Australian Government

RIINHB309X Conduct guided boring

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Release: 1

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Modification History

Release	Comments
1	This unit of competency was first released in RII Resources and Infrastructure Industry Training Package Release 13.0.

Application

This unit describes the skills and knowledge required to conduct guided boring in the drilling and civil construction sectors. It includes planning and preparing for guided boring, boring and steering a pilot hole to a design alignment, completing back reaming and product pull back, responding to problems, and completing equipment maintenance and housekeeping.

This unit applies to those working in operational roles who operate a guided boring rig and locating system to install underground product, such as pipes, conduits and cables, in accordance with approved drilling information, manufacturer specifications and workplace procedures.

Licensing/Regulatory Information

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 this unit.

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

N/A

Unit sector(s)

Civil construction

Drilling

Elements and Performance Criteria

1. Plan and prepare for guided boring	1.1 Access, interpret and apply guided boring documentation, work requirements, site procedures and work instructions, and confirm the work activity is compliant with requirements

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	1.2 Compare approved drilling information with physical work area conditions and report any discrepancies according to workplace procedures 1.3 Identify and address potential risks, hazards and environmental issues and implement control measures according to workplace procedures 1.4 Select, inspect and wear personal protective equipment appropriate for work activities 1.5 Select tools and equipment required to carry out tasks, check for serviceability and rectify or report any faults within scope of own role, according to workplace procedures 1.6 Communicate and coordinate activities with others throughout the work activity according to work requirements 1.7 Obtain and interpret emergency procedures, and be prepared for fire/accident/emergency
2. Bore pilot hole	2.1 Carry out pre-start and start-up procedures, and identify, select and apply rig operational controls, according to manufacturer specifications and workplace procedures 2.2 Fit locating device to drill head, attach drill head to drill stem, and align drilling head with survey tool and survey control system, according to manufacturer specifications 2.3 Drill pilot hole according to design alignment, adding drill stem sections as required, according to manufacturer specifications 2.4 Steer, and where required zone steer, drill head to achieve required pitch and direction to suit design alignment and ground conditions, and monitor drill path to ensure the pilot hole meets the conformance envelope and dogleg severity is within limits 2.5 Monitor and interpret gauge and dial readings, drill fluid return and spoil, and drill head position and pitch, to determine conditions at the drill head according to workplace procedures 2.6 Maintain communication with all relevant personnel according to work requirements, and maintain drill log and reports as required according to workplace procedures
3. Complete back reaming, and product pull back	3.1 Lock out machine according to workplace procedures, remove drill head, and check free rotation of swivel, according to manufacturer specifications 3.2 Connect back reamer, swivel and product to suit ground conditions and product being installed, and locate product feed to prevent damage and within breakover limitations, according to manufacturer specifications

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	3.3 Check all safety precautions are in place and restart machine according to workplace procedures 3.4 Back ream or pre-ream, and install product, removing drill stem sections, according to manufacturer specifications, taking required actions to achieve required product installation according to work requirements 3.5 Monitor and interpret gauge and dial readings, drill fluid flow from both ends of hole, and product feed, according to workplace procedures 3.6 Maintain drill log and reports as required according to workplace procedures
4. Respond to problems	4.1 Identify possible problems in equipment or process according to workplace procedures 4.2 Determine possible causes of problems and action required according to workplace procedures 4.3 Rectify problems within area of responsibility and follow through until final resolution has occurred according to workplace procedures 4.4 Report problems outside area of responsibility to designated person according to workplace procedures
5. Complete equipment maintenance and housekeeping	5.1 Carry out shutdown and secure equipment according to manufacturer specifications and workplace procedures 5.2 Monitor wear on drill stem and threads, and on drill heads and reamers, against wear limits and take required action, dressing damaged threads or replacing drill stem as required, according to manufacturer specifications 5.3 Check all equipment and hoses according to manufacturer specifications 5.4 Clean all equipment upon completion of bore, ensuring environmental controls are followed, and rotate drill stems in stack, according to workplace procedures 5.5 Confirm drill fluid is contained and disposed of according to workplace procedures 5.6 Confirm maintenance schedules and housekeeping activities are completed according to manufacturer specifications and workplace procedures 5.7 Process records according to workplace procedures

Range of conditions

N/A

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Assessment Requirements for RIINHB309X Conduct guided boring

Performance Evidence

The candidate must demonstrate the ability to complete the tasks outlined in the elements and performance criteria of this unit, including evidence of the ability to:

- The candidate must complete guided boring on at least two occasions, including at least one occasion involving changing ground or operating conditions requiring modification of technique.

In the course of the above, the candidate must:

- locate and apply relevant documentation, policies and procedures, and compare approved drilling information against physical work area conditions
- identify and manage hazards, risks and environmental issues relevant to the drilling context, including selecting, inspecting and wearing personal protective equipment
- select and inspect tools and equipment required for guided boring, and interpret geological and survey data to inform the drilling method
- establish and operate the guided boring rig according to manufacturer specifications and workplace procedures
- drill and steer the pilot hole, including adding drill stem sections and maintaining the bore path within the conformance envelope and dogleg severity limits
- monitor gauge and dial readings, drill fluid return, spoil, drill head position and pitch, and calculate hole volume, to determine conditions at the drill head
- complete back reaming and product pull back, adjusting steering, thrust, rotation and fluid flow in response to changes in penetration rate, fluid return, torque or drill spoil, and confirming the bore path remains within the conformance envelope
- respond to problems within scope of own responsibility, and report problems outside this scope to the designated person
- complete shutdown, maintenance, housekeeping and record-keeping requirements on completion of drilling activities
- communicate and coordinate effectively with others throughout the work activity

Knowledge Evidence

The candidate must demonstrate knowledge to complete the tasks outlined in the elements and performance criteria of this unit, including knowledge of:

- key workplace policies and procedures for guided boring, including emergency response, work health and safety, environmental issues and housekeeping
- the reasons position diagrams, plans and instructions are followed precisely, and the consequences of a positioning error for bore path accuracy and adjacent services

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- the reasons routine operator maintenance and servicing are conducted, and the consequences of a missed service item for equipment reliability and fault development
- the capabilities and limitations of the guided boring rig and locating system relevant to the drilling context
- common formation types encountered in guided boring and how each affects penetration rate, steerability, hole stability and fluid loss
- indicators of changing ground conditions observable during drilling, including changes in penetration rate, thrust, rotation torque, fluid pressure, fluid return volume and the character of drill spoil, and what each indicates about conditions at the drill head
- the functions of drilling fluid in a steered bore, including cooling the drill head, transporting cuttings along the bore, stabilising the bore wall and lubricating the drill string, and the consequences of a loss of returns
- the relationship between fluid flow rate, bore diameter and drill stem diameter, and how these determine the removal of cuttings from a near-horizontal bore
- the consequences of inadequate bore cleaning, including increased drag, restricted product installation and stuck drill string
- the reasons dogleg severity is limited, and the consequences of exceeding the minimum radius of curvature for the drill stem and for the product being installed
- common causes of departure from the design alignment, and the consequences of positional error for the bore objective and for adjacent services and structures
- the principles of guided boring, including how the drill head is steered and how head position and pitch are determined
- the reasons ground conditions are established before boring commences, and the consequences of encountering conditions that differ from those anticipated
- the causes and consequences of drilling fluid escaping to the surface, and the control measures applied
- preparation for fire/accident/emergency

Assessment Conditions

The assessment must:

- include access to:
    - personal protective equipment
    - equipment required to conduct guided bore drilling operations
    - workplace documentation such as, drill plans, site plans and procedures, manufacturer instructions and safety data sheets
- be conducted in a safe environment
- be assessed in the context of this sector's work environment

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- be assessed in compliance with relevant legislation/regulation and using policies, procedures and processes directly related to the industry sector for which it is being assessed
- confirm consistent performance can be applied in a range of relevant workplace circumstances.

Where personal safety or environmental damage are limiting factors, assessment may occur in a simulated work environment* provided it is realistic and sufficiently rigorous to cover all aspects of this sector's workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.

*Guidance on simulated environments has been stipulated in the RII Companion Volume Implementation Guide.

Industry Experts

An industry expert engaged by an RTO to wholly or partially conduct assessment, independently or together with another assessor, or be involved in an assessment judgement, must also satisfy the assessor requirements in applicable vocational education and training legislation, frameworks and/or standards.

Assessors and industry experts delivering training in the drilling industry sector must also have a minimum of three (3) years industry experience, directly relevant to the training and assessment being provided.

Mandatory Workplace Requirements

Assessment of performance evidence may be in a workplace setting or an environment that accurately represents a real workplace.

Unit Mapping Information

Previous Code and Title	Equivalence	Comments
RIINHB309E Conduct guided boring	Equivalent	Updates to application, elements and performance criteria, performance and knowledge evidence, and assessment conditions

Links

Companion volumes, including implementation guides, are found on the national training register - https://training.gov.au/training/details/RII.

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