



Australian Government

Department of Education, Employment and Workplace Relations

UETTDRRT32A Maintain energised traction overhead electrical apparatus using stick techniques

Release: 1

UETTDRRT32A Maintain energised traction overhead electrical apparatus using stick techniques

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Competency Standard Unit covers the maintenance and repair of energised traction overhead electrical apparatus via the use of approved live line insulated stick techniques and includes the verification of site conditions and the potential hazards, the conformance with and calculation of physical loads, the selection of appropriate tools and equipment, and authorised work methods. It encompasses the undertaking of correct procedures and precautions to working live line in accordance with the work plan and enterprise requirements. It also includes the visual inspection and necessary checks to confirm that; the electrical apparatus and components are in a safe condition to test and/or return to service, and the recommissioning tests of the electrical apparatus and components.

Application of the Unit

Application of the Unit 2)

This Competency Standard Unit is intended to augment formally acquired competencies. It is suitable for employment-based programs under an approved contract of training.

Licensing/Regulatory Information

License to practice 3)

The skills and knowledge described in this unit may require a licence/registration to practice in the work place subject to regulations for undertaking of electrical work. Practice in workplace and during training is also subject to regulations directly related to Occupational Health and Safety, electricity/telecommunications/gas/water industry safety and compliance, industrial relations, environmental protection, anti discrimination and training. Commonwealth, State/Territory or Local Government legislation and regulations may exist that limits the age of operating certain equipment.

Pre-Requisites

Prerequisite Unit(s) 4)

Competencies 4.1)

Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

Where pre-requisite pathways have been identified. All competencies in the Common Unit Group must be have been completed.

Pathway 1

Qualified and authorised Rail Traction Lineworker

Pathway 2

BSBWOR402A	Promote 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

Prerequisite Unit(s)	4)	
	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
	UETTDREL11A	Apply sustainable energy and environmental procedures
	UETTDREL12A	Operate plant and equipment near live electrical conductors and apparatus
	UETTDREL16A	Working safely near live electrical apparatus
	UETTDNIS52A	Install and maintain poles, structures and associated hardware
	UETTDNIS54A	Install and maintain poles, structures, overhead conductors and cables
	UETTDNIS65A	Contribute to coordinated HV live working
	UETTDRT21A	Install traction overhead wiring systems
	UETTDRT22A	Maintain traction overhead wiring systems
	UETTDRT23A	Install rail traction bonds
	UETTDRT25A	Install overhead rail traction configurations
	UETTDRT26A	Maintain overhead rail traction configurations
	UETTDRT27A	Install overhead traction components and equipment
	UETTDRT28A	Maintain overhead traction

Prerequisite Unit(s) 4)

components and equipment

UETDRRT29A Operate rail road traction height access equipment.

UETDRRT31A Maintain energised d.c. traction overhead wiring system

UETDRRT99A Test and verify rail traction installations

Literacy and numeracy skills 4.2)

Participants are best equipped to achieve 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)

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/plan to maintain energised traction overhead electrical apparatus	<p>1.1 Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are obtained, analysed, if necessary, by site inspection and the extent of the preparation of the work determined for planning and coordination.</p> <p>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.</p> <p>1.3 Calculation of physical loads and authorised work methods are obtained and relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.</p> <p>1.4 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear, to ensure safe systems of work are followed and according to established procedures.</p> <p>1.5 Identify hazards associated with the work and implement risk control measures including the rendering inoperative of automatic reclosing device.</p> <p>1.6 Relevant work permits are secured to coordinate the performance of work according to requirements and/or established procedures.</p> <p>1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.</p> <p>1.8 Relevant personnel at worksite are confirmed current in First Aid, CPR, Pole Top and other rescue procedures according to requirements.</p> <p>1.9 Liaison and communication issues with other</p>

ELEMENT

PERFORMANCE CRITERIA

- authorised personnel, authorities, clients and land owners 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 the maintenance of energised traction overhead electrical apparatus
- 2.1 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, CPR, Pole Top and other Rescue Procedures and other related work procedures are performed according to requirements and/or established procedures.
- 2.3 Lifting, climbing, and aloft, and use of power tools/equipment, techniques and practices are safely exercised according to requirements.
- 2.4 Auto-reclose devices associated with the circuits being worked on have been rendered inoperative and necessary work documentation acquired in accordance with enterprise requirements.
- 2.5 Essential knowledge and associated skills are applied in the safe maintenance of energised traction overhead electrical apparatus to ensure completion within an agreed timeframe and to quality standards with a minimum of waste according to requirements.
- 2.6 Hazard warnings and safety signs are recognised

ELEMENT

PERFORMANCE CRITERIA

- and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures.
- 2.7 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures.
- 2.8 Unplanned events in the maintenance of energised traction overhead electrical apparatus are managed within the scope of established procedures.
- 2.9 Ongoing checks of quality of the work are undertaken in accordance with requirements and established procedures to ensure a quality like outcome is achieved for the client/customer and to a community/industry standard.
- 3 Complete the maintenance of energised traction overhead electrical apparatus
- 3.1 Work undertaken is checked against works schedule for conformance with requirements, anomalies reported and 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 Work site 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 documentation is signed off and, traction overhead electrical apparatus are returned to service, including returning of auto-reclosing device to normal, and advised to client/customer in accordance with requirements.
- 3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and

ELEMENT

PERFORMANCE CRITERIA

appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Essential Knowledge and Associated Skills (EKAS): This describes the essential skills and knowledge and their level, required for this unit.

Evidence shall show that knowledge of maintaining energised traction overhead electrical apparatus (stick) has been acquired.

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

KS01-TRT32A Energised traction overhead electrical apparatus using stick techniques

Evidence shall show an understanding of working on energised traction overhead electrical apparatus using stick techniques to an extent indicated by the following aspects:

T1 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, 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, load stability.

T2 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.
- Constructions types and structures for distribution and sub transmission lines
- Types, sizes and characterises of overhead conductors
- Resources for the stringing and maintenance of conductors - types of low and high voltage overhead electrical conductor connections, causes and effects of poor

REQUIRED SKILLS AND KNOWLEDGE

electrical connections, reasons for and methods used to maintain standard phase sequencing, removing, repairing and replacing of damage conductors, minimum clearances between overhead conductors and low and high voltage structures.

- Techniques for conductor installation - types and application of tools, equipment and hardware
- Methods of stringing, tensioning and termination of low and high voltage conductors

T3 Safe working practices and procedures for the installation of overhead distribution conductors encompassing:

- Limits of approach for personnel, vehicles, mobile plant and elevating work platforms (EWP)
- Requirements of persons prior to making bare hand contact with dead low voltage mains and apparatus
- Requirements of relevant electrical access permits necessary to allow work to be performed on low and high voltage apparatus
- Safe working practices - requirements to enable safe working on conductive poles, procedure to attach an “on-site” earthing device to de-energised low and high voltage overhead circuit

T4 Safe working on energised low voltage 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 low voltage conductors - safe working practices and procedures, identification of hazards, assessment and control of OHS risks, types, selection, maintenance and use of personal protective equipment.
- 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, release and rescue procedures for work on or near exposed energised LV conductors.

T5 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,

REQUIRED SKILLS AND KNOWLEDGE

and the practical procedure 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 requirements, demonstration of 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, identifying, the procedures, and 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 CPR
- Requirements for aerial linework - planning, establishing and implementing relevant aviation authority clearances, determining system requirements, aircrew familiarisation with network operations and equipment, requirements for effective communications operations for aerial work.

T6 Low voltage switching principles encompassing:

- Standards, codes, legislation, supply authority regulations and or enterprise requirements applicable to switching of low voltage 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, LV network interconnectors source of possible backfeed
- Low voltage switching techniques - identifying hazards, assessing and controlling risks associated with LV switching operations, electrical access permit(s), operational procedures, earthing procedures
- Personnel protective equipment (PPE) for LV switching

T7 Safe working on energised DC 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 DC Traction overhead conductors and cables - safe approach distances, safe working practices, instructions and procedures, Occupational Health and Safety hazards and precautions, identification of OHS hazards, assessment and control of OHS risks, types, selection, maintenance, storage and use of personal protective equipment, 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, emergency response and rescue including First Aid etc.
- Techniques in installation, maintenance, replacing and repairing of energised DC traction overhead conductors, cables and equipment - span, cross-span, head-span,

REQUIRED SKILLS AND KNOWLEDGE

section insulator, support equipment, tramway support network, catenary, dropper, contact/trolley, feeder/ in-span feeder, drape/potential jumper

- Techniques in carrying out work on energised DC traction overhead conductors, cables and equipment - removing trapped foreign objects, profiling, vertical adjustment of contact or trolley wire
- Techniques in using plant, equipment and/or tools to carry out work on energised DC traction overhead conductors, cables and equipment - insulated elevating work vehicles, insulated ladder, insulated work platforms, tensioning equipment, insulated sticks, ropes, slings, and chains.

T8 Enterprise specific — policy and procedure instructions encompassing:

- Responsibilities and duty of care of employer and employee relationship
- Methods of obtaining the up-to-date information on enterprise policy and procedures
- Rules and regulations
- Induction into workplace - location of work area and storage area, timetable, uniform, personal well-being, housekeeping rules, emergency procedures, evacuation procedures
- Techniques when deal with others - working in teams, customer relation, complaint and issues procedures.
- Overview of enterprise professional development - fire fighting procedures, fatigue management, training and competency development - understanding and promotion

T9 Enterprises specific — OHS instructions encompassing:

- Standards, codes, legislation, supply authority regulations and specific enterprise regulations pertaining to the OHS policies and procedures
- Methods of obtaining the up-to-date information on enterprise OHS policy and procedures
- Specific enterprise personal protection equipment - type and application, where and when to be used, method of replacement, responsibility of maintenance including cleaning inspection and testing, emergency response, rescue, evacuation and First Aid procedures
- Personal well-being – hygiene, fatigue/stress management, drugs/alcohol
- OHS training - induction training, specific hazard training, specific task or equipment training, emergency and evacuation training, training as part of broader programs such as equipment operation
- OHS records including audits, inspection reports, workplace health and environmental monitoring records, training and instruction records, manufacturers and suppliers information such as MSDSs, registers, maintenance reports, workers compensation and rehabilitation records and First Aid/medical records

T10 Enterprises specific — technical drawing and documents encompassing:

- Types and application of enterprise specific drawings and documents - electrical and electronic drawings, mechanical drawings, project charts, schedules, graphs,

REQUIRED SKILLS AND KNOWLEDGE

technical manuals and catalogues

- Instruction/worksheets sheets - types and application of enterprise specific symbols and diagrams
- Title box - description of parts and version control.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the competency standard unit and must be read in conjunction with the Performance Criteria and the range statement of the competency standard unit and the Training Package Assessment Guidelines. The Evidence Guide forms an integral part of this Competency Standard Unit and shall be used in conjunction with all component 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's 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. It is recognised that, in some circumstances, assessment in part or full can occur outside the workplace. However, it must be in accord with Industry and, Regulatory policy in this regard.

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 nature of working with electricity, electrical equipment, gas or any other hazardous substance/material carries risk in deeming a person competent. Hence, sources of evidence need to be 'rich' in nature so as to minimise error in judgment. Activities associated with normal every day 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 practiced. 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 shall 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 – UET12”. Evidence shall also comprise:

- A representative body of Performance Criteria 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; and
 - Apply sustainable energy principles and practices as specified in the Performance Criteria and range; and
 - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit to such an extent that the learner’s performance outcome is reported in accordance with the preferred approach; namely a percentile graded result, where required by the regulated environment; and
 - Demonstrate an appropriate level of employability skills; and
- Conduct work observing the relevant Anti Discrimination legislation, regulations, policies and workplace procedures; and
 - Demonstrated performance across a representative range of contexts from the prescribed items below:

Range of tools/equipment/materials/procedures/workplaces/other variables		
Group No	The minimum number of items on which skill is to be demonstrated	Item List
A	At least two of the following:	Support structure Span Section insulator Neutral section Midpoint anchor Support equipment Tension regulators
B	At least two of the following:	Catenary Dropper Contact feeder
C	At least one of the following:	Insulated elevating work platform Insulated ladder Insulated mobile platform
D	At least two of the following:	Specialised insulated tools Insulated sticks Tensioning equipment Geometry profiling equipment.
E	At least two of the following:	Air-break switches Insulators Surge arrestors Hardware and fittings
F	At least one occasion	Dealing with an unplanned event by drawing on essential knowledge and associated skills to provide appropriate solutions incorporated in the holistic assessment with the

		above listed items.
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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 maintenance of energised traction overhead electrical apparatus.

In addition to the resources listed above, in context of and specific resources for assessment, evidence should show demonstrated competency working at realistic heights above ground i.e. above 3 metres, in limited spaces, with different structural/construction types and method and in a variety of environments.

Method of assessment 9.4)

This Competency Standard 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 Transmission, Distribution and Rail Traction Industry. This requires that the specified essential knowledge and associated skills are assessed in a structured environment which is primarily intended for learning/assessment and incorporates all necessary equipment and facilities for learners to develop and demonstrate the essential knowledge and associated skills described in this unit.

Concurrent assessment and relationship with other units 9.5)

For optimisation of training and assessment effort, competence in this unit may be assessed concurrently with the following units:

UETDRRT3 Maintain energised traction overhead electrical
3A apparatus using glove techniques

Range Statement

RANGE STATEMENT

10) This relates to the competency standard 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 Competency Standard Unit shall be demonstrated in relation to the maintenance of energised traction overhead electrical apparatus by the adoption of live line insulated stick techniques, without the need to interrupt traction power supply during the course of work undertaking. Competency shall be demonstrated in relation to the maintenance, visual inspection and pre-commissioning tests of the overhead traction electrical equipment and components as well as associated hardware including ancillary equipment.

Maintenance may include the carrying out of diagnostics and tests on conductors, equipment, systems as well as the removal, repair and replacement of cables, conductors, and associated hardware and returning such to operational service.

Types of traction wire support structures may consist of portals, pull-off, drop-pieces, head spans, and cross spans.

Types of traction components may include switches, surge arresters, insulators, droppers, bay components, cantilever hardware, portal hardware, steady spans hardware, steady spans, insulators, pull-off arms, tension regulators, section insulators, neutral sections, air break switches, in span feeders, isolation switches, knuckles (insulated and non-insulated) and cross arms.

Traction system components may consist of metalwork, wires, hardware, fittings and insulators.

Types of conductor may include HD, CAD, and Tin Bearing copper, aluminium, steel, aluminium conductor steel reinforced, copper cover steel.

Types of wiring arrangements include single wire systems, simple and compound catenary systems.

Plant may include live-line tools, insulated ladders, insulated elevating work platforms/vehicles/trains, specialist tension string equipment, wire drums

The following constants and variables included in the element/Performance Criteria in this unit are fully described in the Definitions Section 1 of this volume and form an integral part of the Range Statement of this unit:

- Appropriate and relevant persons (see Personnel)
- Appropriate authorities
- Appropriate work platform
- Assessing risk
- Assessment
- Authorisation
- Confined space
- Diagnostic, testing and restoration
- Documenting detail of work events, record keeping and or storage of information
- Drawings and specifications

RANGE STATEMENT

- Emergency
- Environmental and sustainable energy procedures
- Environmental legislation
- Environmental management documentation
- Established procedures
- Fall prevention
- Hazards
- Identifying hazards
- Inspect
- Legislation
- MSDS
- Notification
- OHS practices
- OHS issues
- Permits and/or permits to work
- Personnel
- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field **11)**

Rail Traction Units