



Australian Government

UEENEEN109A Install and maintain train detection equipment

Release: 2

UEENEEN109A Install and maintain train detection equipment

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the installation and maintenance of train detection equipment in a rail network. It encompasses safe working, regulatory requirements and following installation and work procedures, performing maintenance, finding and repairing faults, performing operational tests, certifying and reporting.

Application of the Unit

Application of the Unit 2)

This unit shall apply to qualifications in installation and maintenance of rail signalling electrical power and control systems.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit may only be practised in the workplace under regulations related to electrical work, the codes of practice and regulations of the State/Territory in which the work is carried out. This includes codes of practice such as the 'Code Of Practice for the Defined Interstate Rail Network' for work carried out on that network.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEN 105A Install and maintain rail signalling power supplies

AND

UEENEEN 103A Install and maintain rail track circuit leads and bonds

AND

Relevant work place requirements in 'Work site protection' have been acquired.

Literacy and numeracy skills 4.2)

Participants are best equipped to achieve competency in this unit if they have reading, writing and numeracy skills indicated by the following scales. Description of each scale is given in Volume 2, Part 3 'Literacy and Numeracy'

Reading 4 Writing 4 Numeracy 4

Employability Skills Information

Employability Skills 5)

This unit contains Employability Skills

The required outcomes described in this unit of competency contain applicable facets of Employability Skills. The Employability Skills Summary of the qualification in which this unit of competency is packaged will assist in identifying Employability Skill requirements.

Elements and Performance Criteria Pre-Content

6) Elements describe the essential outcomes of a competency standard unit
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 Prepare to install and maintain train detection equipment	1.1 OHS procedures for a given work area are identified, obtained and understood.
	1.2 Established OHS risk control measures and procedures are followed in preparation for the work.
	1.3 The extent of the installation and/or maintenance is determined from maintenance schedules, job specifications, drawings and regulatory requirements
	1.4 Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site
	1.5 Materials needed for the installation and/or maintenance work are obtained in accordance with established procedures and checked against job requirements
	1.6 Tools, equipment and testing devices needed for the installation and/or maintenance work are obtained in accordance with established procedures and checked for correct operation and safety.

ELEMENT	PERFORMANCE CRITERIA
2 Install and maintain train detection equipment	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Installation and maintenance work is carried out to manufacturer specifications using procedures consistent with delegated authority.
	2.3 Normal function and operating parameters are confirmed using appropriate manuals, specifications and commissioning data.
	2.4 Fault finding and diagnostic techniques are completed to verify system/faults.
	2.5 Faulty, damaged or insecure components are replaced, repaired or secured in accordance with manufacturer specifications and organisation procedures.
	2.6 Installation and maintenance, adjusting and testing work is carried out efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
	2.7 Appropriate readings are measured and recorded using relevant test instruments.
	2.8 Equipment is tested and adjusted in accordance with the specifications.
	2.9 Equipment operational tests are completed to specifications and procedures.
	2.10 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
3 Complete the installation and maintenance of train detection equipment	3.1 OHS risk control work completion measures and procedures are followed.
	3.2 Correct calibration of equipment is verified and equipment is confirmed as fulfilling functional tests in accordance with organisation

ELEMENT**PERFORMANCE CRITERIA**

certification procedures.

- 3.3 Work completion is documented and appropriate persons notified in accordance with established procedures, and relevant reports produced

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

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

Evidence shall show that knowledge has been acquired of safe working practices and maintaining train detection equipment.

All knowledge and skills detailed in this unit should be contextualised to current industry practices and technologies.

KS01-EN109A

Train detection equipment installation and maintenance

Evidence shall show an understanding of train detection equipment installation and maintenance, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

Rail signalling, train detection equipment

Train detection equipment and their components encompassing:

Track circuits

Note:

Types may include jointed, jointless, non-vital, axle counters, treadles and level crossing predictors.

AC and DC power supplies

Transmitters

Receivers

Relays

Track Shunts

Tuned joint couplers

Central processor

Diagnostics

Fixtures to ironwork.

Operating principles and parameters encompassing:

Interpreting circuits diagrams to evaluate correct operation and relationship to other signalling circuits

Normal mode operation

Note:

Normal mode includes instantaneous coil energisation and delay pickup.

Wrong side operation

REQUIRED SKILLS AND KNOWLEDGE

Failure mode operation

Note:

Failure mode must include wrong side and right side conditions.

Alarm mode

Redundancy mode

Correct operation in accordance with control and locking tables.

Servicing procedures encompassing:

Maintenance documentation

Coordination/planning sequence

Operational test procedures

Scheduled /preventative maintenance

Unscheduled/corrective maintenance

Certification of train detection equipment (commission and de-commission).

Note:

Certifying procedures are only applicable for compliance with rail operator and/or enterprise standards.

Evidence Guide

EVIDENCE GUIDE

9) The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package.

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all components parts of this unit and performed in accordance with the Assessment Guidelines of this Training Package.

Overview of Assessment 9.1)

Longitudinal competency development approaches to assessment, such as Profiling, require data to be reliably gathered in a form that can be consistently interpreted over time. This approach is best utilised in Apprenticeship programs and reduces assessment intervention. It is the industry-preferred model for apprenticeships.

However, where summative (or final) assessment is used it must include the application of the competency in the normal work environment or, at a minimum, the application of the competency in a realistically simulated work environment. In some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accordance with industry and regulatory policy.

Methods chosen for a particular assessment will be influenced by various factors. These include the extent of the assessment, the most effective locations for the assessment activities to take place, access to physical resources, additional safety measures that may be required and the critical nature of the competencies being assessed.

The critical safety issues inherent in working with electricity, electrical equipment, gas or any other hazardous substance/material present a challenge for those determining competence. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday work influence decisions about how/much the data gathered will contribute to its 'richness'. Some skills are more critical to safety and operational requirements while the same skills may be more or less frequently practised. These points are raised for the assessors to consider when choosing an assessment method and developing assessment instruments. Sample assessment instruments are included for Assessors in the Assessment Guidelines of this Training Package.

**Critical aspects
of evidence
required to
demonstrate
competency in
this unit**

9.2)

Before the critical aspects of evidence are considered all prerequisites must be met.

Evidence for competence in this unit shall be considered holistically. Each Element and associated performance criteria shall be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence shall also comprise:

- A representative body of work performance demonstrated within the time frames typically expected of the discipline, work function and industrial environment. In particular this

shall incorporate evidence that shows a candidate is able to:

- Implement Occupational Health and Safety workplace procedures and practices including the use of risk control measures as specified in the performance criteria and range statement
- Apply sustainable energy principles and practices as specified in the performance criteria and range statement
- Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.
- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures
- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
 - Install and maintain train detection equipment as described in 8) and including:
 - a. Interpreting plans and specifications correctly
 - b. Installing, maintaining, adjusting and testing equipment in accordance with workplace procedures
 - c. Using tools and test equipment safely
 - d. Checking that technical operational specifications are met and that equipment is in compliance with work orders
 - e. Following relevant codes of practice OHS and environmental protection procedures and requirements
 - f. Completing relevant technical reports, records and documentation, and
 - g. Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in the holistic assessment with the above listed items

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

Context of and specific resources for assessment 9.3)

This unit should be assessed as it relates to normal work practice using procedures, information and resources typical of a workplace. This should include:

- OHS policy and work procedures and instructions.
- Suitable work environment, facilities, equipment and materials to undertake actual work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to maintaining track circuit equipment and repairing faults.

Method of assessment 9.4)

This unit shall be assessed by methods given in Volume 1, Part 3 'Assessment Guidelines'.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this unit applies. This requires assessment in a structured environment which is intended primarily for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and skills described in this unit.

Concurrent assessment and relationship with other units 9.5)

For optimisation of training and assessment effort, competency

development in this unit may be arranged in combination with other competencies required by a given enterprise installation, maintenance and repair functions.

Concurrent assessment may include:

UEENEEN105A Install and maintain rail signalling power supplies

UEENEEN118A Find and repair rail signal system faults

Range Statement

RANGE STATEMENT

10) This relates to the unit as a whole providing the range of contexts and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

This unit shall be demonstrated in relation to:

- The relevant State/Territory codes of practice and safe working requirements.
- Equipment relevant to a particular rail network.
- Code of practice for the defined interstate rail network.

Activities may include: procedures for maintenance of track circuit equipment in a rail networks and may also include; the use of plans and drawings, manufacturer's / enterprise specifications and manuals.

Maintenance activities may include: finding and repairing faults on track circuit equipment in a rail network and may also incorporate safe working, working according to regulatory requirements and following work procedures, adjust, test and verifying operational integrity and completing report documentation.

Electrical equipment may include: power supplies, receivers, relays, transmitters, matching units/tuning units, axle counters and peripherals, impedance bonds and track filters

Mechanical equipment may include: insulated Rail Joints (IRJs) and treadles.

Technical report may include: incident report, track survey and log report

Test equipment may include: multimeters, frequency meters, integration attachments, impedance tester, insulation resistance and continuity tester, track shunt devices, current sensing devices.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in Volume 2, Section 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Rail Signalling