



Australian Government

UEENEEN112A Install and maintain vital relay interlocking systems

Release 2

UEENEEN112A Install and maintain vital relay interlocking systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers the installation and maintenance of vital relay interlocking systems in a rail network. It encompasses safe working, regulatory requirements and following installation and work procedures, performing schedules maintenance, diagnosing and repairing system faults, performing operational tests 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 107A Install and maintain active level crossing equipment

AND

UEENEEN 108A Install and maintain power operated point actuating devices

AND

UEENEEN 111A Install and maintain power operated trackside signal and train protection equipment

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

Employability Skills**5)**

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 vital relay interlocking systems	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 installation and/or maintenance work is determined from job specifications, drawings and regulatory requirements
	1.4	Appropriate personnel are consulted to ensure the work is coordinated effectively with others to minimise traffic disruptions.
	1.5	Materials needed 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 installation and/or maintenance work are obtained in accordance with established procedures and checked for correct operation

ELEMENT	PERFORMANCE CRITERIA
2 Install and maintain vital relay interlocking systems	and safety.
	2.1 OHS risk control measures and procedures for carrying out the work are followed.
	2.2 Visual inspection or installation wiring and equipment is carried out to identify damaged or faulty equipment.
	2.3 Damaged or faulty components identified from visual inspection are replaced as per technical instructions, manufacturer specifications and maintenance procedures.
	2.4 Installation and maintenance is performed efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
	2.5 OHS risk control measures and procedures for carrying out the work are followed.
	2.6 Systems are investigated using appropriate fault finding and diagnostic techniques to identify faults.
	2.7 Fault indicators and maintenance records are used to assist in the identification of faults
	2.8 Repairs, replacement and/or adjustment of equipment/systems are carried out using appropriate tools and test equipment to ensure equipment/systems function to required technical and operational standards.
	2.9 Faulty, worn, damaged or insecure components are repaired, replaced or secured whilst ensuring system safety integrity is maintained and technical / manufacturers requirements are met.
	2.10 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
	2.11 The system is tested using approved test procedures and equipment to ensure it operates

ELEMENT	PERFORMANCE CRITERIA
3 Complete the installation and maintenance of vital relay interlocking systems	within specified technical parameters.
	3.1 OHS work completion risk control measures and procedures are followed.
	3.2 Reusable, faulty, worn components are tagged and dispatched for repair to maintain adequate spares.
	3.3 Maintenance work activities are recorded as per organisation requirements to provide accurate records
	3.4 Documentation including component faults, test results, authorisations and permits is completed to provide an accurate database and facilitate follow up action, 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 vital relay interlocking systems.

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

KS01-EN112A and maintenance

Vital relay interlocking systems installation

Rail signalling, interlocking systems, electrical

Equipment and their components encompassing:

Power supplies

Relays, timer

Relays, latching/delatching

Relays, line

Relays, biased

Signaller controls/indications

Geographic modules

Mechanical interface.

Operating principles and parameters encompassing:

Normal mode operation

Route selection circuits

Signal approach circuits and timers

Point release circuits and timers

Panel indications and circuits

Wrong side protection mode

Alarm mode

Emergency operation

Correct operation in accordance with control and locking tables.

Servicing procedures encompassing:

Maintenance documentation

REQUIRED SKILLS AND KNOWLEDGE

Coordination/planning sequence

Operational test procedures

Scheduled/preventative maintenance

Unscheduled/corrective maintenance

Certifying interlocking 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/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 timeframes 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 power vital relay interlocking systems as described in 8) and including:
 - a. Interpreting plans and specifications correctly,
 - b. Using appropriate fault finding techniques,
 - c. Installing and maintaining vital relay interlocking systems to operational requirements,
 - d. Organising work to minimise rail traffic disruptions,
 - e. Using tools correctly,
 - f. Following relevant codes of practice, OHS and environmental protection procedures and requirements
 - g. Completing relevant technical reports, records and documentation, and
 - h. 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 power signalling and protective relay interlocking systems.

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:

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 vital relay interlocking 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 vital relay interlocking 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, isolation links, fuses, electro-mechanical vital relays, mechanical timer relays, electronic timer relays, wiring, relay spring clips, multi core signal copper cables, earth detection devices.

Mechanical equipment may include: relay mounting bases, relay coding pins,

Test equipment may include: multimeters, insulation resistance and continuity tester, stop watches, test lamps, relay delatch bases.

Technical report may include: incident report, site survey and data log report.

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

