) and State and Territory Departments of Health</li> </ul>
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**Unit Sector(s)**

<b>Unit sector</b>	Testing
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**Competency field**

<b>Competency field</b>	
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**Co-requisite units**

<b>Co-requisite units</b>		