

1. Module details**Module name****Telecommunications Underground Cabling****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 - 20 hours.

Module code

NUE196

Discipline code

Electrotechnology - 0703225.

2. Module purpose

This module provides the student with the underpinning knowledge required to identify, prepare, haul and joint underground telecommunications cable greater than 20 pair.

3. Prerequisites

NBB02 Occupational Health and Safety
 NUE190 Telecommunications Standards and Regulations
 NUE191 Telecommunications Cables & Installation Methods

4. Relationship to competency standards

This module provides part of the underpinning knowledge and skills in the 'Evidence Guide' of specific units of competency in the National Electrotechnology Training Package and provides similar support, where mapped, to equivalent units in the National Metals and Engineering Competency Standards. For details refer to the module to unit maps, available from NUEITAB.

5. Content**Underground construction**

Man hole and pit

Location

Capacity

Purpose

Duct seal

Conduit

Draw in boxes

Ducts

Capacity (number of cables and size)

Types of ducts (concrete, plastic, earthen ware, metallic)

Cable types

Cable types (optical fibre, plastic, lead, CATV, other)

Cable details (size, type, depth, duct and cable, amplifiers, existing joints)

Labelling cable

Hazards

Dangerous gases
 Toxic fumes
 Sharpes
 Ventilation
 Maintenance of working environment
 Precautions

Working environment

Light and ventilation
 Road way and footway guarding
 Debris
 Temporary cables/services
 Regulations (total fire ban, discharge of water, vehicle parking restrictions, tree lopping/trimming)

Mechanical and manual aids

Mechanical aid
 Manual aid
 Storage
 Inspection

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

Conditions of assessment

Learning and assessment will take place in an environment that is conducive to a learner’s development.

7. Learning outcome details

Learning outcome 1

Describe the characteristics of a hazard free safe underground cabling working environment.

Assessment criteria

- 1.1 List and describe the types of gases that may be encountered.
- 1.2 Describe the symptoms and effects of the listed toxins and gases

Learning outcome 2

Assessment criteria

- 1.3 List the test equipment appropriate for testing a range of gases and toxins likely to be encountered in underground work.
 - 1.4 Describe how to ensure appropriate ventilation to minimise harmful effects from toxic and other fumes.
 - 1.5 List the appropriate actions required to ensure a safe working environment.
 - 1.6 Outline enterprise, state and federal regulations that would affect work practices and have a bearing on a hazard free working environment.
 - 1.7 State the requirements to set up a work environment to ensure adequate lighting and ventilation.
 - 1.8 State the procedure in accordance with requirements, state and federal regulations in setting up adequate roadway and footway guarding.
 - 1.9 Describe the correct procedure to install temporary electrical cables and equipment ensuring personal and public safety.
 - 1.10 Describe the requirements for good housekeeping with regards to rubbish/waste near the work environment.
- Define the types and purposes of mechanical and manual aids.**
- 2.1 Identify the correct mechanical and manual aid for the purpose of removing manhole and pit covers.
 - 2.2 Describe the method of removing manhole and pit covers.
 - 2.3 State the inspection and checks needed on lids to ensure safe re-use.
 - 2.4 Identify any regulatory, standards or codes that apply to the removal and/or closure of manhole/pit covers.
 - 2.5 Describe the correct storage requirements for lids to avoid their damage and injury to personnel.

Learning outcome 3

Describe the purpose, location, and capacity of man holes and pits.

Assessment criteria

- 3.1 Describe the purpose of man holes, pits and jointing chambers.
- 3.2 State the location of man holes, pits, jointing chambers, duct seal and conduit from plans.
- 3.3 Define the capacity of man hole and pits that house cables and equipment.

Learning outcome 4

Describe the types and capacity of duct work.

Assessment criteria

- 4.1 State the capacity of duct with reference to the number and physical size of cables.
- 4.2 Describe the different types of ducts including, concrete, PVC (plastic) earthen ware and metallic.
- 4.2 Identify other duct systems that can be used

Learning outcome 5

Describe the different types of underground cable.

Assessment criteria

- 5.1 Using cable plans, drawings and specifications identify cable details such as:
 - Cable size and type
 - Cable depth
 - Duct and duct size
 - Existing joints
 - Amplifiers.
- 5.2 Identify the different types of underground cables used; including, polyethylene (plastic) lead, cable TV and optical fibre.
- 5.3 Describe the method of cable identification, including size and pair range.
- 5.4 Lists likely damage that can be visually identified in underground cables
- 5.5 Demonstrate the jointing of underground cables greater than 20 pair.

Learning outcome 6	Describe the procedure for the excavation of a site for the installation of a man hole, pit, pipe and conduit.
Assessment criteria	<p>6.1 Describe the procedure to assess excavation area for soil type, hardness and obstructions, such as, power, water, gas and other services.</p> <p>6.2 Describe the procedure for confirming the location for proposed installation of man hole, pit, pipe and conduit using plans and drawings.</p> <p>6.3 List the tools and equipment appropriate for use at the excavation area.</p> <p>6.3 Describe the procedure to safely excavate the site.</p> <p>6.4 State the correct procedure to install the pipe and or conduit according to approved work practices.</p> <p>6.5 Describe the correct procedure to return the excavation area to the previous standard.</p> <p>6.6 Describe the procedure for recording and reporting the new installation(s) on plans and drawings, and to relevant service providers</p>
8. Delivery of the module	<p>Delivery strategy</p> <p>Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective method to achieve this is by integration of theory and practice where students learn by experimentation, research and reports. It is recommended that learning and assessment be facilitated in a holistic manner that may require learning outcome sequence other than that indicated in the module.</p>
Resource requirements	<p>Resources should be sufficient for students to carry out learning activities on an individual basis. This will require a range of support equipment and reference material.</p> <p><i>Students will require access to the following reference material or their replacements:</i></p> <ul style="list-style-type: none"> • TS008 • TS009 • AS/NZS 1668 • AS 1670

- AS1851
- AS 2220
- AS/NZS 3000 series and related sub-standards
- Telecommunications Act 1997 - overview
- The Building Code of Australia Volumes 1-3
- Australian Communications Authority Cabling Provider Rules – Benchmark Cabler Competency Requirements – 2000
- Communication Cabling Manual BCL Package
- Certified Components List (CCL) or replacement
- Labelling

Specialised facilities and equipment required by the training provider include:

- Access to a range of industrial sites that can assist in providing experiential learning associated with underground cabling work.
- Related mechanical and manual aids

In addition learners will require access to:

- Standard workshops and equipment should be available for practical exercises
- Approved telecommunication tools
- Approved safety equipment, including gas and toxin test instruments

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as the particular safety procedures followed as part of the learning / teaching activity and content.