



Australian Government

UEERS0012 Install and maintain trackside signal and train protection equipment

Release: 1

UEERS0012 Install and maintain trackside signal and train protection equipment

Modification History

Release 1. This is the first release of this unit of competency in the UEE Electrotechnology Training Package.

Application

This unit involves the skills and knowledge required to install/maintain trackside signal and train protection equipment.

It includes preparing and installing/maintaining trackside signal and train protection equipment. It also includes completing installation/maintenance of trackside signal and train protection equipment and repairing faults, performing operational tests and reporting requirements.

Persons achieving competence in this unit will need to fulfil the applicable state/territory legislated rail safety requirements and comply with relevant codes of practice, rules and/or guidelines.

No other licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

UEERS0013 Install and maintain train detection equipment

Competency Field

Rail Signalling

Unit Sector

Electrotechnology

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

PERFORMANCE CRITERIA

Performance criteria describe the performance needed to demonstrate achievement of the element.

- | | |
|--|---|
| 1 Prepare to install/maintain trackside signal and train protection equipment | <ul style="list-style-type: none">1.1 Work health and safety (WHS)/occupational health and safety (OHS) requirements and workplace procedures for a given work area are identified, obtained and clarified1.2 Hazards are identified, WHS/OHS risks assessed, and control measures and workplace procedures implemented in preparation for work1.3 Safety hazards that have not previously been identified are documented as part of the job safety assessments, and risk control measures are determined and implemented in consultation with appropriate person/s1.4 Appropriate rail safe working person/s is consulted to ensure work can proceed without delaying or compromising rail operational safety of train movements1.5 Materials needed for the installation/maintenance work are obtained in accordance with workplace procedures and checked against job specifications1.6 Tools, equipment and testing devices needed for installation/maintenance work are obtained in accordance with workplace procedures and checked for correct operation and safety |
| 2 Install/maintain trackside signal and train protection equipment | <ul style="list-style-type: none">2.1 WHS/OHS risk control measures and workplace procedures for carrying out the work are followed2.2 Signal and train protection equipment are checked in accordance with job and technical specifications2.3 Sub-assemblies of signal and train protection equipment are assembled in accordance with work/job specifications and checked to confirm circuit integrity2.4 Assembled sub-assemblies are inspected and tested off-site, where possible, in accordance with job and technical specifications2.5 Installation/maintenance, wiring and assembly of signal and train protection equipment are completed efficiently, without waste of materials or damage to apparatus, the surrounding environment or services using sustainable energy practices |

- 2.6** Signal and train protection components and sub-assemblies are inspected, checked and installed in accordance with job specifications
 - 2.7** Component and wiring test/s are conducted under live test conditions to ensure train protection equipment functions correctly
 - 2.8** Methods for dealing with unplanned situations are determined on the basis of safety and specified work outcomes
 - 2.9** Installation/maintenance work is carried out in accordance with manufacturer specifications, workplace procedures and relevant industry standards
 - 2.10** Appropriate operational inspection and test procedures are applied to ensure equipment and components are operational
 - 2.11** Signal/s and train protection equipment are monitored, inspected and tested to ensure they operate in accordance with technical parameters specified and job specifications
 - 2.12** Testing is performed efficiently, without waste of materials or damage to apparatus, the surrounding environment or services using sustainable energy practices
- 3 Complete trackside signal and train protection equipment installation/maintenance**
 - 3.1** WHS/OHS work completion risk control measures and workplace procedures are followed
 - 3.2** Worksite is made safe in accordance with workplace safety management procedures
 - 3.3** Test results and documentation are completed to confirm system operational compliance to job specifications and relevant reports produced
 - 3.4** Work completion is documented and appropriate rail safety person/s notified in accordance with workplace safe working procedures

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Non-essential conditions may be found in the UEE Electrotechnology Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UEENEEN111A Install and maintain trackside signal and train protection equipment.

Links

Companion Volume implementation guides are found in VETNet - -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b8a8f136-5421-4ce1-92e0-2b50341431b6>

Assessment Requirements for UEERS0012 Install and maintain trackside signal and train protection equipment

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- interpreting specifications and circuit diagrams correctly
- using appropriate fault-finding techniques
- installing/maintaining trackside signal and train protection equipment to operational requirements
- organising work to minimise traffic disruptions
- using tools and test equipment correctly
- following relevant codes of practice and environmental protection procedures and requirements
- completing relevant technical reports and documentation
- dealing with unplanned events
- applying rail safe working practices and relevant industry standards, codes and rail safety regulations
- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including:
 - implementing workplace procedures and practices
 - using risk control measures
- applying sustainable energy principles and practices
- completing installation/maintenance of trackside signal and train protection equipment.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- trackside signal and train protection equipment installation/maintenance, safe working practices and relevant standards, codes and regulations, including:
 - rail signalling principles - electrical
 - overview of electrical rail signalling encompassing:
 - types of rail signalling/safe working systems including computer-based interlocking (CBI), automatic, controlled and interlocked signalling

- advantages of electrical over mechanical signalling
- advantages of CBI over electrical signalling systems
- effects of overhead traction systems on electrical signalling systems (where applicable)
- purpose of elements of an electrical rail signalling system, including signals and aspect systems, train protection systems, point actuating systems, mechanical locking, relay interlocking, CBI, train detection systems, control input devices, indicators, diagrams and monitors, and safe working systems
- rail signalling principles - mechanical
- overview of mechanical rail signalling encompassing:
 - types of mechanical rail signalling systems for different rail traffic, including passenger train, freight train, maintenance vehicles and heritage/tourism train
 - deficiencies of mechanical signalling systems, including automatic, controlled and interlocked signalling
 - effects of overhead traction systems on mechanical signalling systems (where applicable)
 - effects of external factors on the mechanical rail signalling system, including rail overhead, gradients/terrain, environmental and civil configuration
- purpose of elements of a mechanical rail signalling system encompassing:
 - signals, point actuating systems, locking and train detection systems, control input devices, indicators, diagrams and monitors, mechanical interlocking frames, safe working systems and electro-mechanical interfaces
 - rail signalling and signal equipment
- equipment and their components encompassing:
 - incandescent lamps
 - light-emitting diode (LED) lamps
 - electro-mechanical
 - mechanical
 - interfacing to different interlocking systems, e.g. relay and CBI
- operating principles and parameters encompassing:
 - automatic signal control circuits
 - controlled signal control circuits
 - approach control circuits
 - bi-directional block control circuits
 - lamp proving circuits
 - failure mode
 - interpreting circuits diagrams to evaluate correct operation and relationship to other signalling circuits
 - correct operation in accordance with control and locking tables
- servicing procedures encompassing:
 - maintenance documentation

- coordination/planning sequence
- operational test procedures
- scheduled/corrective maintenance
- unscheduled/preventative maintenance
- certifying signal equipment (commission and de-commission)
- certifying procedures applicable for compliance with rail operator/enterprise standards
- rail signalling, train protection equipment
- equipment and their components encompassing:
 - electro-mechanical (e.g. train-stops)
 - electro-magnetic (e.g. automatic warning system (AWS))
 - electronic (e.g. train protection warning system (TPWS))
 - automatic train protection (ATP) system - Balise/beacon based (e.g. ETCS level 1, and Westect)
- operating principles encompassing:
 - permissive operation
 - restrictive operation
 - failure modes
 - interpreting circuits diagrams to evaluate correct operation and relationship to other signalling circuits
 - correct operation in accordance with control and locking tables
- safe working practices and relevant standards, codes and regulations
- relevant job safety assessments or risk mitigation processes
- relevant manufacturer specifications
- relevant WHS/OHS legislated requirements
- relevant workplace policies and procedures.

Assessment Conditions

Assessors must hold credentials specified within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must satisfy the Principles of Assessment and Rules of Evidence and all regulatory requirements included within the Standards for Registered Training Organisations current at the time of assessment.

Assessment must occur in suitable workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in suitable simulated workplace operational situations that replicate workplace conditions.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or other simulations
- relevant and appropriate materials, tools, facilities, equipment and personal protective

equipment (PPE) currently used in industry

- resources that reflect current industry practices in relation to installing/maintaining trackside signal and protection equipment
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

Links

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