



Australian Government

UETDRRT005 Maintain energised d.c. traction overhead wiring system

Release: 1

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Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package Release 2.0.

Application

This unit covers the maintenance and repair of energised direct current (d.c.) traction overhead wiring system through the use of insulated ladder and working bare hand or insulated stick.

It includes the verification of the site conditions and the potential hazards, the conformance with and calculation of mechanical loads, the selection of appropriate tools and equipment, and authorised work method. It includes the undertaking of work health and safety (WHS)/occupational health and safety (OHS) and safe working practices to ensure that correct procedures and precautions to working live in accordance with the work plan and enterprise requirements are followed.

It also includes the visual inspection and necessary checks to confirm that overhead wiring components and associated hardware are in a safe condition to test and/or return to service, the recommissioning tests of the components and associated hardware and the updating of system data/maintenance records.

The application of the skills and knowledge described in this unit may require a licence/registration to practice in the workplace subject to regulations for undertaking of electrical work.

Other conditions may apply under state and territory legislative and regulatory licensing requirements which must be confirmed prior to commencing this unit.

Pre-requisite Unit

Pathway 1

Qualified and authorised Rail Traction Lineworker

Pathway 2

BSBLDR414 Lead team effectiveness

UEENEEE101A Apply Occupational Health and Safety regulations, codes and practices in the workplace

UEENEEE102A Fabricate, assemble and dismantle utilities industry components

UEENEEE104A Solve problems in d.c. circuits

UEENEEE105A Fix and secure electrotechnology equipment

UEENEEE107A Use drawings, diagrams, schedules, standards, codes and specifications

UEENEEG101A Solve problems in electromagnetic devices and related circuits

UEENEEG102A Solve problems in low voltage a.c. circuits

UETDREL001 Apply environmental requirements

UETDREL004 Operate plant and equipment in the vicinity of live electrical apparatus

UETDREL005 Work safely in the vicinity of live electrical apparatus

UETDRIS007 Install and maintain distribution overhead conductors and cables

UETDRIS012 Install and maintain poles, structures and hardware

UETDRRT001 Install overhead rail traction configurations

UETDRRT002 Install overhead traction components and equipment

UETDRRT003 Install rail traction bonds

UETDRRT004 Install traction overhead wiring systems

UETDRRT008 Maintain overhead rail traction configurations

UETDRRT009 Maintain overhead traction components and equipment

UETDRRT011 Maintain traction overhead wiring systems

UETDRRT012 Operate rail road height access plant near rail traction systems

UETDRRT014 Test and verify rail traction installations

UETTDNIS65 Contribute to coordinated HV live working

Competency Field

Rail Traction

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

Elements describe the essential outcomes.

1 Prepare/plan to maintain energised d.c. traction overhead wiring systems

PERFORMANCE CRITERIA

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

1.1 Work schedules, including drawings, plans, requirements, established procedures and material lists, are obtained and analysed, as necessary, by site inspection and the extent of the preparation of the work

determined for planning and coordination

- 1.2** Work is prioritised and sequenced for the most efficient and effective outcome following consultation with others for completion within acceptable timeframes, to a quality standard and in accordance with established procedures
- 1.3** Risk control measures are identified, prioritised and evaluated against the work schedule
- 1.4** Relevant requirements and established procedures for the work are communicated to all personnel and identified for all worksites
- 1.5** Hazards are identified, WHS/OHS risks assessed and control measures prioritised, implemented and monitored, including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures
- 1.6** Relevant work authority/instructions are secured to coordinate the performance of work according to requirements and/or established procedures
- 1.7** Resources, including personnel, equipment, tools and personal protective equipment (PPE), required for the job are identified, scheduled and coordinated and confirmed safe and in technical working order
- 1.8** Clients/customers are provided with possible solutions and/or options within the scope, acceptable cost and requirements
- 1.9** Liaison and communication issues with others/authorised personnel, authorities, clients and landowners are resolved and activities coordinated to carry out work
- 1.10** Site is prepared according to the work schedule and to minimise risk and damage to property, commerce and individuals in accordance with established procedures
- 1.11** Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities coordinated and authorised, where applicable, in accordance with established procedures

- 1.12** Positioning of road signs, barriers and warning devices is planned and coordinated in accordance with requirements
- 2 Carry out maintenance of energised d.c. traction overhead wiring systems**
- 2.1** WHS/OHS and sustainable energy principles and practices to reduce the incidents of accidents and minimise waste are monitored and actioned in accordance with requirements and/or established procedures
- 2.2** First aid, rescue and other related work procedures are performed according to requirements and/or established procedures
- 2.3** Lifting, climbing, working aloft, and use of tools/equipment, techniques and practices are safely exercised according to requirements
- 2.4** Hazard warnings and safety signs are recognised and hazards and assessed WHS/OHS risks are reported to immediate authorised personnel for directions according to established procedures
- 2.5** Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures
- 2.6** Maintenance of energised d.c. traction overhead wiring systems is carried out in accordance with the work schedule and requirements and/or established procedures
- 2.7** Essential knowledge and associated skills are applied in the safe maintenance of energised d.c. traction overhead wiring systems to ensure completion in an agreed timeframe and to quality standards with a minimum of waste according to requirements
- 2.8** Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements
- 2.9** Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality outcome is achieved for the client/customer and to a community/industry standard
- 3 Complete the maintenance of energised d.c. traction**
- 3.1** Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and

overhead wiring systems

solutions identified in accordance with established procedures

- 3.2** Accidents and/or injuries are reported and followed up in accordance with requirements/established procedures
- 3.3** Worksite is rehabilitated, cleaned up and confirmed safe in accordance with established procedures
- 3.4** Tools, equipment and any surplus resources and materials are, where appropriate, cleaned, checked and returned to storage in accordance with established procedures
- 3.5** Relevant work authorities/instructions are signed off or returned to client/customer in accordance with requirements
- 3.6** Work completion records, reports, as installed/modified drawings and/or documentation and information are confirmed, processed and appropriate personnel notified

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 UET Transmission, Distribution and Rail Sector Training Package Companion Volume Implementation Guide.

Unit Mapping Information

This unit replaces and is equivalent to UETDRRT31 Maintain energised d.c. traction overhead wiring system.

Links

Companion Volume Implementation Guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=229bace1-b7bc-4653-9300-dffb13ecfad7>

Assessment Requirements for UETDRRT005 Maintain energised d.c. traction overhead wiring system

Modification History

Release 1. This is the first release of this unit of competency in the UET Transmission, Distribution and Rail Sector Training Package Release 2.0.

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 two separate occasions and include:

- applying relevant work health and safety (WHS)/occupational health and safety (OHS) requirements, including the use of risk control measures
- applying sustainable energy principles and practices
- maintaining, repairing or replacing components, including at least two (2) of the following:
 - span
 - cross-span
 - headspan
 - section insulator
 - support equipment
 - tramway support network
- maintaining traction components, including at least three (3) of the following:
 - catenary
 - dropper
 - contact/trolley
 - feeder/in-span feeder
 - drape/potential jumper
- performing at least two (2) of the following:
 - removal of trapped foreign objects
 - profiling
 - vertical adjustment of contact or trolley wire
- performing work from at least one (1) of the following:
 - insulated elevating work vehicles
 - insulated ladder
 - insulated work platforms
- using materials and equipment, including at least two (2) of the following:
 - tensioning equipment
 - insulated sticks

- ropes
- slings and chains
- geometry profiling equipment
- dealing with unplanned events on at least one (1) occasion.

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:

- basic rigging techniques encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements associated with rigging, including the operation of cranes, hoists and winches and relevant certification and licensing (if required)
 - requirements for the use of enterprise construction manuals, system diagrams/plans and drawings
 - safe use of rigging equipment, tools and associated equipment - types, techniques and application
 - site inspection procedures - identifying hazards, assessing and controlling risks, and appropriate sequence of loading and unloading
 - determining the mass and dimensions of load
 - selection and inspection procedures - rigging equipment, materials and tools (natural and synthetic fibre ropes and chains, fittings, winch and capstan); ratings of wire ropes and slings; removing, repairing and replacing of damage parts
 - techniques for assembling and erecting power winches and capstans
 - checking the integrity of support structure -visual inspection of load connections
 - techniques in moving, lifting, shifting, managing and placing loads - use of appropriate communication and signalling methods, codes of practice/compliance, enterprise and Commonwealth/state/territory legislative requirements, weather conditions, erection of safety nets and lines, methods of fixing and anchoring loads, and load stability
- installation of overhead distribution conductors encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to installing conductors and associated equipment
 - requirements for the use of overhead line construction manuals, system diagrams/plans and drawings - material lists, conductor size, type and route length
 - construction types and structures for distribution and sub-transmission lines
 - types, sizes and characteristics of overhead conductors
 - resources for the stringing and maintenance of conductors - types of low voltage (LV) and high voltage (HV) overhead electrical conductor connections; causes and effects of poor electrical connections; reasons for and methods used to maintain standard phase sequencing; removing, repairing and replacing damaged conductors; minimum clearances between overhead conductors and LV and HV structures
 - techniques for conductor installation - types and application of tools, equipment and hardware

- methods of stringing, tensioning and termination of LV and HV conductors
- safe working practices and procedures for the installation of overhead distribution conductors encompassing:
 - limits of approach for personnel, vehicles, mobile plant and elevated work platforms (EWPs)
 - requirements of persons prior to making bare hand contact with dead LV mains and apparatus
 - requirements of relevant electrical access permits necessary to allow work to be performed on LV and HV apparatus
 - safe working practices - requirements to enable safe working on conductive poles, procedures to attach an on-site earthing device to de-energised LV and HV overhead circuit
- safe working on energised LV equipment encompassing:
 - standards, codes, Commonwealth/state/territory/local government legislation, supply authority regulations and/or enterprise requirements
 - safety precautions specific to working on or near energised LV conductors - safe working practices and procedures; identification of hazards; assessment and control of WHS/OHS risks; types, selection, maintenance and use of personal protective equipment (PPE)
 - work on or near energised LV conductors - types and function of specialised tools, safe working practices when using specialised tools, methods of using specialised tools, safe procedures for work on panels and in cubicles on or near energised LV conductors, and release and rescue procedures for work on or near exposed energised LV conductors
- powerline safety practices encompassing:
 - protective apparatus and apparel for linework - responsibilities for the selection, use, maintenance and storage of protective apparatus and apparel and the types of protective apparatus and apparel used for the line worker
 - requirements for the use of ladders - carrying, erecting, collapsing and lowering different types of extension ladder against a standing pole; maintenance checks on different types of ladders; renewal of extension ropes and the safety issues relating to clearances from overhead conductors
 - requirements for climbing and working aloft - methods used to identify a pole is safe to climb; methods used to inspect a line worker's body belt; application of knots and hitches appropriate to the requirements of a line worker; height safety principles, including personal fall protection, prevention and related requirements; and the practical procedures of climbing an overhead structure and fitting a pole chair
 - traffic management - purpose of traffic management and a line worker's responsibilities in accordance with relevant statutory requirements and electricity supply industry (ESI) requirements, the procedure used to provide an effective traffic management scheme and the use of a two-way radio
 - control of small fires - identification, selection and operation of the appropriate extinguishing mediums for various types of fires, general fire prevention methods and the precautions for personal protection when fighting small fires
 - rescue victims from heights and confined spaces - planning and identifying procedures, establishing responses; developing techniques; involvement of external emergency services; and practical demonstration/rehearsals of rescuing a person from heights and

- from confined spaces and emergency procedures for the rescue of an electric shock victim, including cardiopulmonary resuscitation (CPR)
- requirements for aerial linework - planning, establishing and implementing relevant aviation authority clearances; determining system requirements; aircrew familiarisation with network operations and equipment; and requirements for effective communications operations for aerial work
 - LV switching principles encompassing:
 - standards, codes, legislation, supply authority regulations and/or enterprise requirements applicable to switching of LV to a given schedule
 - requirements for the use of manuals, system diagrams/plans and drawings - types, characteristics and capabilities of electrical apparatus; use, characteristics and capabilities of specialised tools and testing equipment; and LV network interconnectors source of possible back-feed
 - LV switching techniques - identifying hazards, assessing and controlling risks associated with LV switching operations, electrical access permits, operational procedures and earthing procedures
 - PPE for LV switching
 - safe working on energised d.c. traction equipment encompassing:
 - Commonwealth/state/territory/local government legislation, standards, codes, supply authority regulations and/or enterprise requirements
 - safety precautions specific to working on energised LV d.c. traction overhead conductors and cables - safe approach distances; safe working practices, instructions and procedures; WHS/OHS hazards and precautions; identification of WHS/OHS hazards; assessment and control of WHS/OHS risks; types, selection, maintenance, storage and use of PPE; dangers of working in confined spaces and at heights; notification to work systems, safe working policies, procedures and practices when using/operating specialised equipment and tools; and emergency response and rescue, including first aid
 - techniques in installation, maintenance, replacing and repairing of energised d.c. traction overhead conductors, cables and equipment - span, cross-span, head-span, section insulator, support equipment, tramway support network, catenary, dropper, contact/trolley, feeder/in-span feeder and drape/potential jumper
 - techniques in carrying out work on energised d.c. traction overhead conductors, cables and equipment - removing trapped foreign objects, profiling and vertical adjustment of contact or trolley wire
 - techniques in using plant, equipment and/or tools to carry out work on energised d.c. traction overhead conductors, cables and equipment - insulated elevating work vehicles; insulated ladder; insulated work platforms; tensioning equipment; and insulated sticks, ropes, slings and chains
 - enterprise-specific policies and procedure instructions encompassing:
 - responsibilities and duty of care of employer and employee relationship
 - methods of obtaining the up-to-date information on enterprise policies and procedures
 - rules and regulations
 - induction into workplace - location of work area and storage area, timetable, uniform, personal wellbeing, housekeeping rules, emergency procedures and evacuation

- procedures
- techniques when dealing with others - working in teams, customer relation, and complaint and issues procedures
- overview of enterprise professional development - firefighting procedures, fatigue management, and training and competency development - understanding and promotion
- enterprise-specific WHS/OHS instructions encompassing:
 - standards, codes, legislation, supply authority regulations and specific enterprise regulations pertaining to WHS/OHS policies and procedures
 - methods of obtaining the up-to-date information on enterprise WHS/OHS policies and procedures
 - specific enterprise PPE - type and application; where and when to be used; method of replacement; responsibility of maintenance, including cleaning, inspection and testing; and emergency response, rescue, evacuation and first aid procedures
 - personal wellbeing – hygiene, fatigue/stress management and drugs/alcohol
 - WHS/OHS training - induction training, specific hazard training, specific task or equipment training, emergency and evacuation training, and training as part of broader programs, such as equipment operation
 - WHS/OHS records - audits; inspection reports; workplace health and environmental monitoring records; training and instruction records; manufacturer and supplier information, such as material safety data sheets (MSDS); registers; maintenance reports; workers compensation and rehabilitation records; and first aid/medical records
- enterprise-specific technical drawings and documents encompassing:
 - types and application of enterprise-specific drawings and documents - electrical and electronic drawings, mechanical drawings, project charts, schedules, graphs, technical manuals and catalogues
 - instructions/worksheets - types and application of enterprise-specific symbols and diagrams
 - title box - description of parts and version control.

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 workplace operational situations where it is appropriate to do so; where this is not appropriate, assessment must occur in simulated conditions involving realistic and authentic activities that replicate operational 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, equipment and PPE currently used in industry
- applicable documentation, including workplace procedures, equipment specifications, regulations, codes of practice and operation manuals.

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