

1. Module details**Module name****Pole and Hardware Installation****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

Module code

NUE222

Discipline code

0703130

2. Module purpose

This module is designed to supply the knowledge and skilled required by electrical supply industry workers to assemble and erect poles and associated hardware. The experience gained is in the correct procedures and practices involved in preparing for and carrying out assembly, erection and maintenance of various types of poles and associated hardware. Pole type, specification and location are in accordance with enterprise plans, drawings and specifications. All procedures and practices comply in accordance with electricity supply industry standards, Supply Authority Standards and OH&S regulations.

3. Prerequisites

NUE207 Powerline Safety Practices.

NE175 Workshop Practices.

NUE236 Rigging (Basic).

4. Relationship to competency standards

This module addresses Units 2.7, 3.1, 3.3 (partly), 3.4 and 3.17 of the E.S.I. National Competency Standards for Overhead Line Work and Cable Jointing and partially addresses Unit 5.1 of the Electrical Contracting Industry Award Standard.

5. Content**Enterprise diagrams and plans**

Pole types (wood, concrete, steel, composite)

Wood poles (types, preservative impregnation, classification, identification, pole diameter and height)

Crossarms

wooden crossarms

crossarm size

strength

deterioration

configuration of crossarms

dual pole, single crossarm configuration

Concrete poles

threaded ferrules

gain blocks

earthing ferrules

provision for pole steps

Steel poles

solid and multi-part types
assembly
corrosion problems
buried type
rag-bolt mounted

Location of poles

diameter and depths
types of footings: (plain, concrete, rock, baulk, backfill, soil types, strain on the pole pre-fabricated foundations)

Pole fitting

attachments (braces, pole caps, pole steps, luminaire brackets, identification plates bolts and clamps)
stays
earthing systems
earth down leads and bond wires
electrodes and testing

Methods of sinking poles

powered hole borers
pendulum borer
by hand.
hard rock
unstable ground
safety with holes

Pole erection

lifting and handling (safety requirements, calipers, mass of a pole, pole recovery, methods, removal and replacement, hardware maintenance)

Staying

principles and purpose
types
locating stay position (angle of deviation, bisecting stays, calculating stay wire length)
assembling stays
preparing stay footings and anchors (depth, types of anchors, excavation methods, backfill -concrete anchor)
installing screw anchors

Pole maintenance

6. Assessment strategy

Assessment methods

Short answer questions (written, oral or graphic or computer based).
Suitable practical exercises which assess the skills required of each learning outcome.

Conditions of assessment

Theory room for written tests together with practical field observation.

7. Learning outcome details

Learning outcome 1

Plan for the erection and maintenance of poles and associated hardware.

Assessment criteria

- 1.1 Obtain and analyse appropriate construction drawing plans and required to complete the task.
- 1.2 Identify the resources required, including personnel, plant, equipment, tools, hardware and transport to complete the task.
- 1.3 Identify various pole types and sizes and explain the selection of poles considering line design requirements.

Learning outcome 2

Prepare a worksite for the erection and maintenance of poles and associated hardware.

Assessment criteria

- 2.1 Identify the methods of excavation and types of foundations used for the erection and maintenance of poles.
- 2.2 Demonstrate the procedure for installing a pole foundation.

Learning outcome 3

Assemble poles and associated hardware.

Assessment criteria

- 3.1 List the constructional clearances required between low and high voltage conductors.
- 3.2 Identify and list the line hardware required for various types of low and high voltage construction.
- 3.3 Identify the appropriate tools and equipment used to assemble poles and associated hardware.
- 3.4 Pre-assemble poles and associated hardware, ready for erection.

Learning outcome 4	Erect poles and associated hardware.
Assessment criteria	<p>4.1 Identify the methods used to erect a pole.</p> <p>4.2 Demonstrate the erection and removal of poles.</p> <p>4.3 Identify the techniques used, and demonstrate the procedure to stabilise a pole using stays.</p> <p>4.4 Identify and demonstrate the methods used to erect crossarms to standing poles.</p>
Learning outcome 5	Maintain poles and associated hardware.
Assessment criteria	<p>5.1 Identify and demonstrate pole stabilisation techniques used to support unstable poles.</p> <p>5.2 Determine the methods used to straighten leaning poles.</p> <p>5.3 Maintain/replace high voltage insulators.</p> <p>5.4 Maintain/replace high voltage crossarm.</p>
8. Delivery of the module	
Delivery strategy	<p>Delivery strategies must be suitable for both theoretical and/or practical learning and module purpose.</p> <p>It is recommended that learning and assessment be facilitated in a holistic manner which may require a learning sequence other than indicated in the body of this module descriptor.</p>
Resource requirements	<p>Relevant Australian standards</p> <p>Enterprise work manuals and standing instructions</p> <p>Diagrams and layouts</p> <p>All necessary tools and equipment</p>
Occupational health and safety requirements	<p>Students should be made aware of Occupational Health and Safety issues in all situations and be expected to demonstrate safe working practices at all times. Electrical safety must be emphasised.</p>