



Australian Government

MARB3007A Undertake basic maintenance of electrical systems

Release 1

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Modification History

Release 1

This is the first release of this unit.

Unit Descriptor

This unit involves the skills and knowledge required to complete basic maintenance of electrical systems.

Relevant state/territory electrical licensing requirements apply to persons carrying out installation, maintenance and/or repair of electrical circuits or systems that are 50 V alternating current (AC) or above, or 120 V direct current (DC) or above, on a vessel.

Application of the Unit

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW.

This unit applies to engine workers in the maritime industry working as a Marine Engine Driver Grade 2 on vessels up to 750 kW or as a Marine Engine Driver Steam or as a Marine Engine Driver Grade 1 on vessels up to 1500 kW.

WARNING: Relevant state/territory training and qualification requirements need to be fulfilled by any persons carrying out installation, maintenance and/or repair of refrigeration equipment especially with regard to preventing the escape of refrigerants into the atmosphere and to electrical work.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

This unit contains employability skills.

Elements and Performance Criteria Pre-Content

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

- | | |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 Plan maintenance activities | <ul style="list-style-type: none">1.1 Maintenance plan is accessed to determine <i>electrical system maintenance requirements</i>1.2 Inspections are conducted and additional non-routine maintenance requirements are determined1.3 System specifications and diagrams for electrical systems are obtained1.4 Tasks are planned and sequenced in conjunction with others involved in or affected by maintenance work1.5 <i>Consumables and equipment</i> are selected and checked for serviceability |
| 2 Complete preventative maintenance | <ul style="list-style-type: none">2.1 Electrical system is safely isolated according to regulatory and work health and safety (WHS)/occupational health and safety (OHS) requirements2.2 WHS/OHS risk control measures and procedures for carrying out work are followed2.3 Preventative maintenance is carried out in compliance with system specifications2.4 Methods for dealing with unexpected situations are selected on the basis of safety and specified work outcomes2.5 Work is carried out efficiently without waste of materials and damage to equipment and machinery or other services2.6 Maintenance work is checked to verify that it conforms with technical specifications |
| 3 Complete breakdown maintenance | <ul style="list-style-type: none">3.1 <i>Nature of breakdown</i> is confirmed using maintenance records and/or log book entries related to reported breakdown3.2 Restrictions are applied to operations, if necessary, and Master is notified |

- 3.3 Limits of repair work that can be carried out are established according to relevant state/territory electrical licensing requirements
 - 3.4 System is isolated
 - 3.5 Repair work is carried out according to system specifications
 - 3.6 Master is notified of completion of repair work and details are documented
- 4 Clean up and complete documentation**
- 4.1 Work area is cleared and cleaned
 - 4.2 *Materials* are disposed of or recycled according to legislative and workplace requirements
 - 4.3 Tools and equipment are cleaned, checked and stored according to workplace procedures
 - 4.4 Electrical system and equipment are put back into service and monitored for correct operation according to organisational practices
 - 4.5 Maintenance report is completed according to workplace procedures

Required Skills and Knowledge

This section describes the skills and knowledge required for this unit.

Required Skills:

- Carry out simple maintenance of electrical systems
- Implement safe and environmentally responsible work practices
- Read and interpret system specifications

Required Knowledge:

- Battery:
 - charging systems
 - maintenance
 - types and associated hazards
- Connecting batteries in series and parallel
- Connection to shore power
- Earth indicating devices
- Electrical distribution systems
- Isolation of electrical circuits
- Main faults that can occur in:
 - AC electrical systems
 - DC electrical systems
- Maintenance and operation of batteries
- Protection devices
- Single and three-phase AC power
- Starter motors, alternators and associated equipment
- Switchboard and protection devices
- Uses of fuses and circuit breakers
- Use of multi-meter to test voltage and continuity

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, the required skills and knowledge, the range statement and the Assessment Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit

The evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the Elements, Performance Criteria, Required Skills, Required Knowledge and include:

- being aware of own ability and limits to rectify irregularities and faults
- ensuring currency of relevant legislative and regulatory knowledge
- implementing workplace environmental and waste management procedures correctly.

Context of and specific resources for assessment

Performance is demonstrated consistently over time and in a suitable range of contexts.

Resources for assessment include access to:

- industry-approved marine operations site where undertaking basic maintenance of electrical systems can be conducted
- tools, equipment and personal protective equipment currently used in industry
- relevant regulatory and equipment documentation that impacts on work activities
- range of relevant exercises, case studies and/or other simulated practical and knowledge assessments
- appropriate range of relevant operational situations in the workplace.

In both real and simulated environments, access is required to:

- relevant and appropriate materials and equipment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals.

Method of assessment

Practical assessment must occur in an:

- appropriately simulated workplace environment and/or
- appropriate range of situations in the workplace.

A range of assessment methods should be used to assess practical skills and knowledge. The following examples are appropriate to this unit:

- direct observation of the candidate undertaking basic maintenance of electrical systems

Guidance information for assessment

- direct observation of the candidate applying relevant WHS/OHS requirements and work practices.

Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.

In all cases where practical assessment is used it should be combined with targeted questioning to assess Required Knowledge.

Assessment processes and techniques must be appropriate to the language and literacy requirements of the work being performed and the capacity of the candidate.

Range Statement

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below.

- Electrical systems may include:
- AC generators
 - Alarm systems
 - Batteries
 - Emergency electrical supply
 - Emergency generators
 - Generators
 - Motor starting circuits
 - Power and lighting
 - Shore supply
 - Steering gear circuits
 - Switchboards
- Maintenance requirements may include:
- Battery maintenance
 - Motor replacement
 - Replacing:
 - light bulbs
 - faulty wiring
 - Testing:
 - alarm systems
 - emergency generator
 - power and lighting systems
- Consumables and equipment may include:
- Hand and power tools rated for electrical work
 - Replacement parts
 - Test equipment
- Nature of breakdown may include:
- Blown fuses or open circuit breakers
 - Earthing
 - Failure of electricity generating systems
 - Motor brake failure to release
 - Motor failure
 - Shorting
- Materials may include:
- Batteries
 - Damaged wiring
 - Used lamps
 - Rags

Unit Sector(s)

Not applicable.

Competency Field

Equipment Checking and Maintenance