



Australian Government

UEPMNT371A Maintain large scale wind turbine generators

Release: 1

UEPMNT371A Maintain large scale wind turbine generators

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor

1) Scope:

1.1) Descriptor

This unit deals with the skills and knowledge required to undertake the scheduled maintenance of large scale wind turbine generators (WTGs).

Application of the Unit

Application of the Unit 2)

This 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 do not require a licence to practise in the workplace. However, practice in this unit is subject to regulations directly related to Occupational Health and Safety and where applicable contracts of training such as apprenticeships and the like.

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 have been completed.

Unit Code	Unit Title
UEENEEE101 A	Apply Occupational Health and Safety regulations, codes and practices in the workplace

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 levels. A description of what each level entails is provided in Section 2.3.1 Language, Literacy and Numeracy.

Reading	3	Writing	3	Numeracy	3
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Employability Skills Information

Employability Skills 5)

This unit contains Employability Skills.

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 | Plan and prepare for the work | 1.1 | Work requirements are identified from request/work orders or equivalent and clarified/confirmed with appropriate parties or by site inspection |
| | | 1.2 | Occupational Health and Safety standards, statutory requirements, relevant Australian standards, codes of practice, manufacturer specifications, environmental requirements and enterprise procedures are identified, applied and monitored throughout the work procedure. |
| | | 1.3 | Resources required to satisfy the work plan are identified, obtained and inspected for compliance with the job specifications |
| | | 1.4 | Relevant plans, drawings and texts are selected and interpreted in accordance with the work plan |
| | | 1.5 | Work is planned in detail including sequencing and prioritising and considerations made, where appropriate, for the maintenance of plant security and capacity in accordance with system/site requirements |
| | | 1.6 | Coordination requirements, including requests for isolations where appropriate, are resolved with others involved, affected or required by the work |
| | | 1.7 | Work area is prepared in accordance with work requirements and site procedures |
| | | 1.8 | Appropriate teams and individuals roles and responsibilities within the team are identified and, where required, used to assist in the |

ELEMENT	PERFORMANCE CRITERIA
2 Conduct maintenance	<p data-bbox="660 297 1061 333">provision of on-the-job training</p> <p data-bbox="660 365 1307 510">2.1 Equipment is replaced, if required, due to faulty operation or maintenance plan requirements in accordance with manufacturer specifications and site procedures</p> <p data-bbox="660 542 1193 613">2.2 Documented service checklists (or similar documentation) are followed</p> <p data-bbox="660 645 1251 757">2.3 Diagnostic testing and data from monitoring systems are used to identify those components requiring maintenance</p> <p data-bbox="660 788 1246 900">2.4 Equipment is dismantled, if required, for maintenance in accordance with manufacturer specifications and site procedures.</p> <p data-bbox="660 931 1222 1043">2.5 Techniques are used to enable identification and/or re-assembly in accordance with job requirements and site procedures.</p> <p data-bbox="660 1075 1262 1187">2.6 New components, if required, are obtained and inspected for compliance with manufacturer specifications.</p> <p data-bbox="660 1218 1270 1323">2.7 Equipment is tested, monitored and adjusted as required in accordance with manufacturer specifications and site/enterprise requirements.</p>
3 Complete the work	<p data-bbox="660 1355 1246 1467">3.1 Work is completed and appropriate personnel notified in accordance with site/enterprise requirements</p> <p data-bbox="660 1498 1275 1610">3.2 Work area is cleared of waste, cleaned, restored and secured in accordance with site/enterprise procedures</p> <p data-bbox="660 1641 1254 1753">3.3 Plant, tools and equipment are maintained and stored in accordance with site/enterprise procedures</p> <p data-bbox="660 1785 1206 1856">3.4 Work completion details are finalised in accordance with site/enterprise procedures</p> <p data-bbox="660 1888 1302 1957">3.5 Lessons learnt from the activity or experience are shared with other team members and recorded for</p>

ELEMENT

PERFORMANCE CRITERIA

future reference.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) This describes the essential skills and knowledge and their level, required for this unit.

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

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1A

Evidence shall show that knowledge has been acquired of maintaining large scale wind turbine generators (WTGs) to the extent indicated by the following aspects:

- T1. Wind generation industry environmental, work health and safety
- Legislation and regulations relevant to the wind generation industry
 - Manual handling requirements as applicable to the wind generation industry
 - Working at heights as applicable to the wind generation industry
 - Rigging and lifting equipment
 - Working in environmental climates subject to high wind velocity
- T2. Quality principles and enterprise requirements as applicable to the wind generation industry
- T3. Wind farm principles
- Relevant plant and equipment, its location and operating parameters
 - Electric motor types and characteristics as applicable to the wind generation industry
 - Switchgear types and characteristics as applicable to the wind generation industry
 - Electrical protection types and characteristics as applicable to the wind generation industry
 - Wind turbine generator types and characteristics
 - Wind turbine support systems
- T4. Enterprise procedures and documentation
- Plant drawings and manufacturers manuals
 - Enterprise work completion documentation
 - Enterprise timesheets
- T5. Introduction to, and typical arrangements of, power production plant
- Plant status
 - Control and data acquisition systems
- T6. Electrical fundamentals

REQUIRED SKILLS AND KNOWLEDGE

- Voltage, current, power and resistance
 - DC and AC
 - Voltages present in and around a WTG
 - Wiring conventions used in and around WTGs
 - Digital multimeters
- T7. Levelling and aligning techniques
- T8. Isolation procedures
- T9. High torqueing tools and adjustments
- Lubrication principles, types and application as applicable to the wind generation industry

Evidence Guide

EVIDENCE GUIDE

9) The Evidence Guide forms an integral part of this Unit and shall be used in conjunction with all components 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-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 accordance with industry and regulatory policy.

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. Sources of evidence need to be 'rich' in nature to minimise error in judgment.

Activities associated with normal everyday 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 practised. 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, Section 3.1 of this Training Package.

**Critical aspects
of evidence
required to
demonstrate
competency in
this unit** 9.2)

Evidence for competence in this unit shall be considered holistically. Each element and associated Performance Criteria shall be demonstrated:

- On at least two (2) occasions. In accordance with the "Assessment Guidelines" for the UEP12 Training Package.

Evidence shall also comprise:

- A representative body of work performance demonstrated within the timeframe 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 required skills and knowledge 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:

- | | | |
|---|----------------------|---|
| A | All of the following | <ul style="list-style-type: none"> • Climb the tower using all appropriate safety equipment and procedures. • Lift a load (such as a small motor) to the height of the nacelle. |
| B | All of the following | <ul style="list-style-type: none"> • Apply the braking systems. • Mechanically and electrically isolate the system. |
| C | All of the following | <ul style="list-style-type: none"> • Check tension of bolts • Replace a bearing • Clean slip rings • Replace a seal or an o-ring |
| D | All of the following | <ul style="list-style-type: none"> • Connect a diagnostic computer (or similar) to the system and read and interpret problem-solving data |
| E | All of the following | <ul style="list-style-type: none"> • Replace grease in automatic greasing systems. • Confirm oil levels and top-up as required. • Clean up lubrication spills. |
| F | All of the following | <ul style="list-style-type: none"> • Read a maintenance schedule. • Complete enterprise documentation after maintenance activities. |
| G | All of the following | <ul style="list-style-type: none"> • Remediate surface rust or corrosion |
| H | All of the following | <ul style="list-style-type: none"> • Deal with an unplanned event by drawing on essential knowledge and skills to provide appropriate solutions. |

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 work as prescribed by this unit.

These should be used in the formal learning/assessment environment.

Note:

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible reproduce and replicate the workplace and be consistent with the approved industry simulation policy.

The resources used for assessment should reflect current industry practices in relation to:

Maintain large scale wind turbine generators

Method of assessment

9.4)

This unit shall be assessed by methods given in the Assessment Guidelines, Section 1.3 of this Training Package.

Note:

Competent performance with inherent safe working practices is expected in the Industry to which this competency standard unit applies. This requires assessment 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 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 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.

Climbing equipment includes personnel lifts, climb assist, elevators, ladders

Lifting apparatus includes winches and cranes

Hydraulic equipment includes turbine braking equipment.

Maintenance may include: visual inspections, replacement of mechanical components, checking the tension of bolts, replacing bearings, replacing seals and o-rings, condition monitoring, lubrication, testing of equipment for correct operation, cleaning of slip rings and lubrication of equipment.

Tools may include spanners, screwdrivers, side cutters, pliers, high torque wrench, grease pump, digital multimeter.

Test equipment may include laser alignment tools, multimeters, laptop computers, PC tablet, smart phones and other data acquisition tools and equipment.

Consumables may include gearbox oils, bearing grease, paint, detergents, 'Loctite'

Cleaning includes the removal of the following from equipment and gear:

- Grease from bearings

- Oil spills

- Dust

Large Scale Wind Generators (WTGs) include systems having a rating of greater than 10 kW

Work completion details may include plant and maintenance records, job cards, check sheets, on device labelling updates and reporting and/or documenting equipment defects.

Work site environment may be affected by nearby plant or processes and climatic conditions e.g. wind speed, chemical, heat, dust, noise, height and oil.

Location of wind turbine generators may be in urban, suburban, regional or rural locales and environments.

Isolations can refer to electrical/mechanical or other associated processes.

Generic terms used throughout this Vocational Standard shall be regarded as part of the Range Statement in which competency is demonstrated. The definition of these and other terms that apply are given in the Glossaries, Section 2.1 of this Training Package.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field 11)
 Maintenance