



Australian Government

Department of Education, Employment and Workplace Relations

UETTD RTP32A Maintain energised transmission lines using high voltage live work Barehand method

Release: 1

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Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This Competency Standard Unit covers the maintenance of energised high voltage transmission overhead electrical apparatus, i.e. live work using Barehand method and includes the verification of the site conditions and the potential hazards, the conformation and calculation of physical loads and the selection of appropriate and authorised work method. It includes the preparation and cleaning of specialist material and tools in accordance with authorised technical instructions. It also encompasses the undertaking of OHS and safe working practices and the rendering inoperative of the automatic re-closing device including its restoration in accordance with the work plan and the procedure of issuing/accepting electrical access permits and or relevant work document.

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

License to practice

3)

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 Transmission Lineworker

Pathway 2

Unit Code	Unit Title
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
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications

Prerequisite Unit(s)

4)

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
UETTD RIS54A	Install and maintain poles, structures, overhead conductors and cables
UETTD RIS65A	Contribute to coordinated HV live working
UETTD RTP26A	Install transmission structures and associated hardware
UETTD RTP27A	Maintain transmission structures and associated hardware
UETTD RTP29A	Install and maintain transmission overhead conductors and cables
UETTD RTP30A	Inspect transmission overhead structures and electrical apparatus
UETTD RTP31A	Maintain energised transmission lines using high voltage live work stick method
UETTD RTP99A	Test and verify transmission overhead 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.
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Elements and Performance Criteria

ELEMENT

PERFORMANCE CRITERIA

- | | |
|--|--|
| 1 Prepare/plan to maintain energised transmission lines using high voltage live work barehand method | 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. |
| | 1.2 Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites. |
| | 1.3 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 |

ELEMENT

PERFORMANCE CRITERIA

- followed and according to established procedures.
- 1.4 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.
 - 1.5 Risk control measures are identified, prioritised and evaluated against the work schedule.
 - 1.6 Relevant work permits 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 required for the job are identified, scheduled and coordinated and confirmed in a safe and technical working order.
 - 1.8 Relevant personnel at work site are confirmed current in First Aid, CPR, and other rescue procedures according to requirements.
 - 1.9 Liaison and communication issues with other/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.

ELEMENT	PERFORMANCE CRITERIA
2 Carry out the maintenance of transmission lines using high voltage live work barehand method	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 and other Rescue procedures and other related work procedures are performed according to requirements and/or established procedures. 2.3 Lifting, climbing, working aloft, and 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 Hazard warnings and safety signs are recognised and hazards and assessed OHS risks are reported to the immediate authorised persons for directions according to established procedures. 2.6 Remedial actions are taken to overcome any shortfalls encountered in the work schedule according to requirements and/or established procedures. 2.7 Maintenance of energised high voltage overhead electrical transmission apparatus is carried out, in accordance with the work schedule and requirements and/or established procedures. 2.8 Essential knowledge and associated skills are applied in the safe maintenance of energised high voltage overhead electrical transmission apparatus to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements. 2.9 Solutions to non-routine problems are identified and actioned using acquired essential knowledge and associated skills according to requirements.

ELEMENT	PERFORMANCE CRITERIA
3 Complete the maintenance of transmission lines using high voltage live work barehand method	2.10 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.
	3.1 Work is checked against schedule for conformance, anomalies reported 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 permit(s) (live line) are signed off and client/customer advised in accordance with requirements.
	3.6 Works completion records, reports, as installed /modified drawing(s) and/or documentation and information are confirmed, processed and 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 has been acquired of maintaining energised lines (transmission) using Bare Hand technique.

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

KS01-TTP32A Transmission live barehand work for voltages up to and including 500 kV

Evidence shall show an understanding of working on energised lines for voltages up to and including 500 kV utilising the live barehand work method to an extent indicated by the following aspects:

T1 Commonwealth/State/Territory legislation, Standards, codes, supply authority regulations and or enterprise requirements associated with working on energised lines for voltages up to and including 500 kV utilising the live barehand work method.

T2 Relationship and responsibilities of each team member encompassing:

- Role of the individual in the team
- Contribution to joint outcomes
- Goals/plans and objectives of the team
- Work team communication
- Effective teamwork

T3 Safety precautions for working on energised lines encompassing:

- Live work minimum approach distances for persons and plant
- Calculation of forces supported by live working equipment
- Identification of OHS hazards, assessing and controlling the risks
- Types, selection, maintenance, storage and uses of personnel protective equipment including the faraday suit
- Types and functions, safe working policies, procedures and practices for use of specialised live work plant, equipment and tools
- Emergency response and rescue.

T4 Electrical and electrostatic principles encompassing:

- Relationship of the resistance of a human body to different levels of current and voltage
- Relationship of a human body in an electric field
- Effects of electrostatic induction for live barehand work
- Relationship of phase voltage and respective line voltages
- Effect of distance to voltage
- Potential of a conductive object within a field

T5 HV feeder auto-reclosing suppression encompassing:

- Function

REQUIRED SKILLS AND KNOWLEDGE

- Application
- Live work access authority/permit systems

T6 Live barehand work techniques performed in accordance with enterprise requirements encompassing:

- Fit and test a faraday suit
- Erect and use an insulated ladder
- Erect and use a boom pole and insulator cradle
- Installing and/or replacing HV suspension insulators
- Installing and/or replacing HV strain insulators
- Installing and/or replacing suspension clamp unit
- Installing and/or replacing fittings and hardware to conductors
- Installing and/or replacing vibration dampers
- Installing and/or replacing conductor spacers
- Installing and/or replacing preformed repair rods
- Installing and/or replacing HV cross-arms
- Connecting and/or disconnecting HV bypass bridges.

T7 Selection, care, use and maintenance of ropes for live work encompassing:

- Identification of ropes used for live barehand work
- Characteristics
- Application
- Restrictions
- Precautions
- Storage
- Transport
- Cleaning and caring
- Labelling
- Testing
- Records
- Techniques in splicing
- Determining suitability of the rope for continued use

T8 Selection care, use and maintenance of sticks for live work encompassing:

- Care of live work sticks
- Use and load limitations of live work sticks
- Cleaning live work sticks
- Restoring gloss surfaces of live work sticks
- Repairing small ruptures of live work sticks
- Repairing broken fittings of live work sticks

T9 Checking integrity of insulators prior to work encompassing:

REQUIRED SKILLS AND KNOWLEDGE

- Visual and audible assessment
- Check disc voltage difference
- Plot data
- Assess data
- Determine condition of insulator string

T10 Rigging procedures for live barehand work encompassing

- Identification of rigging points on structures
- Selection and positioning of rigging equipment on structures
- Selection of and operation of rope tackles

T11 Safety observer principles and responsibilities encompassing:

- Areas of responsibility
- Supervisor skills
- Protocols and procedures
- Specific duties of a safety observer
- Techniques in observing others in the safe performance of their work
- Minimum approach distances for personnel and hand held tools
- Special Limits of Approach.

Evidence Guide

EVIDENCE GUIDE

9) This provides essential advice for assessment of the unit of competency and must be read in conjunction with the Performance Criteria and the Range Statement of the unit of competency 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 one of the following:	Ladder access EWP access EWB access Rope access
B	All of the following:	Replace strain insulators Replace suspension insulators
C	At least three of the following:	Replace/connect bridge/bonding connections Replace vibration damper Repair/replace conductor spacers Repair/replace conductor joint Repair conductor
D	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 usage of Bare Hand technique in the maintenance of energised transmission lines.

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)

There are no concurrent assessment recommendations for this unit.

Range Statement

RANGE STATEMENT

10) This relates to the unit of competency 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 lines (transmission) using Bare Hand techniques and includes the replacement of suspension and tension insulators and the calculating of conductor loads being both vertical and tension and conductor repairs. In addition the work shall include rope care and maintenance including mandatory testing; electrical testing of insulators; conductive clothing application and maintenance.

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
- Diagnostic, testing and restoration
- Documenting detail work events, record keeping and or storage of information
- Drawings and specifications
- 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

RANGE STATEMENT

- Quality assurance systems
- Requirements
- Testing procedures
- Work clearance systems

Unit Sector(s)

Not applicable.

Competency Field

Competency Field	11)
	Transmission Units