



Australian Government

Department of Education, Employment and Workplace Relations

RIIMEX602A Establish and maintain surface mining ground control and slope stability systems

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the establishment and maintenance of surface mining ground control and slope stability systems in the coal and metalliferous mining and extractive industries. It includes identifying and evaluating: the criteria to create and maintain ground control and slope stability, geological and geotechnical information to establish ground control and slope stability, mining engineering methods, and control options; establishing the ground control and slope stability system; and auditing and review the effectiveness of the ground control and slope stability system.

Application of the Unit

This unit is appropriate for those working in a management or technical specialist roles, within:

- Coal mining
- Extractive industries
- 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

<p>Elements describe the essential outcomes of a unit of competency.</p>	<p>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.</p>
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Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
<p>1. Identify and evaluate the criteria</p>	<p>1.1. Access, interpret and apply compliance documentation relevant to surface mining ground control and slope stability</p> <p>1.2. Identify, access and interpret mine survey data and historical information relating to the mine site</p> <p>1.3. If required identify the necessary resources required to assess ground control and slope stability issues</p> <p>1.4. Review actual and predicted ground control and slope stability performance in the mine</p> <p>1.5. Establish the criteria for establishing ground control and slope stability to acceptable performance levels</p> <p>1.6. Assess risks, determine acceptable levels of risk and identify critical issues related to ground control and stability systems in the mine</p>
<p>2. Identify and evaluate geological and geotechnical information</p>	<p>2.1. Identify all relevant geological, geotechnical, hydrogeological data</p> <p>2.2. Arrange further exploration, monitoring, sampling or testing to assist assessment of ground control and slope stability issues</p> <p>2.3. Assess potential ground movement and slope instability situations</p> <p>2.4. Identify and evaluate overburden and inter-seam characteristics and physical properties</p> <p>2.5. Where appropriate identify and evaluate stress regimes, blast vibration, seismic activity etc</p>
<p>3. Identify and evaluate mining engineering methods</p>	<p>3.1. Evaluate mining system types and methods impact on ground control and slope stability</p> <p>3.2. Identify potential layouts to improve ground control and slope stability from engineering analysis</p> <p>3.3. Identify and evaluate mining constraints impacting on the development of ground control and slope stability options</p> <p>3.4. Identify and evaluate equipment requirements, appropriate for the</p>

	development and maintenance of ground control and slope stability
4. Identify and evaluate control options	<p>4.1. Identify water control methods to improve ground control or slope stability</p> <p>4.2. Identify and evaluate ground support systems or methods of mining to provide appropriate ground control and slope stability</p> <p>4.3. Identify and evaluate ground support installation, monitoring and assessment systems</p> <p>4.4. Identify and evaluate management controls should unacceptable ground movement or slope instability occur</p>
5. Establish the ground control and slope stability system	<p>5.1. Establish exploration programs identifying geological features and characteristics impacting on ground control and slope stability</p> <p>5.2. Establish methods of safe access and egress.</p> <p>5.3. Establish systems and sequences of safe mining</p> <p>5.4. Establish monitoring systems of ground movement and slope instability to warn, control operations and record events.</p> <p>5.5. Establish a program, including systems and procedures to satisfy identified training requirements</p> <p>5.6. Establish emergency response and evacuation plans and procedures in accordance with site requirements</p> <p>5.7. Establish <i>safe operating procedures</i> and ensure incorporation into site documentation</p>
6. Audit and review the effectiveness of the system	<p>6.1. Monitor ground movement and slope stability measurements against defined acceptable standards for compliance with statutory and site requirements</p> <p>6.2. <i>Audit</i> emergency response and evacuation plans and procedures for compliance with site requirements</p> <p>6.3. Identify, assess and incorporate future site mining requirements into the planning procedures to maintain appropriate standard</p>

	<p>of the ground control and slope stability system</p> <p>6.4. Establish procedures for response to instances of non-compliance or other discrepancies/deficiencies revealed by audit</p> <p>6.5. Regularly review performance of the ground control and slope stability system</p>
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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 establish and maintain surface mining ground control and slope stability systems:

- apply legislative, organisation and site requirements and procedures
- access, interpret and apply technical information
- access, interpret and apply mine survey information
- access and analyse archival and historical failure information related to the mine
- interpret and apply mathematical and scientific theorems/laws related to ground control and slope stability
- perform mathematical calculations
- interpret and apply design criteria for ground control and slope stability systems
- interpret computer spreadsheets and mining systems modelling/simulations
- collect, collate and interpret mining data
- apply procedures for preparing technical procedures
- apply procedures for conducting enquiries/investigations and preparing reports
- apply effective communications
- access and interpret data from monitoring systems and equipment
- analyse and report on ground control and slope stability system training needs
- apply risk management processes and techniques

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 establish and maintain surface mining ground control and slope stability systems:

- audit methodologies
- exploration techniques
- factors of safety
- ground support methods and systems
- legislative and statutory requirements for mining structures including mine plans, ground support and safety management systems
- mine planning and design
- mine surveying
- mining and general engineering principles
- mining structure failure modes
- rock types and characteristics

- slope stability criteria
- stress analysis including mining induced stress, vertical and horizontal stress tectonics
- systems of work
- the systems of mining including ore body development
- training systems
- emergency response and evacuation planning processes and techniques

Evidence Guide

<p>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.</p>	
<p>Overview of assessment</p>	
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>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:</p> <ul style="list-style-type: none"> • knowledge of the requirements, procedures and instructions for the establishment and maintenance of surface mining ground control and slope stability systems • implementation of procedures and techniques for the safe, effective and efficient establishment and maintenance of surface mining ground control and slope stability 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 systems that best meet the required outcomes • working with others to establish and maintain surface mining ground control and slope stability systems • consistent and timely establishment and maintenance of surface mining ground control and slope stability systems
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • 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,

	<p>language, literacy and numeracy demands of assessment should not be greater than those required on the job.</p> <ul style="list-style-type: none"> • 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 the work 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.
<p>Method of assessment</p>	<p>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:</p> <ul style="list-style-type: none"> • written and/or oral assessment of the candidate's required knowledge • observed, documented and/or first hand testimonial evidence of the candidate's: <ul style="list-style-type: none"> • 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 • identification of viable options and the selection of surface mining ground control and slope stability systems that best meet the required outcomes • consistently achieving the required outcomes • first hand testimonial and documentary evidence of the candidate's: <ul style="list-style-type: none"> • working with others to undertake and

	<p>complete surface mining ground control and slope stability systems</p> <ul style="list-style-type: none">• consistent and timely gaining of approval of surface mining ground control and slope stability systems• provision of clear, timely required support and advice on the implementation of surface mining ground control and slope stability systems
Guidance information for assessment	Consult the SkillsDMC User Guide for further information on assessment including access and equity issues.

Range Statement

<p>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.</p>	
<p>Relevant compliance documentation may include:</p>	<ul style="list-style-type: none"> • legislative, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • codes of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
<p>Mine site historical information may include:</p>	<ul style="list-style-type: none"> • existence of previous workings within the mine • hydrology • over and underlying rock types • permeability of rocks and faults • physical property testing results of rock, overburden, underburden materials • seismic activity • sedimentology aspects of the mine site relating to subsidence • fissures and water sources • water pumped from mine
<p>Resources may include:</p>	<ul style="list-style-type: none"> • skilled personnel • bolts, cable and grout • face drilling equipment • power systems • mine services • special application equipment • budgetary requirements • geologists, hydrogeologists, geotechnicians, mine planners
<p>Risk is defined as:</p>	<ul style="list-style-type: none"> • the chance of something happening that will have an impact upon objectives. It is measured in terms of consequences and likelihood
<p>Geological and hydrogeological information includes that related</p>	<ul style="list-style-type: none"> • direction and competency of faults • joints, cleats or other fractures

to:	<ul style="list-style-type: none"> • induced collapse • intrusions and deformities • over and underlying rock types, inter-seams • permeability of rocks and faults • physical properties of all materials in ground, dump or slope • subsidence • fissures and water sources • weak zones within operating faces, permanent batters, dumping slopes
Stress includes:	<ul style="list-style-type: none"> • horizontal and vertical tectonic induced stress • mining induced stress • primary and secondary stress fields
Safe operating procedures are also known as:	<ul style="list-style-type: none"> • safe working procedures, standard operating procedures (SOP) and standard working procedures
Audit is defined as:	<ul style="list-style-type: none"> • 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

Unit Sector(s)

Materials Extraction

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.