



Australian Government

Department of Education, Employment and Workplace Relations

RIISDM501A Conduct mine surveying operations

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers conducting mine surveying operations in the mining industries. It includes: planning and preparing for operations; gathering, organising, processing, analysing, evaluating, interpreting and assembling data; compiling and producing survey records; completing and presenting documentation; and maintaining survey equipment.

Application of the Unit

This unit is appropriate for those working in mine surveyor roles, within:

- Coal mining
- Metalliferous mining

Licensing/Regulatory Information

Refer to Unit Descriptor.

Pre-Requisites

Not applicable.

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 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. Plan and prepare for survey operations	1.1. Access, interpret and apply compliance documentation relevant to conducting mine surveying operations 1.2. Schedule key activities and time lines 1.3. Identify stakeholders and organise activities in consultation according to organisation's guidelines 1.4. Plan survey work with due consideration to relevant technical and legislative requirements 1.5. Conduct work according to site procedures, regulations, OHS, other relevant legislation , manufacturer specifications 1.6. Identify, manage and report potential risks and hazards according to site procedures 1.7. Select and use personal protective equipment 1.8. Adhere to emergency procedures
2. Gather data	2.1. Operate equipment to gather spatial data according to manufacturer's specification, legislative and organisation's guidelines 2.2. Correctly measure identified spatial components 2.3. Validate and record measurements in accordance with legislative and project specifications 2.4. Reduce measured spatial data to project spatial reference system for comparison against design parameters as required 2.5. Identify inconsistencies in information by verification and recording them 2.6. Determine uses and limitations of base data
3. Organise and process data	3.1. Identify the outcomes and elements of systems, and design and develop systems standards and integrate into data management quality programs 3.2. Verify the integrity of base spatial and textual data and process and store those data to achieve specific outcomes 3.3. Verify the integrity of processed data

	3.4. Select appropriate database and collate relevant spatial and textual data in one system for transfer and integration into other systems as required 3.5. Convert and transfer data between systems and media, employing appropriate technology and procedures 3.6. Administer databases by applying effective procedures and systems for the manipulation of information, and the security and maintenance of data
4. Analyse, evaluate and interpret data	4.1. Apply systems to analyse spatial data and information 4.2. Determine the required accuracy and reliability of spatial data and information 4.3. Interpret data to ensure that they are relevant to client/stakeholder needs 4.4. Enhance or add value to data, where required, to increase the quality and usability of data 4.5. Collate and relate data to specific areas of operations
5. Assemble data	5.1. Identify, clarify and satisfy stakeholder and operations personnel spatial data requirements 5.2. Create specific information from a number of databases to meet the needs of clients or legislation 5.3. Assemble data into useful sets of information using relevant technology and procedures 5.4. Compile and produce maps, plans and charts 5.5. Format data according to legislative and organisational standards and needs
6. Compile and produce survey records	6.1. Determine the application/uses and limitations of base spatial data 6.2. Maintain records of original survey (raw) data such as field books and data input files 6.3. Identify, select and apply available techniques and technology best suited to present graphical and photographic records to meet client needs 6.4. Transfer spatial data between various

	media to provide consolidated digital spatial information, ensuring the accuracy and reliability and maximum potential of the data 6.5. Integrate spatial data with other information to provide consolidated digital spatial information, ensuring the accuracy and reliability and maximum potential of the data 6.6. Create models of nature or cultural entities and phenomena 6.7. Create model files and integrate with other data 6.8. Transfer model files between various media
7. Complete and present documentation	7.1. Record data according to accepted industry and legislative standards 7.2. Resolve omissions and gaps in spatial data 7.3. Complete promptly and accurately all required documentation according to legislative and organisational requirements 7.4. Store all documentation according to legislative and organisational requirements 7.5. Prepare information and reports in a format and detail appropriate to the client/stakeholder and employ appropriate communication and display techniques to present information and reports 7.6. Apply effective validation procedures to verify the accuracy and reliability of data which are to be certified 7.7. Certify and sign-off data and information to meet legislative and company/site requirements
8. Maintain survey equipment	8.1. Check survey instruments and ensure accuracy and performance in accordance with site practices, legislation and manufacturer's instructions 8.2. Calibrate survey instruments to ensure correct and accurate measurements in accordance with site practices, legislation and manufacturer's instructions 8.3. Ensure safe storage and transport of equipment and survey instruments in

	accordance with site practices and legislation 8.4.Maintain equipment and survey instrument condition and cleanliness
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Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required skills

Specific skills are required to achieve the performance criteria in this unit, particularly for the application in the various circumstances in which this unit may be applied. This includes the ability to carry out the following as required to conduct mine surveying operations:

- apply legislative, organisation and site requirements and procedures
- apply procedures for consulting with stakeholders and others
- apply risk management practices
- apply investigation requirements and procedures
- apply effective communication techniques
- apply instructions
- apply strategic planning techniques
- apply professional judgement
- apply attention to detail
- interpret data/information
- perform under adverse conditions
- apply effective observation techniques
- apply policy management requirements and procedures
- apply interpersonal skills
- liaise with other parties
- apply coordination techniques
- apply information management requirements and procedures
- apply problem solving techniques
- analyse data/information
- use surveying equipment
- apply clear report writing techniques
- facilitate meetings

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly its application in a variety of circumstances in which the unit may be used. This includes knowledge of the following, as required to conduct mine surveying operations:

- measurement techniques
- accuracy and precision requirements
- limitations of equipment, measuring and analysis guidelines
- map reading and spatial comprehension
- site geography and geology

- mine operations in their workplace
- cartographic principles
- surveying techniques
- survey equipment
- survey equipment care and maintenance
- project reporting guidelines
- spatial reference systems
- spatial data reduction and manipulation techniques
- GIS principles and techniques
- risk management principles
- company organisation
- work role definitions
- reporting methods and alternatives
- relevant standards, licenses and permits
- safe work practices
- emergency procedures and obligations
- community expectations
- consultative strategies
- alternative documentation systems for procedures
- environmental issues

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	The evidence required to demonstrate competency in this unit must be relevant to worksite operations and satisfy all of the requirements of the performance criteria, required skills and knowledge and the range statement of this unit and include evidence of the following: • knowledge of the requirements, procedures and instructions for the conducting of mine surveying operations • implementation of procedures and techniques for the safe, effective and efficient conducting of mine surveying • the identification of the relevant information and scope of the work required to meet the required outcomes • the identification of viable options and the selection of options that best meet the required outcomes • working with others to undertake and complete mine surveying operations • consistent successful conducting mine surveying operations
Context of and specific resources for assessment	• This unit must be assessed in the context of the work environment. Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated environment provided it is realistic and sufficiently rigorous to cover all aspects of workplace performance, including task skills, task management skills, contingency management skills and job role environment skills. • The assessment environment should not disadvantage the participant. For example, language, literacy and numeracy demands of assessment should not be greater than those required on the job. • Customisation of assessment and delivery

	environment to sensitively accommodate cultural diversity. • Aboriginal people and other people from a non English speaking background may have second language issues. • Assessment of this competency requires typical resources normally used in a civil works environment. Selection and use of resources for particular worksites may differ due to site circumstances. • Where applicable, physical resources should include equipment modified for people with disabilities. • Access must be provided to appropriate learning and/or assessment support when required.
Method of assessment	This unit may be assessed in a holistic way with other units of competency. The assessment strategy for this unit must verify required knowledge and skill and practical application using more than one of the following assessment methods: • written and/or oral assessment of the candidate's required knowledge to apply in undertaking of mine surveying operations • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate procedures and techniques for the safe, effective and efficient achievement of the required outcomes • identification of the relevant information and scope of the work required to meet the required outcomes • identification of viable options and the selection of options that best meet the required outcomes • consistently achieving the required outcomes • first hand testimonial and documentary evidence of the candidate's: • working with others to undertake and complete mine surveying operations • provision of clear and timely required support and advice on the conducting of

	mine surveying operations
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

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.

Relevant compliance documentation may include:	• legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Stakeholders may include:	• clients • client representatives • government authorities • community groups • geologists • engineers • architects/cartographers • operators • supervisors • contractors • environmentalists/ecologists
Legislation may include:	• industry codes, regulations, standards and guidelines • environmental legislation • health and safety legislation • mining tenure regulations • third tier of legislation • surveying legislation • cultural and heritage legislation
Spatial components may include:	• position • dimension • height • direction • depth • slope

	• volume • stratum
Measurements may be made with:	• theodolite • EDM • GPS • tape/level • photogrammetry • remote sensing • tide gauge • current meter • echo sounder(seismic) • laser scanner • borehole camera
Design may be represented by:	• hard copy plans or maps • digital plans or maps
Spatial and textual data may include:	• coordinates • AMG • lats/longs • grid systems • local grid systems
Technology and procedures may include:	• proven industry standard calculation procedures • hand held calculators, computer software applications • direct instrument download hardware and software applications • GPS • data recorders • text data management procedures
Plans may include:	• policies and procedures relevant to legislation, health and safety or environment, • documentation and records • regulatory and legal compliance • hazard plan • colliery development plan • fire fighting plan • stone dust plan • emergency evacuation plan • gas drainage plan • ventilation plan • risk zone management plan • Survey Memo/Work Instruction

Techniques and technology may include:	• computer generated DTM modelling • CAD dxf format files • media including: • plain paper hardcopies • CAD files (dxf)/GIS files • via e-mail - PDF Format, dxf files
Models may include:	• physical representation, at a different scale, of a real thing • physical models • computer generated models • virtual models • digital models • dynamic models
Information and reports may include:	• plans, maps • digital display • written reports • historical data • graphs, models • formulae
Communication and display techniques may include:	• plans, maps • 'Powerpoint' display • written reports
Survey instruments may include:	• GPS • electronic theodolite • microptic theodolites • levels • alignment lasers • photogrammetric instruments • laser scanners
Equipment may include:	• transport vehicle • tripods • prisms • survey accessories • field books and data recorders

Unit Sector(s)

Spatial Data Management

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.