



Australian Government

Department of Education, Employment and Workplace Relations

TLIS3010A Test rail using ultrasonic equipment

Release: 1

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Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

This unit involves the skills and knowledge required to test plain rail and field welds using ultrasonic equipment in accordance with approved standards, safeworking and regulatory requirements and workplace procedures. It includes determining test requirements, conducting testing using hand directed equipment, conducting visual examination and measurement of welds, identifying and classifying defects, and completing all required documentation. Licensing or certification requirements are not 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 the testing of rail using ultrasonic equipment as part of workplace activities across a variety of operational contexts within the Australian rail system.

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 Determine test requirements	1.1 Test site is identified and prepared using appropriate procedures and materials 1.2 Preparation processes are carried out in accordance with the relevant procedures, statutory and OH&S requirements
2 Conduct testing using hand directed equipment	2.1 The most appropriate ultrasonic test for the application is selected 2.2 Testing equipment is selected and prepared in accordance with standards and/or procedures 2.3 Ultrasonic test is carried out in accordance with relevant standards, specifications and OH&S requirements 2.4 Ultrasonic testing equipment is checked for proper function, maintained and stored in accordance with procedures, OH&S requirements and manufacturer instructions
3 Conduct visual examination and measurement of rail and welds	3.1 Rail or weld is visually assessed for obvious defects 3.2 New welds are assessed for alignment and adjustment tolerance in accordance with standards and/or procedures 3.3 Weld repairs are assessed for alignment tolerance in accordance with standards and/or procedures
4 Identify and classify defects	4.1 Indications are assessed and defects detected in accordance with standards and/or procedures 4.2 Defects are classified in accordance with standards and/or procedures 4.3 Defective welds and weld repairs are marked in accordance with standards and/or procedures
5 Complete documentation	5.1 Test results are reported in accordance with standards and/or procedures 5.2 Required documentation is completed in accordance with workplace procedures

Required Skills and Knowledge

REQUIRED KNOWLEDGE AND SKILLS

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

Required knowledge:

- Relevant safety, OH&S and environmental procedures and regulations
- Principles of ultrasonic testing

REQUIRED KNOWLEDGE AND SKILLS

- Ultrasonic probes, beam, their characteristics and screen display
- Beam angles and probes required to locate various defect types
- Fundamentals of rail and rail defects
- Rail defects and rail defect classification
- Workplace procedures for the ultrasonic testing of rail and welds
- Problems that may occur during the ultrasonic testing of rail and welds, and action that can be taken to report or resolve the problems
- Hazards that may exist during the ultrasonic testing of rail and welds, and ways of controlling the risks involved
- Basic mechanical knowledge relevant to the ultrasonic testing of rail and welds
- Relevant communication systems and procedures
- Workplace protection
- Hazardous situations and related personal protection measures
- Relevant recording and documentation procedures

Required skills:

- Read and interpret instructions, procedures, information, technical data, standards and drawings relevant to the ultrasonic testing of rail and welds
- Interpret and follow operational instructions and prioritise work
- Complete documentation related to the ultrasonic testing of rail and welds
- Operate communication equipment to required protocol
- Promptly report and/or rectify any identified problems, faults or malfunctions that may arise when testing rail and welds using ultrasonic equipment in accordance with regulatory requirements and workplace procedures
- Implement contingency plans for unexpected events when testing rail and welds using ultrasonic equipment
- Identify hazards associated with ultrasonic testing
- Apply precautions and required action to minimise, control or eliminate hazards that may exist during work 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 hand tools, power tools and equipment
- Adapt to differences in equipment in accordance with standard operating procedures
- Select and use required personal protective equipment conforming to industry and OH&S

Required skills:

standards

- Identify, clean and prepare inspection areas for testing using appropriate procedures and materials
- Visually assess inspection areas and identify and classify obvious discontinuities
- Identify types of rail defects
- Select probes to use to locate each type of defect
- Check and maintain ultrasonic testing equipment
- Set up probes for each type of test
- Test with appropriate probes for each type of defect
- Interpret screen indications
- Locate, measure and assess defect size for all defect types
- Use sizing definitions
- Carry out additional visual and geometry assessments for field welds
- Report test results

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
- Assessment must include exercises which demonstrate competent performance of the following in a range of situations:
 - determining test requirements
 - conducting testing using hand directed equipment
 - conducting visual examination and measurement of rail and welds
 - classifying defects

EVIDENCE GUIDE

Context of and specific resources for assessment

- completing documentation
- 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 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
- weather conditions specified in relevant standards

Work may be conducted in:

- restricted spaces
- exposed conditions
- controlled or open environments

Work may involve exposure to:

- chemicals
- dangerous or hazardous substances

RANGE STATEMENT

Types of ultrasonic test and/or visual examination and measurement may vary according to:	• movements of equipment, goods and vehicles • location • rail mass or type • weld type • test requirement
Weld type may include:	• new aluminothermic welds • flashbutt welds • head repair welds using wirefeed or 'stick' welding process
Test requirements may include:	• acceptance testing (ultrasonic, geometric alignment and visual) of new aluminothermic welds • acceptance testing (ultrasonic, geometric alignment and visual) of new flashbutt welds • acceptance testing (ultrasonic, geometric alignment and visual) of new head repair welds • ultrasonic testing of plain rail and welds
Equipment may include:	• ultrasonic testing units • ultrasonic probes • alignment gauges • tape measures
Materials may include:	• coupling medium • marking pens/paint
Liaison may include:	• internal or external personnel from other work areas (e.g. train controllers, electricians)
Communications equipment may include:	• two-way radios • telephones/mobile phones • agreed audible or hand signal
Depending on work context, safety and personal protective equipment may include:	• high visibility clothing • hearing protection • gloves • sunscreen • sunglasses • safety glasses • insect repellent • safety headwear • safety footwear • portable radios/mobile phones • hand lamps • flags • safety devices

RANGE STATEMENT

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:

- operational instructions, policies and workplace procedures
- information provided by other workplace personnel
- rail inspections and reports
- relevant logs or record books
- work orders
- technical instructions
- manufacturers or workplace equipment instructions and operation manuals
- emergency procedure manuals
- two-way radio/mobile phone 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:

- legislated rail safety requirements including acts and regulations from each applicable state and territory together with any nationally approved compliance codes and/or guidelines
- relevant state/territory regulations, codes of practice and safeworking system requirements
- 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