Australian Government

UEENEEN118A Find and repair rail signalling system faults

Release: 2

INDUSTRY SKILLS COUNCILS
Creating Australia's Future

UEENEEN118A Find and repair rail signalling system faults

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor **1) Scope:**

1.1) Descriptor

This unit covers finding and repairing faults with rail signalling, systems. It encompasses safe working, regulatory requirements and following work procedures, predicting likely signalling system faults, using appropriate fault finding techniques, repairing or rectifying faults 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 114A	Install and maintain computer based interlocking systems

OR

UEENEEN 112A	Install and maintain vital relay interlocking systems

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 find and repair signalling system faults	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	Safety hazards that have not previously been identified are documented and risk control measures devised and implemented in consultation with appropriate personnel.
	1.4	Appropriate persons are consulted to establish the nature of the fault and to coordinate effectively with others affected by the fault.
	1.5	Likely causes of the fault and order of probability are determined from system data and historical trend.
	1.6	Impact of the fault on system is ascertained and appropriate personnel notified in accordance with established procedures.
	1.7	Materials needed to find and repair the fault are obtained in accordance with established procedures and checked against job requirements
	1.8	Tools, equipment and testing devices needed to find and repair the fault are obtained in accordance with established procedures and

ELEMENT	PERFORMANCE CRITERIA	
		checked for correct operation and safety.
	1.9	Circuits/equipment are checked as being isolated where necessary in strict accordance operational procedures and OHS requirements.
2 Find and repair signalling system faults	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	Knowledge of signalling system performance parameters is applied to appropriate fault finding techniques.
	2.3	Tests are conducted to determine the type and location of the fault.
	2.4	Wiring system is visually inspected for physical damage or installation defects where necessary.
	2.5	Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes.
	2.6	Ongoing checks of the signalling system are undertaken to confirm the continued rectification of the fault.
	2.7	Faults are located and identified efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices.
	2.8	Signalling system faults are rectified in accordance with established procedures
3 Complete the finding and repair of the signalling system faults	3.1	OHS risk control measures and procedures for carrying out the work are followed.
	3.2	Unresolved faults are reported to appropriate persons for further action in accordance with established procedures.
	3.3	Inspection and test results actions taken or recommended are documented and appropriate person(s) notified in accordance with established

ELEMENT	PERFORMANCE CRITERIA
	procedures.
	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 finding and repairing of rail signalling system.

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

KS01-EN118A Rail signalling system fault finding and repair

Evidence shall show an understanding of rail signalling system fault finding and repair, applying safe working practices and relevant Standards, Codes and Regulations to an extent indicated by the following aspects:

Fault-finding and diagnostic techniques encompassing:

Establish an accurate description of the fault situation by appropriate questioning of client or operator

questioning techniques to efficiently and effectively obtain from a client/operator a description of a fault situation.

Confirm the fault history and symptoms through observation and application of first-line tests.

draw valid conclusions from observations.

identify concepts of broad first-line testing.

In the absence of the client or operator, to establish the symptoms through application of systematic tests and observation.

identify appropriate diagnostic tests for given symptoms using manufacturers' charts, handbooks, specification sheets.

use results of systematic tests to identify symptoms.

Rail signalling system fault finding encompassing:

System operational and safety requirements

Common mechanical faults, symptoms and testing

Common electrical faults, symptoms and testing

Common control faults, symptoms and testing

Rail signalling system repairs encompassing:

System operational and safety requirements

REQUIRED SKILLS AND KNOWLEDGE

Fault/circuit/system isolation

Repairing/replacing faulty components

Component testing

Reconnection of component/circuit/system

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, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:
  - Locate and repair 3 different types of rail signalling system faults, as described in 8) and including:
  a. Interpreting plans and specifications correctly
  b. Identifying and interpreting fault history
  c. Identifying faults efficiently
  d. Rectifying faults promptly using appropriate diagnostic techniques
  e. Minimising interruption to rail traffic and services
  f. Using testing equipment and tools correctly and safely
  g. Confirming the integrity of the signalling system
  h. Following relevant codes of practice
  i. Completing relevant technical reports, records, and
  j. 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 locating and repairing cable system 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:

UEENEEN112A Install and maintain vital relay interlocking systems

UEENEEN114A Install and maintain computer based interlocking systems

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 or Territory codes of practice and safe working requirements
- Equipment and systems relevant to the rail network for which competency is sought
- Code of practice for Defined Interstate Rail Networks

Activities may include: procedures for fault finding and repair of rail signalling systems and equipment and may also include; the use of plans and drawings, manufacturer's / enterprise specifications and manuals.

Fault finding activities may include: finding and repairing faults on rail signalling systems and equipment 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, computer based interlocking equipment, mechanical timer relays, electronic timer relays, wiring, train detection devices, signals and train protection devices, point actuating devices, level crossing protection devices, non-vital telemetry system devices and screen based non-vital control system 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.

Types of system faults may include: incorrect installation, power loss, open and short circuits, operator error, damaged equipment, vandalism and environmental factors.

Technical report may include: incident report, fault analysis and rectification report 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