



Australian Government

Department of Education, Employment and Workplace Relations

UETTD RTP14B Install and maintain overhead transmission network infrastructure

Release: 1

UETTD RTP14B Install and maintain overhead transmission network infrastructure

Modification History

Not Applicable

Unit Descriptor

Unit Descriptor

1)

1.1) Descriptor

This Competency Standard Unit covers the erection of non-energised, pyramid, delta, Pi or enterprise specific transmission towers and associated hardware and includes installation and maintenance of poles and/or structures and associated hardware and the installation and maintenance of overhead conductors and cables used on towers. It encompasses the erection of components in accordance with construction plans, specifications, work orders and standing enterprise requirements. Erection could also involve cleaning and welding. It also encompasses maintenance work associated with the diagnosing of faults, the conducting of visual inspections, the confirmation of phasing and the completion of other enterprise tests on overhead conductors and cables. It also encompasses confirming isolation of systems and circuits, and/accepting/issuing electrical permits. The updating of system data, records and or completion of relevant documentation in accordance with enterprise requirements also forms part of this competency.

Application of the Unit

Application of the Unit 4)

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

1.2) License to practice

The skills and knowledge described in this unit requires 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) 2)

2.1) Competencies

Entry into this unit requires a current 'Unrestricted Electrician's Licence' or equivalent issued in an Australian State or Territory or satisfaction of the ERAC requirements for the issue of an unrestricted electrician's licence. Granting of competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed:

	UETTDREL02B	Operate plant and equipment near energised and exposed electrical conductors/apparatus
and	UETTD RIS22B	Implement and monitor the organisational OHS policies, procedures and programs
and	UETTD RIS23B	Implement and monitor the environmental and sustainable energy management policies and procedures

For the full prerequisite chain details for this unit please refer to Table 3 in Volume 1, Part 2

Employability Skills Information

Employability Skills

3)

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: Elements describe the essential outcomes of a unit of competency

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 for the installation and maintenance of transmission network infrastructure	1.1	Works schedule(s), including drawings, plans, requirements, established procedures, and material lists, are received, analysed and confirmed, if necessary, by site inspection.
	1.2	Relevant requirements and established procedures for the work are communicated to all personnel and identified for all work sites.
	1.3	OHS policies and procedures related to requirements and established procedures for the installation and maintenance of transmission network infrastructure are obtained and confirmed for the purposes of the work to be performed and communicated.
	1.4	Work is prioritised and sequenced following consultation with others for completion within acceptable timeframes and in accordance with

ELEMENT	PERFORMANCE CRITERIA
	established procedures.
	1.5 Hazards are identified, OHS risks assessed and control measures are prioritised, implemented and monitored including emergency exits kept clear according to established procedures.
	1.6 Relevant work permits are obtained to access and perform work according to requirements and/or established procedures.
	1.7 Resources including personnel, equipment, tools and personal protective equipment required for the job are obtained and confirmed in working order.
	1.8 Relevant personnel at work site are confirmed current in First Aid, Tower/Pole Top Rescue and other related work procedures according to requirements.
	1.9 Liaison and communication issues with other/authorised personnel, authorities, clients and land owners are resolved to carry out work where necessary.
	1.10 Personnel participating in the work, including plant operators and contractors, are fully briefed and respective responsibilities confirmed where applicable in accordance with established procedures.
	1.11 Site is prepared according to the work schedule and to minimise risk and damage to property, commerce, and individuals in accordance with established procedures.
	1.12 Traffic management plan is identified and implemented.
2 Carry out the installation and maintenance of transmission network infrastructure	2.1 OHS, sustainable energy and environmental principles and practices to reduce the incidents of accidents and minimise waste are monitored and followed in accordance with requirements and/or established procedures.
	2.2 Lifting, climbing, working aloft, and use of power tools/equipment, techniques and practices are

ELEMENT**PERFORMANCE CRITERIA**

- safely followed and, currency according to requirements confirmed.
- 2.3 Systems and circuits are isolated as required, proved safe to work on in accordance with the requirements /permits and established procedures.
- 2.4 Essential knowledge and associated skills are applied in the safe installation and maintenance of transmission network infrastructure to ensure completion in an agreed timeframe and, to quality standards with a minimum of waste according to requirements.
- 2.5 Poles and/or structures and their associated hardware to be installed are stabilised according to requirements.
- 2.6 Installation of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
- 2.7 Towers and associated hardware to be erected are stabilised according to requirements.
- 2.8 Maintenance, including repair and/or replacement of poles and/or structures is carried out, in accordance with the work schedule and requirements/established procedures.
- 2.9 Overhead conductor/cables are strung, tensioned and terminated as per requirements/established procedures.
- 2.10 Conductors and anti-vibration devices, spaces/spreaders are secured as per established procedures.
- 2.11 Electrical connections are made in accordance with the requirements/established procedures.
- 2.12 Maintenance, including repair and/or replacement of overhead conductors and cables used on towers is carried out, in accordance with the work schedule and requirements/established procedures.

ELEMENT**PERFORMANCE CRITERIA**

	2.13	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.
	2.14	Erection of towers and associated hardware is carried out, in accordance with the work schedule and requirements/established procedures.
	2.15	Unplanned events in the erection of towers and associated hardware are undertaken within the scope of established procedures.
	2.16	Known solutions to a variety of problems are applied using acquired essential knowledge and associated skills.
	2.17	On going checks of quality of the work are undertaken in accordance with instructions and established procedures.
3	Complete the installation and maintenance of transmission network infrastructure	
	3.1	Work undertaken is checked against works schedule for conformance with requirements and anomalies reported in accordance with established procedures.
	3.2	Accidents and/or injuries are reported in accordance with requirements/established procedures, where applicable.
	3.3	Work site is rehabilitated, cleaned up and made 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 or disposed of in accordance with established procedures.
	3.5	Relevant work permit(s) are signed off and, the transmission network infrastructure is returned to service in accordance with requirements.
	3.6	Works completion records, reports, as installed /modified drawing and/or documentation and information are finalised and processed and appropriate personnel notified.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

7) 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 erecting transmission towers and associated hardware.

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

The extent of the essential knowledge and associated skills (EKAS) required is given in Volume 2 - Part 2.2 EKAS. It forms an integral part of this unit.

- E2.8.2.2 Alternating current principles - power
- E2.8.6 Electromagnetic principles
- T2.1.1. Engineering applications of mathematical principles
- T2.1.2. Engineering applications of mechanical principles
- T2.1.3. Engineering applications of material properties
- T2.1.4. Basic rigging techniques
- T2.1.9. Stores procedures
- T2.2.1 Generation power systems
- T2.2.2 Transmission, distribution and rail power systems
- T2.2.3 Substations, power transformers and reactors
- T2.2.6 Pole and hardware installation and maintenance
- T2.2.10 Transmission structures and hardware
- T2.2.11 Routine maintenance on transmission structures
- T2.2.21 Installation and maintenance on transmission lines and associated equipment
- T2.2.30 Powerline transmission installation safety

REQUIRED SKILLS AND KNOWLEDGE

T2.3.1 Powerline safety practices

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.

EVIDENCE GUIDE

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 - UET09". 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

EVIDENCE GUIDE

A	Install and maintain at least one of the following:	Wood pole/structure Steel pole/structure Concrete pole/structure Composite pole/structure
B	With regards to "A" incorporate at least three of the following:	Insulators Cross arm braces Crossarms Pole steps Shackle straps Earth leads Traction supports Traction registration Bonding
C	With regards to "A" incorporate at least one of the following:	Baulking Stays Concreting including foundation
D	With regards to "A" incorporate at least one of the following:	Crane Auger/erector 'A' frame Lifting beam Pole pikes Helicopter lift
E	Erect any one of the following towers:	Pyramid Delta pi Enterprise specific type
F	With regards to "E" incorporate at least two of the following:	Insulators Clamps Bolts Structural components
G	With regards to "E" incorporate at least one of the following:	Welding Cleaning
H	Install and	Copper

EVIDENCE GUIDE

	maintain at least one of the following:	Aluminium Steel Composite Aluminium/steel reinforced Pilot
I	With regards to "H" incorporate at least two of the following:	Elevated work platform Portable platform Gondola Hook ladder* Elevated work box (*must do)
J	With regards to "H" incorporate at least five of the following:	Winches* Tension equipment* Stringing equipment Cable trailers Crimping equipment * Pre-formed splices Hardware Cable drum stands Ropes Rollers/ sheaves Comealongs Swivels (*must do)
K	With regards to "H" incorporate at least two of the following:	Voltage/ de-energised indicating device Field intensity meter Operating rods (*must do)
L	With regards to "H" incorporate at least one of the following:	Dynamometer Site board Abney level Sag chart* Theodolite (*must do)
M	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

EVIDENCE GUIDE

		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 erection of towers and associated equipment.

In addition to the resources listed above, in Context of and specific resources for assessment, evidence should show demonstrated competency working below ground, 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

8) 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/may be demonstrated in relation to the installation and maintenance of transmission network infrastructure in accordance with the following:

Tower types may include pyramid, delta and pi and other enterprise specific types.

Equipment may include:

Pole types and structures may include wood, concrete, steel and composite.

Maintenance may include the basic inspection, removal, repair and replacement of poles including welding, pole staking and rebutting.

Associated hardware includes insulators, crossarms, stays, earth down leads and bond wires, crossarm braces, pole steps, shackle straps and associated bolts and clamps, cantilever assembly, pull off, head span, portal, drop tube

Pole stabilisation techniques include back-fill consolidation, concreting, baulking, reinforcement nailing, approved steel reinforcing and temporary and permanent stay-wires.

Methods of erection may include crane, auger/erector, winch/'A' frame, lifting apparatus and helicopter lift.

Installation and maintenance of overhead conductor and or cables used on transmission towers may include the stringing, tensioning, terminating, removal, repairing and replacement of the conductors/cables. Visual inspections and the diagnosing of faults is also included.

Structures include towers and columns.

Types of conductor include copper, aluminium, steel and composites. Conductor configurations may be single or bundled and include pilot cables.

Overhead conductors include earthing systems

Plant may include elevating work platform, winches and capstans, specialist tension stringing equipment, cable trailers, cable drum stands and equipotential equipment.

Testing and recording equipment includes, insulation resistance testers, recording meters and other approved devices and techniques applicable to the voltage.

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

RANGE STATEMENT

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

Unit Sector(s)

Not Applicable

2.2) Literacy and numeracy skills

2.2) Literacy and numeracy skills

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
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Competency Field

Competency Field 5)

Transmission Units