Australian Government

Department of Education, Employment and Workplace Relations

RIINHB307B Conduct conventional core drilling

Release: 1

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Modification History

Not applicable.

Unit Descriptor

This unit covers the conducting of conventional core drilling in resources and infrastructure industries. It includes planning and preparing for drilling, operating the drill and drill fluid system, using core orientation equipment, taking core samples, responding to problems, and maintaining equipment.

Application of the Unit

Core drilling may also be called diamond core drilling, diamond drilling or coring. It is used for environmental, geotechnical and mineral exploration drilling. This unit is appropriate for those working in operational roles, at worksites within:

- Civil construction
- Coal mining
- Drilling
- 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

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. Plan and prepare for conducting conventional core drilling	1.1. Access, interpret and apply ***compliance documentation*** relevant to the work activity 1.2. Obtain, confirm and apply **work instructions** for the allocated task 1.3. Identify, manage and report all potential ***hazards*** 1.4. Resolve ***coordination requirements*** with others at the site prior to commencing and during work activities
2. Operate a core drill	2.1. Identify and use different ***drill rod*** or casing types, thread forms and thread make up parameters 2.2. Select appropriate ***drill bits*** and reamer shells 2.3. Adjust inner tube length to ensure appropriate ***fluid*** flow around the ***core*** 2.4. Use ***rod and casing handling equipment*** safely 2.5. Add and break out and remove drill rods and pipes and down hole equipment 2.6. Apply appropriate rotation speed, weight on the bit, drilling fluid flow rate and penetration rate applicable to the ground conditions 2.7. Measure drill string components and calculate depth of hole 2.8. ***Collar*** holes 2.9. Install casing and seal at the collar
3. Operate drill fluid system	3.1. Identify hole conditions requiring the use of drilling fluid additives 3.2. Select, prepare, apply, test and monitor suitable fluids and additives 3.3. Monitor fluid return and solids content and implement control measures 3.4. Monitor fluid and cuttings specific gravity and up hole velocity to ensure efficient hole clearing 3.5. Monitor causes of pressure in fluid systems 3.6. Select the appropriate fluid pumping rate for the hole size

4. Use survey and core orientation equipment	4.1. Assemble, maintain and use ***survey and core orientation devices*** 4.2. Read and record survey data 4.3. Operate core orientation devices
5. Take core samples	5.1. Implement control measures for minimising core loss 5.2. Identify core blockages affecting ***sample*** quality
6. Respond to problems	6.1. Identify possible problems in equipment or process 6.2. Determine problems needing action 6.3. Determine possible fault causes 6.4. Rectify problem using appropriate solution within area of responsibility 6.5. Follow through items initiated until final resolution has occurred 6.6. Report problems outside area of responsibility to designated person
7. Maintain equipment	7.1. Use the required ***personal protective equipment*** and follow safe working procedures 7.2. Strip impregnated bits according to required procedures 7.3. Dismantle and service head assembly 7.4. Maintain drill string 7.5. Maintain bit management, record required information and store bits correctly

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 conventional core drilling:

- apply legislative, organisation and site requirements and procedures
- apply routine checks and basic maintenance procedures for mud and water delivery pumps
- identify, mix and apply of collar sealants
- apply procedures for attachment of required equipment to collar casing
- apply basic drilling fluid tests such as viscosity and specific gravity
- apply procedures to ensure that core is handled correctly and placed in core trays as required
- apply techniques for measuring bits and other related components

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 conventional core drilling:

- configuration of various thread forms and make up torque requirements
- the function of hole collaring, use of casing and collar sealing techniques
- methods required to produce uncontaminated samples
- impregnated bit stripping procedures
- bit selection for different types of drilling and different ground conditions
- the relationships between penetration rate and bit life
- the role that core blockages play in affecting sample quality
- the functions of drilling fluids and control procedures
- relationship between hole diameter, rod diameter, pump output and the specific gravity of formation cutting
- types of mud and water delivery pumps and their applications
- the purpose of drill hole surveys and the functions of azimuth and dip readings
- purpose and principles of core orientation

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 conventional core drilling • implementation of requirements, procedures and techniques for the safe, effective and efficient completion of conventional core drilling tasks • working with others to undertake and complete the conventional core drilling tasks that meets all of the required outcomes • consistent timely completion of conventional core drilling tasks 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 conventional core drilling tasks

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, organisation and site requirements and procedures • manufacturer's guidelines and specifications • Australian standards • code of practice • Employment and Workplace Relations legislation • Equal Employment Opportunity, Disability Discrimination legislation

Work instructions may come from:	• briefings, handovers, plans and work orders and may be written or verbal, formal or informal and may include:
	  • nature and scope of tasks
	  • specifications
	  • quality of finished works
	  • achievement targets
	  • operational conditions
	  • obtaining of permits required
	  • site layout
	  • out of bounds areas
	  • worksite inspection requirements
	  • lighting conditions
	  • plant or equipment defects
	  • hazards and potential hazards
	  • coordination requirements or issues
	  • contamination control requirements
	  • environmental control requirements
	  • barricade and signage requirements

Hazards include:	• incorrect speed of operation • inadequate maintenance • inner tube drop off
Coordination requirements may include:	• drill team • other equipment operators

	• maintenance personnel • supervisors • worksite personnel
Drill rods may include:	• conventional or wireline drill rods • casing - steel, PVC
Drill bits may include:	• blade bits • tricone bits • PCD bits • surface set diamond core bits and reamer shells • impregnated diamond core bits and reamer shells • non-core diamond bits

Fluids may include:	• drilling mud and additives:
	  • polymers
	  • soluble oils
	  • fluid loss additives
	  • water
	  • salt
	• cement and cement additives
	• two part urethane foam
	• sealants - urethane foam, cement, gypsum

Core barrels may include:	• conventional single tube core barrels • conventional double tube core barrels • conventional triple tube core barrels • starter barrels • chrome barrels
Rod and casing handling equipment may include:	• manual handling • hoist plug • mechanised rod handlers • foot operated rod safety clamp • hydraulic rod/casing clamps • hydraulic rod/casing spinner • hook and clamshell
Collar attachments may include:	• stuffing boxes • fluid control valves • T pieces • gas control equipment
Survey and core orientation devices may include:	• single shot survey camera - mechanical/electronic • multi shot survey camera - electronic/mechanical

	• digital survey devices • spear type core orientation device • ball type core orientation device • pin type orientation devices • electronic orientation devices
Samples may include:	• sampling from mud rotary • collection of sludge • core samples
Personal protective equipment includes:	• steel-capped boots and hardhat • gloves • dust mask • eye and hearing protection • general protective and reflective clothing

Unit Sector(s)

Drilling (General)

Competency field

Refer to Unit Sector(s).

Co-requisite units

Not applicable.