



Australian Government

Department of Education, Employment and Workplace Relations

RIIMCU606A Establish and maintain the mining method and strata management systems

Release: 1

RIIMCU606A Establish and maintain the mining method and strata management systems

Modification History

Not applicable.

Unit Descriptor

This unit covers the establishment and maintenance of the mining method and strata management systems in the coal industry. It includes: identifying and evaluating the criteria to create and maintain a stable mining structure, identifying and evaluating geological and geotechnical information to establish a stable mining structure, identifying and evaluating mining engineering principles and practices, identifying, evaluating and determining the strata control systems, establishing the strata management plan, planning and preparing for the implementation of the mining method and strata management systems, and establishing the process to audit the effectiveness of the strata management system. Licensing, legislative, regulatory and certification requirements that apply to this unit can vary between states, territories, and industry sectors. Relevant information must be sourced prior to application of the unit.

Application of the Unit

This unit is appropriate for those working in a management or supervisory role at worksites within:

- Coal 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.
---	--

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and evaluate the criteria to create and maintain a stable mining structure	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Identify and record the necessary resources required to create and maintain a stable mining structure 1.3. Identify and evaluate historical information relating to the mine site 1.4. Identify, assess and record possible mining structure failure modes relevant to the mine site 1.5. Determine the criteria for establishing the stability of mining structures 1.6. Identify the hazards and analyse the risks associated with failures of mining structures 1.7. Identify and assess the limitations and controls applying to design of stable mining structures
2. Identify and evaluate geological and geotechnical information to establish a stable mining structure	2.1. Identify and determine exploration techniques to gain information about geological, hydrological and geotechnical conditions 2.2. Identify and evaluate geological, geotechnical and hydrological information 2.3. Identify and evaluate strata gas information 2.4. Identify and evaluate roof, seam and floor lithological and physical properties information 2.5. Identify and evaluate stress regimes information
3. Identify and evaluate mining engineering principles and practices	3.1. Identify and evaluate mining system types and methods 3.2. Identify potential layouts for stable mining structures from engineering analysis 3.3. Identify and evaluate mining constraints impacting on the development of a stable mining structure 3.4. Identify and evaluate equipment requirements, appropriate for the development and maintenance of a stable mining structure 3.5. Identify the effects of mining induced subsidence on surface areas
4. Identify, evaluate and	4.1. Identify, evaluate and determine ground

determine the strata control systems	support systems. 4.2. Identify, evaluate and determine ground support installation and monitoring systems 4.3. Identify and evaluate causes and impacts of strata failure mechanisms 4.4. Identify and evaluate natural and induced stress control methods
5. Establish the strata management plan	5.1. Design and establish methods of entry to the coal seam 5.2. Design and establish systems of mining 5.3. Design and establish sequences for mining operations 5.4. Design and establish strata management procedures 5.5. Identify the training needs and establish a training plan 5.6. Establish action response plans for the management of strata movement
6. Plan and prepare for the implementation of the mining method and the strata management systems	6.1. Access, interpret and clarify the mining method and the strata management system 6.2. Identify and communicate to all personnel roles and responsibilities, as specified in the strata management system 6.3. Identify, forecast, obtain and allocate/schedule resources required for the implementation of the strata management system 6.4. Develop the implementation process for the strata management training plan 6.5. Develop the monitoring and review processes for the strata management system
7. Establish the process to audit the effectiveness of the strata management system	7.1. Audit mining structures for stability in accordance with legislative and site requirements 7.2. Audit monitoring systems in accordance with legislative and site requirements 7.3. Audit compliance to action response plans 7.4. Audit recording and reporting systems in accordance with legislative and site requirements 7.5. Audit maintenance program and procedures in accordance with legislative and site requirements 7.6. Audit the training plan for currency, relevance and compliance with the site requirements 7.7. Establish procedures for response to

	instances of non-compliance or other discrepancies/deficiencies revealed by <i>audit</i>
--	--

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 of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes the ability to carry out the following, as required to establish and maintain the mining method and strata management systems:

- apply legislative, organisation and site requirements and procedures for establishing and maintaining the mining method and strata management systems
- access, interpret and apply technical information
- access, interpret and apply mine survey information
- access and analyse historical strata information related to the mine and failure mode of mine structures
- interpret and apply mathematical and scientific theorems/laws related to mining structures
- perform mathematical calculations
- interpret and apply design criteria for mining structures systems and devices
- collect, collate and interpret mining structures data
- prepare technical procedures relating to mining structures
- conduct enquiries/investigations and prepare reports
- communicate effectively in the workplace
- access data from monitoring systems and equipment
- operate hand held monitoring equipment
- analyse and report on training needs
- apply risk management processes and techniques

Required knowledge

Specific knowledge is required to achieve the Performance Criteria of this unit, particularly for its application in the various circumstances in which this unit may be used. This includes knowledge of the following, as required to establish and maintain the mining method and strata management systems:

- legislative and legislative requirements for mining structures, including mine plans, ventilation, gas monitoring, strata support and safety management plans
- mine planning and design
- the systems of mining, including tunnels, drifts, stone drivage, shift sinking, pillar extraction, partial extraction, punch mining, longwall mining (including installation and recovery), the use of breaker line supports and faults drivage
- stress analysis, including mining induced stress, vertical and horizontal stress tectonics
- sedimentology, including subsidence, water bearing strata, permeability of seam and strata, hydrology, physical property testing, caving characteristics, windblast,

outblast, gas content and over and underlying strata

- systems of work, including bord and pillar, place changing, longwall, highwall, auger mining, pillar extraction, partial extraction, the use of breaker line supports and punch mining
- mining structure failure modes
- exploration techniques
- geology, lithology and strata gas characteristics
- mining and general engineering principles relevant to the behaviour of excavations in rock
- ground support systems
- audit methodologies
- pillar design criteria
- pillar stress/strain/strength/ratios
- width/height ratios
- roof support design criteria
- Mohr's Circle
- Young's Modules
- Poisson's Ratio
- stress distribution diagrams
- factors of safety
- mine surveying
- mining of coal deposits

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 establishing and maintaining the mining method and strata management systems • implementation of procedures and techniques for the safe, effective and efficient establishment and maintenance of the mining method and strata management systems • 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 mining method and strata management techniques that best meet the required outcomes • working with others to undertake and complete the establishment and maintenance of the mining method and strata management systems • consistent successful establishment and maintenance of the mining method and strata management system
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. • Assessment of this competency requires typical resources normally used in a resources

	and infrastructure sector environment. Selection and use of resources for particular worksites may differ due to the site circumstances. • 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. • 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 the establishment and maintenance of the mining method and strata management systems • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate requirement, procedures and techniques for the safe, effective and efficient achievement of 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 mining method and strata management techniques that best meet the required outcomes • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and complete the establishment and maintenance of the mining method and strata management systems • provision of clear and timely required support and advice on the establishment and maintenance of the mining method and strata management systems
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, organisational and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Resources may include but are not limited to:	• skilled personnel • roof and rib supports • face equipment • power water/gas drainage systems • budgetary requirements • standard operating procedures • training materials
Historical information may include, but are not limited to:	• existence of previous workings within the work seam or other seam • sedimentology aspects of the mine site relating to subsidence • outburst • gas content • roof and floor technical data • over and underlying strata • water bearing strata • permeability of seam and strata • hydrology • physical property testing results • caving characteristics • windblast • mine plans
Risk is defined as: <i>the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood</i>	

(definition from AS/NZS 4360:1999 Risk Management).	
---	--

Stress includes, but is not limited to, horizontal and vertical tectonic induced stress and mining induced stress.	
Mining system types and methods may include, but are not limited to:	• bord and pillar • longwall • highwall • place changing • auger mining • pillar extraction • partial extraction • punch mining • systems of entry
Stable structure controls include, but are not limited to:	• roadway size • pillar sizes • depth of cover • strength of coal and underlying/overlying strata • stress regimes • strata characteristics • longwall chocks • water ingression • systems of mining • breaker line supports • direction of mining
Audit is defined as: <i>a systematic examination against defined criteria to determine whether activities and related results conform to planned arrangement, and whether these arrangements are implemented effectively and are suitable to achieve the organisation's policy and objectives (AS/NZS 4804: 2001)</i>	
Mine design is the process of engineering analysis applied to the mining systems and sequences involved in mining.	
Mine design may include in whole or in part requirements relating to:	• mine plan • mining induced stress

	• ventilation • tunnels • sequencing • drifts • stone drivage • shaft sinking • pillar extraction • partial extraction • punch mining • modelling • seam grades • windblast • outburst • geology • gas drainage • fault management • multi-seams • fault drivage • spontaneous combustion • roof and floor technical data • overlying strata • subsidence and legislative • legislative requirements
--	--

Hazard is defined as: <i>a source of potential harm or a situation with a potential to cause loss</i> (definition from AS/NZS 4360:1999 Risk Management)	
Standard operating procedures (SOP) are also known as safe working procedures, safe operating procedures and standard working procedures.	
Geological, hydrological and geotechnical information may be related, but is not limited, to:	• subsidence • roof and floor technical data • gas composition and content • over and underlying strata • water bearing strata • permeability of seam and strata • physical properties • caving characteristics • outburst and windblast • faults • intrusions • deformities
Mine gases may be seam gases or gases from other introduced sources and may include:	• methane • carbon dioxide • carbon monoxide • oxides of nitrogen • hydrogen • sulphur dioxide • hydrogen sulphide • hydrocarbons • combinations
Mining constraints may include, but are not limited to:	• lease boundaries • stress regimes • seam thickness • seam gas characteristics • surface infrastructure and features • geological features • abandoned workings • adjacent mines
Coal seam characteristics may include, but are not limited to:	• rank • petrology

	• moisture • cleat • coal hardness • seam gas • friability • pyrites <i>or depositional factors such as:</i> • seam thickness • multiple and rider seams • seam dip • depth of cover
Monitoring may include:	• survey checks and measurements • instruments for measuring strata movement • observation of safe work procedures • instruments for measuring stress • visual observation • instruments for measuring surface subsidence • instruments for measuring water levels

Unit Sector(s)

Coal Mining (Underground)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.