



Australian Government

RIICTC307 Conduct tunnel boring machine operations

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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 11.0.

Application

This unit describes the skills and knowledge required to assist the operation of tunnel boring machines (TBM) in civil construction, including conducting TBM pre-operational checks and monitoring, operating and adjusting TBM controls.

It applies to those working in operational roles. They generally work under minimal supervision to undertake a broad range of tasks in varied work contexts, using some discretion and judgement in selecting equipment, services or contingency measures.

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)

Civil construction

Elements and Performance Criteria

Element	Performance criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element. Required knowledge, skills and application should be considered and clearly articulated.</i>
1. Prepare to conduct TBM operations	1.1 Obtain relevant Permit to Tunnel (PTT) and/or Safe Work Method Statement (SWMS) before commencing work

	1.2 Confirm task requirements with site personnel 1.3 Identify and address potential risks and hazards in accordance with work health and safety (WHS) requirements and within scope of own role 1.4 Wear designated personal protective equipment (PPE) prescribed in site signage, PTT or SWMS after checking its serviceability 1.5 Confirm and comply with environmental protection, safety and traffic management signage requirements in accordance with regulatory requirements and worksite instructions 1.6 Assess and manage changes to workplace conditions and the adequacy of hazard controls in accordance with site requirements and scope of own role 1.7 Confirm location of escape routes, self-contained self-rescuer (SCSR) device, safe place, refuge chambers and fire services and emergency equipment in accordance with WHS requirements 1.8 Comply with environmental protection, safety and traffic management signage requirements in accordance with applicable legislation, regulatory requirements and worksite instructions
2. Conduct TBM pre operational checks	2.1 Confirm TBM parameters and conditions against permit to bore and design limitations for tunnel and TBM in accordance with worksite instructions 2.2 Check and verify that all required preparatory activities are completed and safety controls are in place prior to commencing tunnelling work in accordance with WHS requirements 2.3 Confirm required works that prevent tunnelling are completed before tunnelling commences in accordance with WHS requirements 2.4 Conduct visual and functional inspections of TBM in accordance with worksite instructions 2.5 Verify safety and monitoring devices are operational in accordance with manufacturer instructions 2.6 Verify that the TBM's electrical and hydraulic systems, including the control dashboard, are operational in accordance with manufacturer instructions 2.7 Check that the levels of critical fluids meet manufacturer and site requirements in accordance with manufacturer instructions 2.8 Inspect hydraulic hoses for abnormalities including leaks and damage in accordance with manufacturer instructions

	2.9 Ensure all audible alarms and lights are working correctly and warning decals are intact in accordance with manufacturer instructions 2.10 Monitor TBM operations and report identified technical faults in accordance with worksite requirements.
3. Operate TBM	3.1 Ensure all job site personnel are aware equipment is starting up and clear of equipment before commencing in accordance with WHS requirements 3.2 Use positive communication processes and systems to relay operational requirements of TBM in accordance with worksite requirements 3.3 Observe and respond accordingly to all gauges, meters, controls and warning devices in accordance with manufacturer instructions 3.4 Check line and grade alignment regularly in accordance with worksite instructions 3.5 Operate tunnel boring machine controls to maintain correct line, grade, and alignment in accordance with project specifications and guidance systems 3.6 Monitor machine performance indicators, pressures, torque, and thrust levels to maintain optimal cutting rates and prevent overloading or equipment damage in accordance with manufacturer instructions 3.7 Coordinate operation of backup and support systems and communication with relevant site personnel in accordance with WHS requirements and worksite instructions 3.8 Identify and respond promptly to alarms, changes in conditions, or abnormal machine behaviour in line with site procedures and manufacturer instructions 3.9 Conduct shutdown, isolations and restart sequences safely and systematically, ensuring all systems are isolated, depressurised, and locked out in accordance with worksite and manufacturer requirements 3.10 Conduct reporting procedures, including reporting of problems as required in accordance with worksite requirements 3.11 Monitor operating parameters when TBM is at docking mode in accordance with manufacturer instructions
4. Conduct housekeeping activities	4.1 Carry out operator maintenance according to manufacturer specifications and worksite requirements 4.2 Inspect machine components for signs of wear, damage, or fluid leaks and report findings according to worksite requirements

	4.3 Complete records according to worksite requirements
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Range of conditions

N/A

Assessment Requirements for RIICTC307 Conduct tunnel boring machine operations

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 tunnel boring machine (TBM) operations on at least **three** occasions, including:
 - completing at least **one hour** of the tunnelling phase
 - completing at least **one hour** of ring building
 - completing at least **one hour** of excavation.

In the course of the above work the candidate must also:

- locate and apply required documentation, policies and procedures
- implement the requirements, procedures and techniques to conduct TBM operations, including:
 - monitoring, interpreting and controlling TBM control panels
 - interpreting required documentation, including engineering drawings, permits to bore and on screen tunnelling parameters
 - respond to ground conditions according to site requirements
- work with others to conduct TBM operations in a way that meets required outcomes, including:
 - organising work activities to meet task requirements
 - communicating with others to receive and clarify work instructions according to site requirements
 - using techniques and systems to advise others of work activity and maintain safe working conditions
 - monitoring hazards and identifying and communicating changes to work environment.

Knowledge Evidence

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

- policies, procedures and documentation required to conduct TBM operations, including those relating to:
 - environmental protection, including atmospheric monitoring
 - work instructions

- hazard and risk management
- environmental protection
- incident and emergency response
- job safety analyses (JSA)/job safety environmental analyses (JSEA)/safe work method statements (SWMS)
- project quality requirements
- permits to bore
- design limitations
- manufacturer specifications for required plant and equipment
- site requirements
- communication techniques and equipment
- workplace recording and reporting
- safety data sheet (SDS) and materials handling methods
- waste management
- work health and safety (WHS)
- requirements and procedures for selecting PPE, checking PPE serviceability, and ensuring correct fit types, operational phases, characteristics and limitations of TBM and equipment required to operate TBM
- principles and techniques for effective TBM operations, including:
 - TBM operational roles and responsibilities
 - techniques for creating and monitoring safe and stable tunnelling environments
 - techniques for interpreting and applying TBM controls, permits to bore and engineering drawings
- types and characteristics of tunnels required for TBM operations, including:
 - soil and rock types and characteristics
 - implications of soil and rock types for TBM operations
 - civil construction terminology required for conducting tunnel construction.

Assessment Conditions

Mandatory conditions for assessment of this unit are stipulated below. The assessment must:

- include access to:
 - TBM
 - personal protective equipment (PPE)
- be conducted in a safe environment; and,
- be assessed in context of this sector's work environment; and,

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

Assessor Requirements

In addition to the requirements in applicable vocational education and training legislation, frameworks and/or standards, assessors and industry experts must also have a minimum of two (2) 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
RIICTC306 Conduct tunnel boring machine operations	Equivalent	Supersedes and is equivalent.

Links

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