



Australian Government

Department of Education, Employment and Workplace Relations

TLIS2004A Install and maintain rail bonding systems

Release: 1

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Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to install and maintain all types of temporary and permanent bonds and bonding cables in use in the Australian rail system in accordance with safeworking and regulatory requirements and workplace procedures. This includes planning the installation and maintenance, preparing the worksite, installing and maintaining the bonds and bonding cables, and conducting all required post-installation activities. Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Application of the Unit

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Persons achieving competence in this unit will need to fulfil the applicable legislated rail safety requirements including acts and regulations from each state and territory together with any nationally approved compliance codes and/or guidelines.

Work is performed under some supervision, generally within a team environment.

It involves the application of routine operational principles and procedures to install and maintain rail bonding systems as part of workplace activities across a variety of operational contexts within the Australian rail system.

Operators of mechanised equipment must have undertaken training and, where appropriate, hold the relevant licence, permit or certificate and be recognised as competent for the class of machinery being used.

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability Skills 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 required performance needed to demonstrate achievement of the element. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1 Plan the installation and maintenance of the relevant bonding systems	1.1 Works order including drawings, plans and material lists is received/accessed, analysed and confirmed, if necessary by site inspection 1.2 Work is prioritised/scheduled including site and relevant electrical permits 1.3 Resources including personnel, plant, equipment and tools are identified and scheduled 1.4 Liaison and communication issues with other personnel, authorities, clients and landowners are resolved
2 Prepare the worksite	2.1 Personnel participating in the task, including plant operators and contractors, are fully briefed 2.2 Site preparation is completed in accordance with works order 2.3 Where required, specialist testing and earth equipment is inspected and replaced if defective 2.4 Where required, road signs, barriers and warning devices are positioned 2.5 Safeworking practices are observed on or about the running track/line
3 Install and maintain bonding system cables	3.1 Systems and circuits are isolated as required, proved safe to work on in accordance with work plan and, where required, electrical permits are issued/accepted/relinquished 3.2 Cable and surrounds, including rail and other surfaces, are prepared to appropriate specifications 3.3 Bonds are attached in accordance with specifications 3.4 Joint and termination procedures are carried out in accordance with authorised work procedures 3.5 Continuity testing procedures are carried out as required 3.6 The system is commissioned following the conduct of a visual inspection, and the completion of other testing
4 Conduct post-operational activities	4.1 Worksite is rehabilitated in accordance with workplace procedures 4.2 Work is completed in an agreed time and with a minimum waste 4.3 Notification, records and documentation for updating system data is completed

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

This describes the essential knowledge and skills and their level required for this unit.

Required knowledge:

- Applicable legislated rail safety requirements including acts and regulations from each state and territory together with any nationally approved compliance codes and/or guidelines
- Relevant OH&S and environmental procedures and regulations
- Workplace procedures for the installation and maintenance of rail bonding systems
- Problems that may occur during the installation and maintenance of rail bonding systems and action that can be taken to report or resolve the problems
- Hazards that may exist during the installation and maintenance of rail bonding systems and ways of controlling the risks involved
- Characteristics, capabilities and uses of various types of cables
- Cable testing and fault identification/location procedures
- Testing and commissioning procedures, including testing and earth/rail connecting conductors
- Traction earthing systems and bonding systems
- Basic circuits for signalling and communications systems
- Switching operation, isolation and access permit procedures
- Electrical principles including OHMs law, voltage and current transformation, voltage drop, cable
- Current capacities, inductance and capacitance, protection systems and devices
- The responsibilities and rights of other authorities, clients and landowners
- Regulatory and workplace traffic control requirements and guidance signals
- Relevant workplace documentation and records systems

Required skills:

- Communicate effectively with others when installing and maintaining rail bonding systems
- Read and interpret technical data, drawings, instructions and manuals relevant to the installation and maintenance of rail bonding systems
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to the installation and maintenance of rail bonding systems
- Operate electronic communication equipment to required protocol
- Work collaboratively with others when installing and maintaining rail bonding systems
- Adapt appropriately to cultural differences in the workplace, including modes of behaviour and interactions with others
- Promptly report and/or rectify any identified problems, faults or malfunctions that may occur when installing and maintaining rail bonding systems in accordance with regulatory requirements and workplace procedures

Required skills:

- Implement contingency plans for unplanned events that may arise when installing and maintaining rail bonding systems
- Apply precautions and required action to minimise, control or eliminate hazards that may exist during work activities
- Organise activities
- Monitor work activities in terms of planned schedule
- Modify activities depending on differing operational contingencies, risk situations and environments
- Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment
- Select and use relevant equipment and tools
- Joint and terminate earthing and bonding cables
- Guide, using signals, operators of plant and equipment during the installation and maintenance of cables
- Work at heights and in confined spaces
- Perform basic and exothermic welding
- Adapt to differences in equipment in accordance with standard operating procedures
- Select and use required personal protective equipment conforming to industry and OH&S standards

Evidence Guide**EVIDENCE GUIDE**

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required knowledge and skills, the range statement and the assessment guidelines for this Training Package.

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 and satisfy all of the requirements of the elements and performance criteria of this unit and include demonstration of applying:
 - the underpinning knowledge and skills
 - relevant legislation and workplace procedures
 - other relevant aspects of the range statement

Context of and specific resources for assessment

- Performance is demonstrated consistently over a period of time and in a suitable range of contexts
- Resources for assessment include:
 - a range of relevant exercises, case studies and/or

EVIDENCE GUIDE

	other simulated practical and knowledge assessment, and/or - access to an appropriate range of relevant operational situations in the workplace - In both real and simulated environments, access is required to: - relevant and appropriate materials and equipment, and - applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
Method of assessment	- Assessment of this unit must be undertaken by a registered training organisation - As a minimum, assessment of knowledge must be conducted through appropriate written/oral tests - Practical assessment must occur: - through activities in an appropriately simulated environment at the registered training organisation, and/or - in an appropriate range of situations in the workplace

Range Statement

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.

Operations may be conducted:	by day or night
Work may be conducted in:	- restricted spaces - exposed conditions - controlled or open environments
Work may involve exposure to:	- chemicals - dangerous or hazardous substances - movements of equipment, goods and vehicles
Rail bonding systems to be installed and maintained may include all those in service in the Australian rail system, including:	- traction bonding (as required in all electrified rail systems) - track circuit continuity bonds - cross bonding

RANGE STATEMENT

Maintenance may include:	• the diagnosis of faults and recommissioning • the repair and replacement of cables and associated hardware
Earthing and bonding systems may include:	• permanent systems • temporary systems • grading rings • earth grids
Types of conductors may include:	• steel • steel rail • copper • aluminium and steel • bare and sheathed cables • single core • stranded • flexible
Cables may include:	• surface mounted • aerial • buried • enclosed
Permanent jointing and terminating materials may include:	• polymeric tape materials • polymeric heat shrink and covering materials • exothermic welds • crimped connections • bolted connections
Temporary terminating components may include:	• screwed earth/rail/conductor clamps • clipped earth/rail/conductor clamps • sticks • testers
Communications equipment may include:	• two-way radios, and/or • telephones
Depending on work context, safety and protective equipment may include:	• high visibility clothing • hearing protection • gloves • sunscreen • sunglasses • safety glasses • insect repellent • safety headwear • safety footwear

RANGE STATEMENT

	• portable radios • hand lamps • flags • safety devices
Depending on the type of organisation concerned and the local terminology used, workplace procedures may include:	• company procedures • enterprise procedures • organisational procedures • established procedures
Information/documents may include:	• applicable legislated rail safety requirements including acts and regulations from each state and territory together with any nationally approved compliance codes and/or guidelines • operational instructions, policies and workplace procedures • relevant logs or record books • work orders and specifications • technical instructions • manufacturers or workplace equipment instructions and operation manuals • emergency procedure manuals • two-way radio operation procedures • QA plans, data and document control • conditions of service, legislation and industrial agreements including workplace agreements and awards
Applicable procedures and codes may include:	• applicable legislated rail safety requirements including acts and regulations from each state and territory together with any nationally approved compliance codes and/or guidelines • relevant Australian Standards and related requirements, including AS 4292 • relevant state/territory OH&S legislation • relevant state/territory environmental protection legislation

Unit Sector(s)

Not Applicable

Competency Field

Competency Field

S - Construction and Installation