



Australian Government

TLIW3043A Weld rail on tram/light rail systems using electric welding process

Release: 1

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Modification History

Release 1 - New unit of competency

Unit Descriptor

This unit involves the skills and knowledge required to weld rail, crossings or switches on tram/light rail systems using an electric welding process in accordance with approved standards, safeworking and regulatory requirements, and organisational procedures. It includes preparing rails, crossings or switches for welding; gouging or grinding; setting up welding equipment; performing the welding operation; checking weld conformance; and completing required documentation.

Licensing or certification requirements are not applicable to this unit.

Application of the Unit

This unit covers the processes used to repair rail surface defects and restore rail profile to plain rail, crossings and switches.

Licensing/Regulatory Information

Not applicable.

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

Elements and Performance Criteria

1 Prepare rails, crossings or switches for welding	1.1 Weld repair area is identified and assessed in accordance with standards and procedures 1.2 Welding equipment and consumables are prepared and checked for serviceability 1.3 Weld repair area is prepared for welding in accordance with workplace standards and procedures 1.4 Track components are assembled/aligned to specification where required
2 Assemble and set up welding equipment	2.1 Welding equipment is set up and adjusted to meet welding process requirements 2.2 Accessories and consumables are selected for use
3 Assemble and set up gouging and grinding equipment	3.1 Gouging and grinding equipment is assembled and set up 3.2 Equipment settings are adjusted to meet process requirements 3.3 Accessories and consumables are selected for use
4 Remove defect	4.1 Appropriate method to be used to remove the defect is identified in accordance with organisational standards and procedures 4.2 Defect is removed using identified method in accordance with organisational standards and procedures
5 Perform welding operation	5.1 Weld metal is applied to repair area to meet specification in accordance with standards and procedures 5.2 Welded area is cleaned in preparation for grinding 5.3 Welded area is ground in accordance with organisational standards and procedures
6 Check weld conformance	6.1 Finished ground weld area is visually inspected for surface finish and defects 6.2 Finished ground weld area is checked for conformance to rail/crossing/switch profile acceptance standards
7 Complete post-operative checks and documentation	7.1 Equipment is checked for serviceability 7.2 Defective equipment is replaced and/or reported for servicing/repair in accordance with organisational policies and procedures 7.3 Documentation on work undertaken is completed in accordance with organisational requirements

Required Skills and Knowledge

This section describes the knowledge and skills required for this unit.

Required knowledge:

- Acceptance standards for weld repairs on rail
- Authorisation/approval processes and procedures
- Documentation and recordkeeping requirements
- Fundamentals of tram track and components
- Hazards that may exist when welding rail using an electric welding process, and ways of controlling the risks involved
- Problems that may occur when welding rail using an electric welding process, and action that can be taken to report or resolve the problems
- Relevant communication systems and procedures
- Relevant safety, occupational health and safety (OH&S) and environmental procedures and regulations
- Track standards for tram rail, crossing and switch condition and surface profile
- Workplace procedures for removing defects by gouging, grinding and welding rail using an electric welding process

Required skills:

- Communicate effectively with others when welding rail using an electric welding process
- Complete documentation related to welding rail using an electric welding process
- Implement contingency plans for unexpected events when welding rail using an electric welding process
- Interpret and follow operational instructions and prioritise work when welding rail using an electric welding process
- Modify activities depending on differing operational contingencies, risk situations and environments
- Monitor work activities in terms of planned schedule
- Operate and adapt to differences in equipment in accordance with standard operating procedures
- Operate communications equipment to required protocol
- Read and interpret technical data, drawings, instructions and manuals relevant to welding rail using an electric welding process
- Report and/or rectify any identified problems, faults or malfunctions that may occur when welding rail using an electric welding process in accordance with regulatory requirements and organisational procedures
- Select and use hand tools, power tools and equipment
- Select and use required personal protective equipment (PPE)
- Work collaboratively with others when welding rail using an electric welding process

- Work systematically with required attention to detail without injury to self or others, or damage to goods or equipment

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 required knowledge and skills
 - relevant legislation and workplace procedures
 - other relevant aspects of the range statement
- Assessment must include exercises which demonstrate competency in the following in a range of situations:
 - preparing items for welding according to workplace requirements
 - assembling and setting up welding, gouging and grinding equipment and preparing consumables
 - performing welding grinding, gouging and testing operations on rails, crossings or switches
 - ensuring weld conforms to organisational requirements
 - completing documentation in accordance with organisational requirements

Context of and specific resources for assessment

- Performance must be 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 other simulated practical and knowledge assessment, and/or
 - access to an appropriate range of relevant operational situations in the workplace or
 - simulated environment using actual components, tools and equipment
- 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

- 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, and/or

- in an appropriate range of situations in the workplace

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.

Work may involve exposure to:	• chemicals • dangerous or hazardous substances • movements of equipment, goods and vehicles
Types of weld repairs may vary according to:	• welding process location • rail mass or type • crossing and switch type • rail, switch and crossing material
Welding process may include:	• flux core arc welding • manual metal arc welding
Welding equipment may include:	• electric welders • generators • wirefeed welding unit • electrode holder • robotic welder
Equipment may include:	• mechanical handling/lifting equipment • hand tools including impact wrenches, tie tampers, gauges, track jacks, spiking hammers and bars • oxy/LPG gouging equipment • manual or mechanical grinder • wire brushes • cutting and boring equipment • fastening equipment • fume extraction equipment • on-line respirator
Materials may include:	• flux core wire • welding electrodes • grinding discs
Liaison may include:	• internal or external personnel from other work areas (e.g. train controllers, signal technicians)
Communications equipment may include:	• two-way radios • telephones/mobile phones • agreed audible or hand signal
Depending on the work context, safety and personal protective equipment may include:	• high visibility clothing • long pants and shirts • hearing protection • long gloves • spats

- sunscreen
 - sunglasses
 - welding helmet
 - safety glasses
 - insect repellent
 - safety headwear
 - safety footwear
 - portable radios/mobile phones
 - hand lamps
 - flags
 - safety devices
 - special PPE
- Information/documents may include:
- operational instructions
 - information provided by other workplace personnel
 - rail inspections reports
 - work orders
 - technical instructions
 - manufacturer or workplace equipment instructions and operation manuals
 - emergency procedure manuals
 - two-way radio/mobile phone operation procedures
 - conditions of service, legislation and industrial agreements including workplace agreements and awards
- Applicable procedures and codes may include:
- legislated rail safety requirements including acts and regulations from each applicable state and territory together with any nationally approved compliance codes and/or guidelines
 - organisational policies and procedures
 - local authority regulations and procedures relevant
 - relevant state/territory OH&S legislation
 - relevant state/territory environmental protection legislation

Unit Sector(s)

Not applicable.

Competency Field

W – Equipment and Systems Operations