



Australian Government

CPPSIS6033 Conduct underground mine surveys

Release: 1

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Modification History

Release 1.

Replaces superseded equivalent CPPSIS6033A Conduct underground mine surveying.

This version first released with CPP Property Services Training Package Version 3.

Application

This unit of competency specifies the outcomes required to conduct underground mine surveying operations to meet client specifications. The unit covers project management activities relating to scheduling, measuring, recording, monitoring and reporting work progress; organising resources and equipment; and planning for risks and contingencies. The unit also covers identifying projects, and organising resources and planning to support an underground mine surveying operation, including for developing headings, rock stability and ground support, loading and haulage and mine ventilation. The unit requires the ability to implement underground surveying operations using specialist equipment to measure identified components of an underground mine, capture and reduce data, and create mine drawings. The unit requires knowledge of underground mining operations and requirements to comply with standards, legislation and regulations applicable to the mining industry.

The unit supports those who work in a technical management role in an underground mining environment.

Licensing, legislative, regulatory or certification requirements apply to this unit in some States where mining surveying must be undertaken under the supervision of a registered surveyor. Relevant state and territory regulatory authorities should be consulted to confirm those requirements.

Pre-requisite Unit

Nil

Unit Sector

Surveying and spatial information services

Elements and Performance Criteria

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions.

1. Prepare for

1.1. Client requirements and project specifications are

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|-----------------------------|---|--|
| underground mine surveying. | | identified in consultation with <i>appropriate persons</i> . |
| | 1.2. | <i>Processes and procedures</i> involved in undertaking underground mining methods are planned according to organisational requirements. |
| | 1.3. | Mining techniques applicable to developing headings in underground mining operations are planned according to project objectives and organisational requirements. |
| | 1.4. | <i>Underground mining methods</i> for metalliferous and coal mines are determined according to project specifications and organisational requirements. |
| | 1.5. | Project specifications are developed that incorporate levels of rock stability, ground support, and loading and haulage requirements for underground mines. |
| | 1.6. | Mine ventilation requirements for underground mines are detailed in project specifications according to organisational requirements. |
| 2. | Plan underground mine surveying operations. | |
| | 2.1. | Surveying objectives, deliverables, constraints, work activities and surveying equipment needs are identified and documented according to spatial data specifications and organisational requirements. |
| | 2.2. | Project management mechanisms are implemented to schedule, measure, record and report progress of activities in relation to agreed schedule and plans. |
| | 2.3. | Agreed communication processes between client and other appropriate persons are implemented and maintained. |
| | 2.4. | Risk management and contingency strategies are devised and followed to ensure project complies with legal and statutory standards and organisational requirements. |
| 3. | Conduct operational elements of underground mine surveying. | |
| | 3.1. | Identified spatial components of mine design are accurately measured or set out according to project specifications. |
| | 3.2. | Measured spatial data is reduced to project reference system for comparison with design. |

- 3.3. Mine drawings are created to meet project specifications.
 - 3.4. Captured data is reduced and used to calculate mine volumes according to project specifications.
 - 3.5. Measurements are validated and recorded according to organisational requirements.
 - 3.6. Problems are identified and resolved, and contingencies managed according to organisational requirements.
 - 3.7. Underground development is set out according to design parameters.
4. Finalise and report project outcomes.
 - 4.1. Project is finalised and checked for compliance with project specifications and organisational requirements.
 - 4.2. Appropriate persons are notified of project results according to organisational requirements.
 - 4.3. Documentation is completed and spatial data archived according to project and organisational requirements.

Foundation Skills

This section describes the language, literacy, numeracy and employment skills essential to performance in this unit but not explicit in the performance criteria.

Skill	Performance feature
Planning and organising skills to:	plan and prioritise work to meet contracts and resource constraints.
Numeracy skills to:	conduct precise measurements and calculations relating to height, depth, dimension, direction and position in actual operational activity and virtual representation.
Oral communication skills to:	- inform clients and other stakeholders of project progress - negotiate to meet client requirements.

- Reading skills to:
- analyse graphical and technical information in mining and engineering plans.
- Writing skills to:
- record technical information in organisational documentation.
- Technology skills to:
- connect equipment to coordinate systems
 - set up and calibrate specialised surveying equipment.
- Problem-solving skills to:
- identify and resolve areas of potential non-compliance of operations with legislation, regulations and standards.

Range of Conditions

This section specifies work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included. Bold italicised wording, if used in the performance criteria, is detailed below.

- Appropriate persons*** must include at least two of the following:
- client
 - colleague
 - engineer
 - manager
 - registered or qualified surveyor
 - supplier.

- Processes and procedures*** must include:
- mine access
 - mine layout
 - service provision.

- Underground mining methods*** must include at least one of the following:
- mining methods applicable to underground coal mining, including:
 - long wall
 - room
 - pillar
 - mining methods applicable to underground metalliferous

mining, including:

- block caving
- cut and fill stoping and shrinkage stoping
- sub-level caving
- sub-level open stoping.

Unit Mapping Information

CPPSIS6033A Conduct underground mine surveying

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=6f3f9672-30e8-4835-b348-205dfcf13d9b>

Assessment Requirements for CPPSIS6033 Conduct underground mine surveys

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Performance Evidence

A person demonstrating competency in this unit must satisfy the requirements of the elements, performance criteria, foundation skills and range of conditions of this unit. The person must also conduct underground mine surveys for two different projects.

While conducting the above underground mine surveys, the person must:

- analyse organisational priorities and plans and drawings to identify project specifications
- prepare and document project plans and specifications that detail:
 - levels of rock stability and ground support
 - loading and haulage requirements for underground mines
 - mine ventilation requirements
 - required equipment
 - strategies for risk and contingency management
 - underground mining methods for metalliferous and coal mines
- set out underground development based on design parameters in drawings
- communicate clearly with clients and stakeholders to clarify and report project information
- comply with organisational policies and procedures, standards, regulations and legislation relating to underground mining surveying operations when planning for:
 - drainage and dewatering
 - dumps and stockpiles
 - equipment use
 - loading and haulage
 - mine ventilation and air control
 - power and lighting
 - records and reporting
 - rock stability and ground support
 - standards and quality
 - surveying tasks
 - water control and supply
 - work health and safety and mines safety requirements

- conduct underground surveying tasks to create mine drawings, and capture and reduce data to calculate mine volumes
- perform calculations to measure, reduce and validate spatial data captured from underground mine surveying
- measure survey components using two of the following pieces of equipment:
 - cavity monitoring systems
 - gyro-theodolites
 - level
 - remote sensing
 - tape
 - total station
- plan and implement project management mechanisms to ensure the underground mine surveying operation is completed within required timeframes and the project complies with specifications and standards
- work safely, using personal protective equipment (PPE) when performing surveying tasks.

Knowledge Evidence

A person demonstrating competency in this unit must demonstrate knowledge of:

- accuracy and precision requirements for surveying data
- data capture and set-out techniques
- data reduction and manipulation techniques
- drilling techniques:
 - applicable to blasting in mining operations
 - used for sampling rock and unconsolidated sands
- methods for developing headings in underground mining operations
- methods for ensuring adequate mine ventilation, including:
 - duties of ventilation officer for an underground mining operation
 - exposure standards for atmospheric contaminants
 - methods for measuring air velocity and determining air quantity given relevant operational data
 - properties of natural air flow
 - methods of mechanical and auxiliary ventilation
 - procedures for testing and sampling atmospheric contaminants
 - requirements for ventilation plans
 - sources of atmospheric contaminants in an underground mining environment
- mineral exploration methods, including geophysical, geochemical and geological techniques
- mining methods for metalliferous and coal mines
- organisational policies and procedures, standards, regulations and legislation relating to:
 - client and stakeholder communication
 - using equipment, as specified in the performance evidence

- mining industry and underground mining, including:
 - mine access
 - layout development
 - service provision, such as water, air, power, lighting and dewatering
 - work health and safety and mines safety requirements
- records and reporting
- risk and contingency management
- phases and stages of exploration procedure and possible methods of exploration relevant to each
- project management techniques for scheduling, measuring and monitoring work progress and planning for risks and contingencies
- safe work practices in all aspects of underground mining
- specialised surveying equipment requirements and accessibility in relation to underground mining
- techniques for providing rock stability and ground support, including cable bolts and rock bolts
- terminology and nomenclature applicable to underground mining.

Assessment Conditions

The following must be present and available to learners during assessment activities:

- equipment:
 - as specified in the performance evidence, including PPE
- specifications:
 - mining and surveying specifications, including relevant plans and drawings
 - organisational policies, procedures and documentation relating to:
 - work health and safety
 - mining regulations
- relationships with team members and supervisor:
 - lead role in a team.

Timeframe:

- as specified by project requirements.

Assessor requirements

As a minimum, assessors must satisfy the assessor requirements in the Standards for Registered Training Organisations (RTOs) current at the time of assessment.

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