



Australian Government

CPPSIS6021A Conduct open mine pit surveying

Release 1

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Modification History

Unit revised and not equivalent to CPPSIS6001A Conduct open mine pit surveying
Element structure, performance criteria, and critical aspects reviewed to reflect workplace requirements
Skills and knowledge requirements and the range statement updated

Unit Descriptor

This unit of competency specifies the outcomes required to work in a surveying capacity in an open mine pit environment. It requires knowledge of surface mining operations and the ability to plan and draft mine drawings to meet job specifications. Functions would be carried out within organisational guidelines.

Application of the Unit

This unit of competency supports the application of managing teams, sound communication, technology, designing data, planning, high-level problem solving, implementing project specifications and implementing safety requirements. The skills and knowledge acquired upon completion of this unit would support the needs of employees in surveying.

Licensing/Regulatory Information

Licensing, legislative and regulatory requirements for this unit may include relevant components of state, territory and federal legislation.

Pre-Requisites

Nil

Employability Skills Information

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 required performance needed to demonstrate achievement of the element. Where ***bold italicised*** text is used, further information is detailed in the required skills and knowledge and/or the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

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|---|---|-----|--|
| 1 | Identify project. | 1.1 | <i>Organisational priorities</i> are determined to identify project activity. |
| | | 1.2 | <i>Schematic models</i> of areas that may have mineral deposits are presented to <i>relevant personnel</i> . |
| 2 | Organise resources for open mine pit operation. | 2.1 | Processes and procedures involved in undertaking exploration of mineral deposits are planned according to <i>organisational guidelines</i> and <i>OHS</i> requirements. |
| | | 2.2 | <i>Mining methods</i> and techniques applicable to <i>surface mining</i> operations are planned according to <i>project objectives</i> . |
| | | 2.3 | Required explosives, blasting and blasting practices applicable to the mining industry are identified. |
| | | 2.4 | Required mining methods including dumps, stockpiles drainage and dewatering are detailed according to project specifications and <i>Mines Safety requirements</i> . |
| | | 2.5 | Levels of <i>rock stability and ground support</i> are incorporated in surface mining operation plans. |
| | | 2.6 | <i>Surface mining loading and haulage requirements</i> are detailed in the project <i>specifications</i> . |
| | | 2.7 | <i>Mine ventilation requirements</i> for surface mines, with regard to air quality and possible contaminants, are detailed in project specifications according to OHS guidelines. |
| | | 2.8 | <i>Mining regulations</i> with regard to management, |

- surveying, safety, blasting, power and lighting are detailed according to relevant **legislation** and **company policy**.
- 2.9 **Equipment** use is planned according to **manufacturer specifications**.
- 3 Manage open mine pit surveying operations.
- 3.1 Project objectives, deliverables, **constraints**, **principal work activities** and equipment requirements are defined and documented according to spatial data specifications and **client requirements**.
- 3.2 Work is scheduled to be completed within **time available**.
- 3.3 **Project management mechanisms** are implemented to measure, record and report progress of activities in relation to the agreed schedule and plans.
- 3.4 Agreed communication processes between project members, **client** and other **stakeholders** are implemented and maintained.
- 3.5 OHS and legislative requirements are incorporated into project **risk management**.
- 3.6 Pertinent **legal and statutory standards** are researched, considered and adhered to.
- 3.7 **Contingencies** and constraints are managed to ensure project meets specifications.
- 4 Conduct operational elements of open mine pit surveying operations.
- 4.1 Identified spatial components of the open mine pit are accurately measured or set out.
- 4.2 Measured spatial data is reduced to project reference system.
- 4.3 Mine drawings are created to meet job specifications.
- 4.4 Captured data is used to calculate mine volumes.
- 4.5 OHS requirements are adhered to.
- 4.6 **Measurements** are validated and recorded according to project specifications.
- 4.7 **Quality assurance processes** are implemented based on

the project activity.

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|---|-----------------------|-----|---|
| 5 | Finalise the project. | 5.1 | Relevant personnel are informed of the results according to organisational guidelines. |
| | | 5.2 | <i>Required documentation</i> is completed according to organisational guidelines. |
| | | 5.3 | Spatial data is archived according to project specifications. |

Required Skills and Knowledge

This section describes the essential skills and knowledge and their level, required for this unit.

Required skills

- communication skills to:
 - consult effectively with clients and colleagues
 - impart knowledge and ideas through oral, written and visual means
 - write technical reports
- initiative and enterprise skills to translate requirements into design
- literacy skills to:
 - assess, develop and use workplace information
 - prepare and manage documentation and information flow
 - read and write key performance reports, including technical reports
- numeracy skills to:
 - analyse errors
 - perform mental calculations
 - record with accuracy and precision
 - undertake high level computations
- organisational skills to plan and prioritise activities to meet contractual requirements
- project-management skills to:
 - identify needs
 - coordinate activity to conduct open mine pit surveying operation
 - monitor and document activity within designated timeframes
- spatial skills to:
 - exercise precision and accuracy in relation to mine surveying
 - archive and retrieve spatial
 - manage and manipulate spatial data
 - manage files
 - solve complex problems relating to height, depth, breadth, dimension, direction and position in actual operational activity and virtual representation
- technology skills to:
 - use computers to develop business documentation
 - use instruments when conducting open mine pit surveying

Required knowledge

- abilities of work teams
- accuracy and precision requirements
- advances in current mining technology
- balance that must be maintained between economic viability, sustainable resource development and environmental factors as related to the mining industry
- basic characteristics of common ore deposits
- specialised surveying equipment requirements and accessibility
- classification of economic mineral deposits and the process involved in presenting a schematic model
- concept of mining in terms of objectives, types, classifications and purpose
- data capture and data set out
- data formats
- data management
- data reduction and manipulation techniques
- drilling methods applicable to mining operations
- drilling purpose
- drilling techniques applicable to blasting in mining operations
- drilling techniques used for sampling rock and unconsolidated sands
- engineering-related tasks and associated computations
- explosives, blasting and blasting practices applicable to mining operations
- legislative, statutory and industry requirements and standards
- limitations of the guidelines relating to equipment, measuring and analysis
- mineral exploration methods: geophysical, geochemical and geological techniques
- OHS guidelines
- organisational policies
- phases and stages of exploration procedure, and possible methods of exploration relevant to each
- planning and control processes
- principles of explosives and the types of properties of commercially available explosives
- processes and procedures involved in undertaking exploration of mineral deposits
- project guidelines
- project review procedures
- safe work practices in all aspects of surface mining, including explosives
- scope of mining in terms of cultural, economical and social significance
- spatial reference systems
- surveying equipment for data capture
- surveying reference systems
- terminology and nomenclature applicable to mining

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the Assessment Guidelines for this Training Package.

Overview of assessment	This unit of competency could be assessed on its own or in combination with other units relevant to the job function, for example CPPSIS6033A Conduct underground mine surveying.
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: • conducting a collection and validation process based on thorough assessment of all relevant considerations • accessing and interpreting design information to identify the components to be measured and monitored • managing contingencies • organising and prioritising activity • performing measurements • planning resources • reducing and manipulating spatial data • recording and reporting non-conformity aspects • knowledge of surface mining operations.
Specific resources for assessment	Resource implications for assessment include access to: • assessment instruments, including personal planner and assessment record book • assignment instructions, work plans and schedules, policy documents and duty statements • registered training provider of assessment services • relevant guidelines, regulations and codes of practice • suitable venue and equipment. Access must be provided to appropriate learning and assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Context of assessment	Holistic: based on the performance criteria, evidence guide, range statement, and required skills and knowledge.
Method of assessment	Demonstrated over a period of time and observed by the assessor (or assessment team working together to conduct the assessment). Demonstrated competency in a range of situations, that may include customer/workplace interruptions and

involvement in related activities normally experienced in the workplace.

Obtained by observing activities in the field and reviewing induction information. If this is not practicable, observation in realistic simulated environments may be substituted.

Guidance information for assessment

Assessment requires that the clients' objectives and industry expectations are met. If the clients' objectives are narrowly defined or not representative of industry needs, it may be necessary to refer to portfolio case studies of a variety of surveying and spatial information services requirements to assess competency.

Oral questioning or written assessment and hypothetical situations (scenarios) may be used to assess underpinning knowledge (in assessment situations where the candidate is offered a preference between oral questioning or written assessment, questions are to be identical).

Supplementary evidence may be obtained from relevant authenticated correspondence from existing supervisors, team leaders or specialist training staff.

All practical demonstration must adhere to the safety and environmental regulations relevant to each State or Territory.

Where assessment is for the purpose of recognition (recognition of current competencies [RCC] or recognition of prior learning [RPL]), the evidence provided will need to be authenticated and show that it represents competency demonstrated over a period of time.

In all cases where practical assessment is used it will be combined with targeted questioning to assess the underpinning knowledge.

Assessment processes will be appropriate to the language and literacy levels of the candidate and any cultural issues that may affect responses to the questions, and will reflect the requirements of the competency and the work being performed.

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 in the performance criteria is detailed below. Add any 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.

Organisational priorities may include:

- client focus
- external influence and focus
- financial priorities
- internal influence and focus
- operational plan

- strategic plan.

Schematic model may include:

- detailed reconnaissance of favourable areas
- regional appraisal
- surface appraisal of target area
- three-dimensional sampling and preliminary evaluation.

Relevant personnel may include:

- colleagues
- registered surveyors
- company personnel
- staff or employee representatives
- supervisors or line managers
- suppliers
- users.

Organisational guidelines may include:

- appropriate timelines
- code of ethics
- company policy
- final product formats
- formal design parameters
- legislation relevant to the work or service function
- manuals
- OHS policies and procedures
- personnel practices and guidelines outlining teamwork, work roles and responsibilities
- requirements for data processing.

OHS may include:

- Australian standards
- development of site safety plan
- identification of potential hazards
- inspection of work sites
- training staff in OHS requirements
- use of personal protective clothing
- use of safety equipment and signage.

Mining methods may include:

- bench blasting using a delay detonator sequence
- development of coal pits, roads and ramps
- drilling
- interburden removal
- pre-strip
- spoil pits
- stockpiles, dumps and safety berms.

Surface mining may include:

- characteristics of excavations
- factors associated with the selection of an open mine pit method
- grade control and blending
- requirements for stockpiles and waste dump storage

- sources of water in a surface mine and methods of control, including pumping
- terminology appropriate to surface mining.

- Project objectives** may include:
- agreed client requirements
 - written survey specifications.
- Mines Safety requirements** may include:
- dumping
 - explosives handling
 - hazards associated with such things as ventilation, poor lighting and instability
 - lighting
 - loading
 - Mines Safety requirements relating to:
 - blasting
 - explosives
 - practical application
 - storage and usage
 - statutory regulations
 - transport
 - the working of faces and benches as defined by Mines Safety regulations.
- Rock stability and ground support** relating to how these factors are used to derive a suitable pit wall slope:
- techniques to ensure rock stability and ground support include:
 - cable bolts
 - mesh
 - pit wall slope
 - rock bolts.
- Surface mining loading and haulage requirements** may include:
- application of loading and haulage methods relative to excavation and transport requirements
 - principles of excavation and transportation of materials relative to mining operations
 - selection of types of equipment and processes to be used in mining operations for loading and haulage.
- Specifications** may include:
- detailed technical descriptions of survey data and its requirements
 - preparation of cross-sections and plans with all information included.
- Mine ventilation requirements** may include:
- duties of the ventilation officer for a surface mining operation
 - exposure standards
 - testing and sampling of atmospheric contaminants.
- Mining regulations** may include:
- Australian standards
 - coal mining Acts and regulations
 - environmental agency regulations
 - isolation procedures

- manufacturer specifications and recommendations
- other applicable legislation, including:
 - electricity
 - explosives
 - gas
 - radiation
 - mine legislation.

- Legislation** may include:
- Australian standards
 - award and enterprise agreements
 - certification requirements
 - codes of practice
 - environment protection legislation
 - OHS legislation
 - quality assurance requirements.
- Company policy** may include:
- company OHS standards
 - customer service standards
 - company goals, such as mission statement
 - governance guidelines
 - guidelines on the use of equipment
 - internal and external communication guidelines
 - operational manuals
 - operational plan
 - strategic plan.
- Equipment** may include:
- augers and drills
 - bucketwheel
 - draglines
 - equipment, such as trailers and floats
 - excavators
 - four-wheel drive passenger vehicles
 - high well miners
 - mobile plant heavy earth-moving equipment
 - scrapers
 - water and service machines.
- Manufacturer specifications** may include:
- equipment specifications
 - operator manuals.
- Constraints** may include:
- coverage
 - datum
 - environmental factors
 - industry requirements
 - legal and statutory
 - financial
 - resource availability
 - time.
- Principal work activities** may include:
- activity and sequence of activity determined to be essential in order to meet project objectives.
- Client requirements** refer to description of outputs
- contracts
 - memos

- and may be contained in:
- tender briefs
 - verbal instructions
 - written instructions.

- Time available** may involve estimates for time duration of project, including:
- client instructions
 - consideration of contingencies
 - consideration of past project experiences
 - experience of project personnel
 - location of project
 - methods to be employed
 - resources and equipment to be used.
- Project management mechanisms** may include:
- communication with stakeholders
 - dispute resolution
 - monitoring and adjusting key milestones.
- Client** may include:
- customers with routine or special requests
 - external to organisation
 - internal to organisation
 - regular and new customers, including:
 - business enterprises
 - government agencies
 - members of the public
 - suppliers.
- Stakeholders** may include:
- human resource personnel: internal or external
 - procurement agency: internal or external management.
- Risk management** may include:
- adhering to budget
 - anticipating external influences
 - contingency planning
 - guidelines for the selection of contractors
 - effective communication and consultation
 - effective project management
 - internal and external audit processes
 - milestone review and evaluation
 - realistic timelines
 - targeted activity.
- Legal and statutory standards** may include:
- local government requirements
 - national standards
 - state statutes and regulations.
- Contingencies** may include:
- equipment failure
 - injury to personnel
 - personnel turnover
 - observation errors
 - obstructions to project activity
 - weather.
- Measurements** may include use of:
- current meter
 - echo sounder

- global navigation satellite system (GNSS)
 - level
 - remote sensing
 - tape
 - tide gauge
 - total station.
- Quality assurance processes** may include:
- internal and external
 - product or service measurement against set criteria
 - standard verification
 - target monitoring.
- Required documentation** may include:
- electronic or paper-based correspondence with client
 - field records
 - final report
 - records of conversation
 - survey plots
 - organisational work activity sheets.

Unit Sector(s)

Surveying and spatial information services

Custom Content Section

Not applicable.