Australian Government

RIINHB330X Conduct down hammer drilling

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Release: 1

RIINHB330X Conduct down hammer drilling

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 down hammer drilling operations in drilling and related resources and infrastructure work environments.

It applies to operators conducting down hammer drilling using compressed air to operate a down percussion hammer and associated drill bit, who are expected to work within site, manufacturer and authorisation requirements, maintain situational awareness, and adjust drilling techniques in response to changing ground and operating conditions.

This unit does not apply to top hammer or reverse circulation (RC) drilling.

Licensing/Regulatory Information

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite unit(s)

No pre-requisite units

Competency field(s)

N/A

Unit sector(s)

Drilling

Elements and Performance Criteria

Element	**Performance criteria**
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*

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1. Plan and prepare for down hammer drilling	1.1 Access, interpret and apply drilling documentation and ensure the work activity is compliant 1.2 Interpret and confirm work requirements, site procedures and work instructions 1.3 Identify and address potential risks and hazards, and implement site-specific environmental control measures as required by workplace procedures 1.4 Select, inspect and wear personal protective equipment appropriate for work activities 1.5 Communicate and coordinate activities with others throughout the work activity according to work requirements 1.6 Select tools and equipment to carry out tasks, check for serviceability and rectify or report any faults according to workplace procedures 1.7 Check restraining devices on all pressure hoses and fit or replace as required according to workplace procedures 1.8 Obtain and interpret emergency procedures and confirm readiness to respond to fire, accident and other emergency situations
2. Verify and establish drilling requirements	2.1 Carry out pre-start and start-up procedures according to manufacturer specifications and workplace procedures 2.2 Position, level and stabilise the drill according to manufacturer specifications and workplace procedures 2.3 Use drill onboard systems to confirm drilling information and operating parameters, where fitted 2.4 Select rod type, thread form, down hole hammer and drill string components to suit hole specification and ground conditions, and confirm thread compatibility and make-up requirements, according to manufacturer specifications 2.5 Measure and select bit to suit hole diameter and ground conditions according to manufacturer specifications 2.6 Use rod handling equipment according to manufacturer specifications and workplace procedures
3. Conduct down hammer drilling	3.1 Collar hole to establish correct position and direction and minimise deviation, according to manufacturer specifications 3.2 Add, break out and remove drill rods, pipes and down hole equipment according to manufacturer specifications 3.3 Apply, monitor and adjust drilling operating parameters within authorised and manufacturer operating limits to

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	achieve effective penetration while maintaining hole quality and equipment condition 3.4 Select and prepare fluids to suit identified conditions according to manufacturer specifications 3.5 Apply and adjust hole-cleaning and dust suppression methods and parameters to achieve required hole clearance and effective removal of cuttings, appropriate to drilling conditions and site requirements 3.6 Measure drill string components, calculate drill hole depth and monitor drilling progress against required hole specifications 3.7 Identify and respond to abnormal drilling conditions and emergencies within scope of own responsibility 3.8 Complete drill hole according to required depth, location and specifications, conduct required quality checks and protect completed drill hole
4. Carry out post-operational procedures	4.1 Carry out shutdown procedures and secure equipment according to manufacturer specifications and site requirements 4.2 Carry out serviceability checks, cleaning and housekeeping according to scope of own role, environmental requirements and site procedures 4.3 Record completed drill hole information using approved recording method, and complete record keeping and reporting requirements

Range of conditions

N/A

Assessment Requirements for RIINHB330X Conduct down hammer drilling

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:

- conduct down hammer drilling on at least two occasions under different ground or operating conditions, including at least one occasion that requires the candidate to adjust drilling technique in response to changing conditions

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- carry out routine servicing of a down hole hammer and drill bit on at least one occasion, including disassembly, inspection, replacement of unserviceable parts, reassembly and bit sharpening

During the above, the candidate must:

- prepare the work area, drill and equipment for drilling
- set up the drill string and bit to suit the hole specification and ground conditions
- collar, drill and complete holes to required specifications
- respond to at least one drilling problem or abnormal condition within scope of own responsibility
- complete post-operational procedures and records

Knowledge Evidence

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

- key policies, procedures and established requirements for conducting down hammer drilling, including those for:
    - emergency response procedures for fire, accident, uncontrolled release of stored or compressed air, and other emergency situations
    - environmental practice
    - housekeeping
    - personal protective equipment selection, inspection and use
    - operating drill rig
    - sample handling,
    - labelling and custody tools, equipment and safety devices, including serviceability checks and fault reporting
- WHS requirements, emergency procedures and environmental practice requirements applicable to down hammer drilling
- the distinguishing characteristics of down hammer drilling relative to top hammer and RC drilling methods
- drill string and component integrity:
    - make-up torque requirements for the thread form in use, and the consequences of incorrect thread matching or torque for drill string failure
    - wear limits for drill pipe and threads, and the effect of exceeding them on drill string integrity and hole condition
    - the consequences of inaccurate bit or component measurement for hole diameter, drill string fit and drilling performance

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- principles of drill positioning, levelling and stabilisation, including manufacturer operating limits and the purpose of onboard monitoring systems
- down hammer construction and operating principles:
    - principles and techniques for safely disassembling, inspecting, replacing unserviceable parts and reassembling a down hammer
    - function of hammer components (piston, cylinder, foot valve, chuck, bit)
    - how air pressure and volume determine up-hole velocity and cuttings removal, and the effect of insufficient up-hole velocity on sample quality and hole condition
    - the effect of feed pressure and rotation rate on hammer performance, bit life and hole deviation
    - routine servicing and lubrication requirements, and the effect of inadequate lubrication on hammer performance and service life
- requirements for hole collaring, and the consequences of a poorly collared hole for hole deviation and sample contamination
- causes of sample contamination and reduced sample return in down hammer drilling, and their effect on sample and assay validity
- how ground conditions determine bit selection, and the theory of TC bit sharpening technique and its effect on penetration rate, cuttings size and sample quality
- drilling and dust control fluids:
    - fluid ingredients used to suit hole, ground and environmental conditions
    - the function of dust control fluids and foams, and how ground and water conditions determine their selection
- methods and hazards of clearing blockages in the hole, sample delivery hose and pressure delivery hose, including the requirement for restraining devices on pressure and sample delivery hoses
- indicators that drilling must stop or exceeds the scope of own responsibility
- interpretation of drilling conditions:
    - gauges, pressures, flow rates and temperatures, and what a deviation in each indicates about conditions at the bit
    - surface indicators of changing ground conditions (penetration rate, air return, cuttings size and colour) and their significance
    - the effect of ground water on cuttings behaviour, hammer performance and sample quality

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Assessment Conditions

The assessment must:

- include access to:
    - personal protective equipment
    - equipment required to conduct down hammer 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
- 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.

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Unit Mapping Information

Previous Code and Title	Equivalence	Comments
RIINHB330 Conduct down-hole hammer drilling	Equivalent	Updates to title, 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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