



Australian Government

Department of Education, Employment and Workplace Relations

RIINHB312A Conduct raise boring

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers conducting raise boring in the metalliferous mining industry. It includes: planning, preparing and setting up for drilling; locating collar and drill pilot hole; drilling and monitoring progress of pilot hole; reaming raise bore; packing-up drill site; and carrying out operator maintenance and housekeeping activities.

Application of the Unit

This unit is appropriate for those working in a driller roles, in underground mines within:

- Drilling
- 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 drilling	1.1. Access, interpret and apply compliance documentation relevant to the work activity 1.2. Obtain, confirm and apply shift changeover details, geo-technical reports and drill plan for the allocated task 1.3. Inspect and assess site conditions to identify and manage possible scaling requirements, misfires and other hazards and potential risk 1.4. Resolve coordination requirements with others at the site prior to commencing and during work activities 1.5. Select and wear personal protective equipment appropriate for work activities
2. Set up for drilling	2.1. Set up the raise bore drill rig site 2.2. Locate the drill rig on the prepared pad and position and check alignment as specified according to drill plan 2.3. Secure drill rig to the pad using recommended equipment and anchors 2.4. Stand drill rig in specified position according to drilling plan 2.5. Connect components to drill rig 2.6. Test raise drill for correct, safe operation 2.7. Calculate rods needed to drill to depth, and set up drill rack 2.8. Load drill rods and equipment onto drill rack 2.9. Conduct equipment pre-start checks to ensure equipment is safe and ready to use
3. Locate collar and drill pilot hole	3.1. Inspect and assemble collaring starter equipment 3.2. Install dust suppression and extraction systems 3.3. Confirm and set drill direction accurately and collar hole as specified in the drill plan 3.4. Install assemblies in collared hole to allow pilot hole drilling to be carried
4. Drill and monitor progress of	4.1. Inspect job-site for safe working conditions

pilot hole	4.2. Maintain safety of driller and surrounding personnel 4.3. Interpret drill plans and drill holes to design 4.4. Operate equipment safely within working environment limitations and ground conditions 4.5. Monitor ground conditions and adjust drilling techniques and components to maintain efficient drilling operations 4.6. Monitor drilling progress using appropriate equipment indicators 4.7. Carry out and monitor drill "break through" procedures and inspect break through 4.8. Remove housing assemblies
5. Ream raise bore	5.1. Coordinate personnel to attach the reaming head to drill string 5.2. Communicate with appropriate personnel to ensure safe removal of raise bore cuttings 5.3. Maintain safety of driller and surrounding personnel 5.4. Operate equipment safely within working environment limitations and ground conditions 5.5. Monitor ground conditions and adjust reaming techniques to maintain efficient drilling operations 5.6. Diagnose and take appropriate action to manage reaming problems and advise appropriate personnel 5.7. Remove and store reamer
6. Pack-up drill site	6.1. De-rig equipment 6.2. Confirm equipment is ready for transport
7. Carry out operator maintenance	7.1. Carry out shutdown procedures 7.2. Service and make minor adjustments to equipment 7.3. Visually inspect equipment and report faults and make equipment available for routine operational servicing
8. Carry out housekeeping activities	8.1. Clean equipment to maintain condition of equipment and ensure safe and efficient operations

	8.2. Clear site of debris and excess stores 8.3. Clean and store <i>auxiliary service</i> equipment 8.4. Complete all required documentation clearly, concisely and on time 8.5. Pass on end of shift information to oncoming shift
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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 raise boring:

- apply legislative, organisation and site requirements and procedures
- use clinometers
- read and interpret plans
- use hand and power tools
- set up and load rod rack
- set up and align a raise bore in readiness for drilling
- attach and remove drill rods, bits and reamers
- pack up raise drill in readiness for transport

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 raise boring:

- auxiliary services procedures
- cleaning procedures
- down hole problems
- drilling procedures
- calculating and setting drill angles
- environmental procedures
- drilling equipment processes, technical capability and limitations
- equipment safety requirements
- geological and technical data
- inspection procedures
- isolation procedures
- manufacturer's specifications
- mining regulations
- operational procedures and checks
- recovery procedures
- site safety requirements
- start-up and shutdown procedures
- storage procedures
- towing procedures
- underground procedures
- dealing with misfires

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 conducting raise boring • implementation of requirements, procedures and techniques for the safe, effective and efficient conducting of raise boring • working with others to undertake and complete raise boring that meets all of the required outcomes • consistent timely completion of raise boring 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. • 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 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.
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 • consistently achieving the required outcomes • first hand testimonial evidence of the candidate's: • working with others to undertake and complete the raise boring
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 • code of practice • Employment and workplace relations legislation • Equal Employment Opportunity and Disability Discrimination legislation
Drill plan may include:	• access to inclines and decline • drive plan • equipment and resource allocations/requirements • face • geological details • verbal or written instructions • worksite details • services • stope • drilling angles • breakthrough
Hazards and potential risks may include:	• ground control failure • scaling requirements • lack of ventilation • vertical openings • limited egress • loose material on working surface • misfires • gases • entry by unauthorised personnel • unstable ground conditions • airborne dust and fibres • unstable footing • poor housekeeping • noise

	• rotating machinery (drill rods) • electrical hazards • airborne rock fragments
Coordination requirements may include:	• rig operator • observers • site communicator • LHD unit operator
Personal Protective Equipment may include:	• eye protection • hearing protection • gloves • helmet • boots
Setting up rig may involve:	• locating minor components • packing components with sandbags to ensure level and stability
Drill rigs may be:	• electric • hydraulic • pneumatic • rotary • track
Locating drill rig may involve:	• towing or manoeuvring the derrick sled on the pad • conducting final position adjustments • aligning sled rails • ensuring rails and pad are free of contaminants
Securing drill may include:	• collecting equipment for securing the rig • drilling hole through sled • cleaning out drill holes • inserting resin cartridges to secure bolts • tightening nuts on rock bolts
Standing drill rig may include:	• cleaning and greasing parts • checking turnbuckles • connecting to power supplies • standing and checking that rig is at appropriate angle • inserting back pins
Connecting components may include:	• hanging out cable hangers • checking, cleaning and connecting hydraulic • checking, cleaning and connecting air and water supplies • running out air and water lines to derrick

	- installing and testing pumps - connecting power and testing motor rotation
Testing raise drill may include:	- rig rotation - rig crosshead movement - rig slow and fast up and down - pipe loader grip close and open - pipe loader swing and tilt - emergency stops - indicator lights - components move freely - correct pressures are attained - computer readings
Equipment may include:	- collar piping - covering devices (plugs, cones, hessian bags) - drill rig (electric/hydraulic, pneumatic) - drilling components (drill rods, bits,) - extra lighting (flood lights) - flags - hoses - inclinometer - lifting and handling equipment - measuring tape - oils - paint (spray cans) - plates - recovery equipment - scaling bars - signs - support vehicles - tamping stick/tapes - witches hats - recommended/required PPE
Equipment pre-start checks may include:	- air filter restriction indicator - cab (horn, lights, air conditioner) - computer systems - display instrumentation and gauges (indicators, gauges, laser levels) - fire and suppression systems - fire extinguishers - fluid levels (hydraulic oil, coolant, grease, water, engine oil, fuel) - visual and audio warning devices and lights

	• drilling equipment (hydraulic hoses, bits and couplings) • drill rig platform, steps and hand rails
Inspecting collaring may include:	• ensuring that collaring bush wear is in recommended limits • ensuring that all components/parts are free from burrs and damage • ensuring that drill bit is free with no excessive play
Dust suppression and extraction methods may include:	• mobile/fixed sprays • screens (vent doors, vent blinds) • use of water trucks • ventilation bags operational • watering down site • Blooie housing
Job-site inspections may include:	• ventilation • air and water services • scaling requirements • pumps • signs and barricades • post firing rock falls • site housekeeping
Personnel may include:	• blasters • contractors • drillers • drivers • holders of appropriate tickets • inspectors • licensed operators • maintenance staff • personnel authorised by mine management • service personnel • supervisors • surveyors • tradespersons
Ground conditions may include:	• broken ground • dryness • location of water table • noise • slope of working surface • stability of ground • stable ground (compaction) amount of scale

	• ventilation characteristics (fumes, dust) • visibility/wet • breakthrough
Drilling/reaming techniques may include:	• adjustment to feed • removing debris • rotation • speed and pull force adjustments
Equipment indicators may include:	• pressure gauges • control panel readings • rotation • depth markers
Equipment cleaned may include:	• platform • steps and hand rails (removal of oil, grease, debris) • drill rods
Auxiliary services may include:	• compressed air • de-watering pumps • electricity • ventilation • water
Drilling/reaming problems may be:	• environmental • geological (ground conditions) • mechanical (bogged)

Unit Sector(s)

Drilling (General)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.