



Australian Government

Department of Education, Employment and Workplace Relations

RIIMSM306A Design and maintain pillar system and ground control

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the design and maintenance of pillar systems and ground controls in the metalliferous mining industry. It includes designing pillar configurations to maximise safe materials extraction, developing pillar systems, and extracting pillars. 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 an operational role at worksites within:

- 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. Design pillar configuration to maximise safe material extraction	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Determine location of materials/ore to determine design parameters 1.3. Identify the potential hazards which could have an effect on pillar design and layout 1.4. Identify the characteristics and properties of the roof to determine the span that can stand unsupported 1.5. Identify ground conditions where secondary support will be needed 1.6. Evaluate the effect of any adjacent mines and incorporate in pillar design
2. Develop pillar system	2.1. Plan and prepare for pillar development according to pillar design parameters 2.2. Identify, address and/or report risks and hazards 2.3. Select and use appropriate personal protective equipment 2.4. Visually inspect work area to ensure safe access 2.5. Ensure work area is properly ventilated before entry and is free of dust and fumes 2.6. Inspect and assess site conditions to determine if scaling is required and take appropriate action 2.7. Ensure that dust suppression and/or extraction is prepared and ready for use 2.8. Arrange communications with other relevant personnel 2.9. Conduct pillar development safely and efficiently 2.10. Continuously monitor ground conditions and modify operation to maintain safe conditions
3. Extract pillars	3.1. Identify the strategic pillars which must not be removed for roof stability 3.2. Establish and observe a retreat system 3.3. Prop ground surrounding pillar before pillar removal

	3.4.Extract selected <i>pillars</i> starting furthest from shaft, in a systematic manner 3.5.Prop ground area previously held by the removed <i>pillars</i> 3.6.Continuously monitor ground conditions and modify operation to maintain safe <i>pillar</i> removal
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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 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 design and maintain pillar systems and ground control:

- apply legislative, organisation and site requirements and procedures for the design and maintenance of pillar systems and ground control
- apply operational safety requirements
- install secondary support devices
- operate communications systems
- operate extraction plant and machinery
- maintain records
- identify faults
- apply environmental constraints
- dispose of environmentally sensitive fluids and materials

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 design and maintain pillar systems and ground control:

- pillar configuration
- assessment of mine ground conditions
- pillar design and layout
- characteristics and properties of roofs
- dust suppression methods and equipment
- hazards affecting pillar design and development
- secondary support methods and installation techniques
- pillar extraction methods and safety requirements
- operational safety requirements
- communication systems
- emergency procedures
- environmental requirements

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 designing and maintaining pillar systems and ground control • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of designing and maintaining pillar systems and ground control • working with others to undertake and complete the design and maintenance of pillar systems and ground control that meets all of the required outcomes • consistent timely completion of designing and maintaining pillar systems and ground control that safely, effectively and efficiently meets the required outcomes
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 • 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 • consistent achievement of required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and complete the design and maintenance of pillar systems and ground controls
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
Pillars are the primary means of roof support required to hold up the mass of ground between the underground mine workings and the surface and may be:	• randomly spaced • regularly spaced • square • rectangular • round
Design parameters may include those for:	• single-level mining • multiple-level mining • thick-level mining • decline-access mining
Secondary support may include:	• rock bolts • props
Effects of adjacent mines may include:	• water levels in old or currently unworked claims if a breakthrough occurs • stresses transferred through the rock due to the excavations made in the adjacent claims • the requirements for boundary pillars to be left • any falls which may act as a warning • the presence of geological discontinuities
Characteristics and properties may include:	• weight of upper strata • vertical compressive force • discontinuities • faults • separation cracks • different-coloured layers • different textures • iron oxide stains

	• bleaching • joints • blows • bands
Personal Protective Equipment may include:	• lamp • safety helmet • eye protection • hearing protection • protection from atmospheric contaminants (dust/oil mist) • hand protection • overalls • safety footwear
Work area inspections may include:	• travel ways • footings • access • retreat • fumes or dust • ventilation air flow • ground conditions • services
Dust suppression and/or extraction may include:	• fans (electric or compressed air) • ventilation bags • mobile or fixed sprays • vent devices • air movers • watering down work area
Communications may include:	• radio • telephone • computer • lights • audible signals (bells, whistles, sirens) • physical signals • written and verbal means

Unit Sector(s)

Metalliferous Mining (Small Mines)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.