



Australian Government

UEENEEN121A Repair rail signalling power and control cables

Release: 2

UEENEEN121A Repair rail signalling power and control cables

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit covers repair of signalling power cables and multi core signalling control cables up to 50 cores. It encompasses safe working, regulatory requirements and following work procedures, selecting and using appropriate cable joining methods, testing continuity and insulation resistance of repaired cable cores and reporting repair activities.

Application of the Unit

Application of the Unit 2)

This competency standard is suitable for employment-based programs under an approved contract of training at the AQF level of the qualification in which the unit is first packaged or higher.

The unit may be selected as an elective from the relevant schedule (see qualification packaging rules) provided that all prerequisite units are undertaken or addressed through recognition processes.

This unit may be included in a skill set provided that it is listed in the schedule of electives (see Qualification Framework) and all prerequisite units are undertaken or addressed through recognition processes.

Delivery and assessment of this unit should be undertaken within regard to the requirements of License

to Practice (1.2 above), Prerequisite Competencies and Literacy and Numeracy skills (2 above) and the recommendations for concurrent assessment and relationship with other units (9.5 below).

This unit shall apply to qualifications in installation and maintenance of rail signalling electrical power and control systems AQF Level 3 or higher

Practice in the workplace and during training is also subject to regulations directly related to occupational health and safety and where applicable contracts of training such as apprenticeships.

Note:

1. Compliance with permits may be required in various jurisdictions and typically relates to the operation of plant, machinery and equipment such as elevating work platforms, powder operated fixing tools, power operated tools, vehicles, road signage and traffic control and lifting equipment. Permits may also be required for some work environments such as confined spaces, working aloft, near live electrical apparatus and site rehabilitation.
2. Compliance may be required in various jurisdictions relating to currency in First Aid, confined space, lifting, risk safety measures etc.

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 102A Assemble and wire internal electrical rail signalling equipment

And

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 repair rail signalling cables | 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 noted, and established risk control measures are implemented. |
| | | 1.4 | Access times and methods are confirmed to comply with customer requirements and relevant legislation. |
| | | 1.5 | Appropriate personnel are consulted to ensure the work is coordinated effectively with others involved on the work site |
| | | 1.6 | Extent and nature of the damage to the rail signalling cable is confirmed with appropriate personnel and through established procedures. |
| | | 1.7 | Appropriate cable joining kit is obtained in accordance with established procedures and checked against manufacturer's instructions to ensure all components are included. |
| | | 1.8 | Cable diagrams necessary to effect repairs are obtained, read and understood. |
| | | 1.9 | Tools and cable testing devices appropriate for the cable repair are obtained in accordance with established procedures and checked for correct operation and safety. |

ELEMENT	PERFORMANCE CRITERIA
2 Repair damaged rail signalling cables	2.1 Work area made safe, the damaged cable is isolated for repair and other OHS risk control measures and procedures for carrying out the repair are followed
	2.2 Corresponding ends of broken cable core are identified by core marking and confirmed by continuity test
	2.3 Appropriate cable joining kit is used to repair damaged cable following manufacturer's instructions and established procedures
	2.4 Effectiveness of the repair to the damage cable is tested for cable core continuity, insulation between cable cores and cores to earth.
	2.5 Cause of unacceptable test results is located and rectified in accordance with established procedures
	2.6 Established methods for dealing with unexpected situations are dealt with safely and with the approval of an authorised person
	2.7 Cable repair is performed efficiently without waste of materials or damage to apparatus and the surrounding environment or services and using sustainable energy practices
3 Complete rail signalling cable repairs	3.1 OHS work completion risk control measures and procedures are followed
	3.2 Work area is cleaned and made safe in accordance with established procedures
	3.3 Cable repair work is documented including test results and an appropriate person or 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 must show that knowledge has been acquired of safe working practices and performing rail signalling cable repairs.

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

KS01-EN121A **repair**

Rail signalling power and control cables

Evidence shall show an understanding of repairing rail signalling cables to an extent indicated by the following aspects:

Types of cable used for rail signalling encompassing:

signalling power cables and multi core signalling control cables

Types of cable joining kits used to repair damaged signal cables encompassing:

heat shrink and water proof jointing kits. (e.g. epoxy mould)

Procedures for identifying corresponding ends of broken cable cores encompassing:

cable isolation methods and testing deenergised cable cores

Methods of joining broken cable core conductors and reinstating insulation encompassing:

use of hand tools to remove insulation and applying crimp lugs, selection of inline joiner lugs, and selection of appropriate jointing materials and kits

Conductor continuity and core insulation and earth testing procedures and acceptable results encompassing:

testing to confirm deenergised cores; continuity of repaired cores, earth resistance of repaired cores and insulation between repaired cores; industry standard acceptable cable test results; and recording of test results

Special termination tools and their use encompassing:

use of insulation removal tools inline crimping tools, conducting tool tests, checking calibration date and recording tests

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 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 is to 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 have a bearing on the decision as to how much and how detailed 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 must be considered holistically. Each element and associated performance criteria must be demonstrated on at least two occasions in accordance with the 'Assessment Guidelines – UEE11'. Evidence must 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 must 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:
 - Perform signalling cable repairs for the following:
 - Repairing at least one signalling power cable relevant to a particular rail network.
 - Repairing at least one signalling multi-core control cable, 6 cores or greater, relevant to a particular rail network
 - Repairing signalling cables using at least one approved

jointing kit, and

- System tests as described in 8) and including:
 - a. Selecting approved cable joining kit, cable repair tools and testing devices
 - b. Interpreting cable diagrams
 - c. Identifying corresponding ends of broken cable cores accurately
 - d. Repairing damaged cable effectively
 - e. Using testing devices and tools correctly and safely
 - f. Locating and rectifying causes of unacceptable cable test results
 - 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 a 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 part of 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 performing signalling cable repair and system tests.

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 signalling

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 must be demonstrated in relation to:

- the relevant State/Territory codes of practice and safe working requirements

Activities may include procedures for the isolation of signalling cable from supply and/or equipment, and may also include the use of plans and drawings, manufacturer's / enterprise specifications and manuals.

Jointing activities may include: crimping, soldering, heat shrinking and epoxy jointing.

Testing activities may include; continuity tests, insulation resistance tests, determining fit for signalling purpose, compliance and functional testing and completing the necessary documentation.

Codes/practices could include dial before you dig.

Plant could include; back hoe, Pot holing and generators

Test equipment may include; insulation resistance and continuity tester, multimeter, bell/buzz tester, voltage detector and or daisy chain.

Technical report may include: Safety incident report, cable survey report and defect report

Specialised equipment, tools and devices may include cable locator and cable fault tester.

Equipment relevant to a particular rail network.

Associated hardware could include Trunking, cable pits, conduits and terminals.

Cable types may include: copper, single core, double core and multi-core signalling cables.

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, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)

Rail Signalling