



Australian Government

Department of Education, Employment and Workplace Relations

RIIUND501A Implement the ventilation management plan

Release: 1

RIIUND501A Implement the ventilation management plan

Modification History

Not applicable.

Unit Descriptor

This unit covers implementation of the ventilation management plan in the resources and infrastructure industries. It includes planning and preparing for the implementation of the ventilation management plan, implementing the plan, implementing the maintenance of and changes to the mine ventilation system and auditing the effectiveness of the plan. 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
- 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 the implementation of the ventilation management plan	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Access, interpret and clarify the ventilation management plan 1.3. Identify, and communicate to all involved, roles and responsibilities as specified in the ventilation management plan 1.4. Identify, forecast, obtain and allocate/schedule resources required for the implementation of the ventilation management plan 1.5. Identify training needs
2. Implement the ventilation management plan	2.1. Identify and interpret the impact of changes to the ventilation system on the mine atmosphere 2.2. Implement standards and procedures for the installation and operation of monitoring systems and equipment 2.3. Incorporate ventilation control devices into the ventilation system 2.4. Implement standards and procedures for inspection, monitoring, recording and reporting on mine ventilation 2.5. Implement standards and procedures for the collection and analysis of ventilation data 2.6. Process, record and report monitoring system data 2.7. Implement the ventilation management training plan 2.8. Interpret and compare measured data with relevant legislative requirements and those stipulated by the ventilation management plan and action requirements 2.9. Implement water management procedures 2.10. Respond to alarms raised 2.11. Implement emergency and evacuation procedures in accordance with the mine safety management systems
3. Implement the maintenance of	3.1. Implement inspections, repair and

and changes to the mine ventilation system	<i>maintenance</i> activities 3.2. Implement the system of recording, reporting and reviewing maintenance requirements and activities 3.3. Implement changes to the mine ventilation systems 3.4. Encourage, receive, review and, where appropriate implement suggestions and recommendations for changes to ventilation management procedures
4. Audit the effectiveness of the ventilation management plan	4.1. Audit ventilation specifications for compliance with legislative requirements and the ventilation management plan 4.2. Audit ventilation control devices for compliance with legislative requirements and the ventilation management plan 4.3. Audit monitoring systems operations for compliance with relevant legislative requirements and the ventilation management plan 4.4. Audit effectiveness of alarm responses and trigger levels 4.5. Audit recording systems for compliance with the ventilation management plan 4.6. Audit ventilation system maintenance standards and procedures for compliance with the ventilation management plan 4.7. Audit emergency and evacuation plans for compliance with the mine safety management system 4.8. Audit the ventilation management training plan for currency, relevance and compliance with the ventilation management plan

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 implement the ventilation management plan:

- apply legislative, organisation and site requirements and procedures for implementation of the ventilation management plan
- access, interpret and apply technical information
- access and analyse ventilation information related to the mine including archival and historical information
- measure air quality and quantity
- perform routine operational mathematical calculations (quantity, pressure, prediction)
- interpret and apply design criteria for ventilation systems and devices
- interpret computer spreadsheets and ventilation modelling/simulations
- collect, collate and interpret ventilation data
- conduct enquiries/investigations and prepare reports
- communicate effectively in the workplace
- access, interpret and apply data from monitoring systems and equipment
- operate hand held monitoring equipment
- implement the ventilation management training plan
- apply risk management processes and techniques
- implement emergency response and evacuation procedures

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 implement the ventilation management plan:

- legislative and site requirements for ventilation including:
 - air quality and quantity
 - maximum and minimum values
 - control and distribution
 - flammable gas and dust limits
 - ventilation fans
 - gas monitoring
 - respirable dust limits
 - inspections

- recording/reporting
- methods of mine ventilation and their applications/limitations including:
 - exhaust/force
 - antitropical
 - homotropical
 - flank returns
 - ascensional/descensional
 - bleeder
 - Z/U/Y systems
 - other combinations
- methods of panel ventilation and their applications/limitations including:
 - homotropical and antitropical auxiliary fans
 - coursed ventilation (narrow side/wide side)
 - machine mounted scrubber systems
 - compressed air venturis and bleeders
- impact of mining techniques
- impact of mine and panel design on ventilation
- mine roadways and shafts and their impact on mine ventilation
- impact of material characteristics and seam gradients on mine ventilation design
- impacts on ventilation system of gas drainage, spontaneous combustion, outburst and windblast
- mine gases; types and characteristics, sources, physiological effects and methods of detection
- dust, fumes and other particulate matter; the types, sources, physical and physiological effect and control/mitigation methods
- mine fires; the types, sources of ignition, possible effects on the ventilation circuit and prevention/control/mitigation methods
- mine explosions; types, ignition sources, possible effects on the ventilation circuits and prevention/control/mitigation methods
- pressure changes; causes, impacts on the ventilation system, and responses (to include the causes and effects of natural ventilation and re-circulation)
- heat/humidity; sources and factors which may impact on mine ventilation and personnel
- mine fans including:
 - fan types
 - applications
 - limitations
- ventilation control devices; types, purposes, design criteria and specifications, distribution/placement criteria and limitations
- de-gassing; methods of control - including brattice, auxiliary fans, compressed air venturis, sails, hurdles and bleeders
- fixed ventilation monitoring systems types, uses and limitations

- portable monitoring equipment, types, characteristics, uses and limitations
- functions, capabilities, advantages, limitations and use of computer modelling tools and simulation techniques
- basic computer-based systems used for mine ventilation monitoring and analysis
- ventilation management plan development requirements and processes
- ventilation surveys; the types, frequency and method for conducting including pressure/quantity/temperature and gas
- respirable dust survey requirements
- processes and techniques for determining alarms and trigger points/levels
- audit and review processes and techniques
- site document control requirements
- emergency preparedness and plan response/measures
- airway resistance and fan curves and duty points
- general use and application of ventilation theory including:
 - psychrometry and heat
 - gas laws including Charles and Boyle
 - natural ventilation pressures
 - air quality measurement
 - control device leakage
 - duct leakage
 - regulator
 - equivalent office calculation and Kirchoff's laws

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 implementation of the ventilation management plan • implementation of procedures and techniques for the safe, effective and efficient implementation of the ventilation management plan • 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 processes for the implementation of the ventilation management plan that best meet the required outcomes • working with others to undertake and complete the implementation of the ventilation management plan • consistent successful implementation of the ventilation management plan
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 should 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 implementation of the ventilation management plan • observed, documented and/or first hand testimonial evidence of the candidate's: • implementation of appropriate requirements, 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 processes for the implementation of the ventilation management plan 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 implementation of the ventilation management plan • provision of clear and timely required support and advice on the implementation of the ventilation management plan
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
Ventilation management plan may include:	• establishing procedures for maintaining optimum mine ventilation including: • hazard identification and quantification • emergency and evacuation procedures • risk assessment • authority and responsibility • controls established to manage identified risks • reporting and communication • document control • audit and review specifications
Mine atmosphere includes:	• atmosphere in all areas in the general mine ventilation district and beyond into waste working and goafs in the mine
Standards and procedures include:	• construction • action response • permit to work • condition monitoring • auditing • maintenance • document control • atmosphere monitoring • ventilation system control • communication systems • survey procedures • sealing procedures

	• changes • training • systems recording/reporting
Ventilation management training may include:	• mine workers • trades people • permanent employees • contractors • mine official • other special requirements
Water may:	• impact on the mine ventilation management plan through • liberation of dissolved gases • capture of soluble gases and fumes • gas drainage efficiency • seam moisture infusion or drainage • dust liberation and suppression • large ingresses disrupting ventilation networks • ventilation requirements for pumping stations • influence on sponcom propensity • humidity • hydrostatic pressure
Maintenance may include:	• inspection • servicing • repair

Unit Sector(s)

Underground Mining

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.