Australian Government

UEENEEH165A Troubleshoot fire protection systems

Release: 2

INDUSTRY
SKILLS
COUNCILS
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UEENEEH165A Troubleshoot fire protection systems

Modification History

Not applicable.

Unit Descriptor

Unit Descriptor	1) Scope:
	1.1) Descriptor
	This unit covers troubleshoot fire protection systems that include multiple connected detection, warning and fire control devices and remote monitoring to the sub-assembly level. The unit encompasses safe working practices, interpreting circuit diagrams, applying logical fault finding procedures, conducting repairs, safety and functional testing and completing the necessary service documentation.

Application of the Unit

Application of the Unit	2)
	This unit is intended for competency development entry-level employment based programs incorporated in approved contracts of training or approved training programs. It may also used to augment formally acquired competencies.

Licensing/Regulatory Information

License to practice	3)
	The skills and knowledge described in this unit require a license to practice in the workplace 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 and where applicable contracts of training such as apprenticeships.

Pre-Requisites

Prerequisite Unit(s)   **4)**

Competencies   **4.1)**

Granting competency in this unit shall be made only after competency in the following unit(s) has/have been confirmed.

UEENEEE101A	Apply Occupational Health and Safety regulations, codes and practices in the workplace
UEENEEE102A	Fabricate, assemble and dismantle utilities industry components
UEENEEE105A	Fix and secure electrotechnology equipment
UEENEEE107A	Use drawings, diagrams, schedules, standards, codes and specifications
UEENEEH161A	Install fire detection and warning system apparatus
UEENEEH162A	Enter and verify programs for fire protection systems
UEENEEH163A	Commission large fire protection systems
UEENEEH164A	Troubleshoot fire protection systems

Literacy and numeracy skills   **4.2)**

Participants are best equipped to achieve competency in 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   5   Writing   5   Numeracy   5

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 Prepare to find and rectify faults	1.1	OHS procedures for a given work area are identified, obtained and understood.
	1.2	OHS risk control measures and procedures are followed in preparation for the work.
	1.3	The likely extent of work to be undertaken is envisaged from fault/breakdown reports and/or discussions with appropriate person(s).
	1.4	Advice is sought from the work supervisor to ensure the work is co-ordinated effectively with others.
	1.5	Sources of materials that may be required for the work are established in accordance with established procedures.

ELEMENT	PERFORMANCE CRITERIA

	1.6	Tools, equipment and testing devices needed to locate faults are obtained in accordance with established procedures and checked for correct operation and safety.
2 Find and repair faults	2.1	OHS risk control measures and procedures for carrying out the work are followed.
	2.2	The need to test or measure live is determined in strict accordance with OHS requirements and when necessary conducted within established safety procedures.
	2.3	Circuits/machines/plant/system interfaces are checked as being isolated where necessary in strict accordance OHS requirements and procedures.
	2.4	Safety hazards resulting from the fault or breakdown are documented and risk control measures devised and implemented in consultation with appropriate personnel.
	2.5	Fault finding is approached methodically drawing on knowledge of fire protection systems and components using measured values of system parameters.
	2.6	System components are dismantled where necessary and parts stored to protect them against loss or damage.
	2.7	Faulty system/components are rechecked and their fault status and confirmed.
	2.8	Materials/replacement parts required to rectify faults are sourced and obtained in accordance with established procedures.
	2.9	Effectiveness of the repair is tested in accordance with established procedures.
	2.10	Apparatus is reassembled, finally tested and prepared for return to service.
	2.11	Unexpected situations are dealt with safely and with the approval of an authorised person.

ELEMENT		PERFORMANCE CRITERIA	
		2.12	Fault finding and repair activities are carried out without unnecessary damage to apparatus, circuits, the surrounding environment or services and using sustainable energy practices.
3	Completion and report fault finding and repair activities	3.1	OHS work completion risk control measures and procedures are followed.
		3.2	Reusable, faulty or worn components are tagged and dispatched for repair to maintain adequate spares.
		3.3	Fault finding and repair work activities are documented in accordance with established procedures.

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

8) Evidence shall show that knowledge has been acquired of safe working practices and finding and repairing faults in fire protection systems.

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

Fire protection systems' faults

Evidence shall show an understanding of technical fault finding to an extent indicated by the following aspects:

2.2.3

T1   Factors to consider in clarifying the nature of a fault encompassing:

- Initial fault report
- Confirmation of symptoms of the fault
- Comparison of symptoms with normal operation

T2   Effect to cause reasoning — assumptions of possible causes

T3   Methods for testing assumptions encompassing:

- Visual inspection
- Sectional testing
- Split-half tests
- Component isolation

T4   Dealing with intermittent faults

Note:

Typical causes of intermittent faults are vibration, shock, changes in temperature and electromagnetic interference.

2.2.4

Evidence shall show an understanding of problem solving concepts and techniques as they apply in the workplace, to an extent indicated by the following aspects:

T1   Identify problems

Note.

Examples may include: Process and quality problems; Equipment selection, availability and failure; Teamwork and work allocation problems; Safety and emergency situations and incident; Performance gaps; Profit improvement and the like.

T2   Mathematical Tools

Note.

Examples may include: Average, Standard deviation and the like.

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REQUIRED SKILLS AND KNOWLEDGE

T3   Use of analytical techniques in problem solving

Note.

Examples may include: Brainstorming; Fishbone diagrams/cause and effect diagrams; Logic trees; Process logic/process requirements; Similarity/difference analysis; Pareto analysis; Force field/SWOT analysis.

T4   Using tools to assistance in problem solving

Note.

Examples may include: Procedures and work instructions; Safety data sheets; Job cards; Maintenance logs; Plant drawing.

T5   Determine corrective action encompassing:

- Tools
- Mode of communication procedure used within each enterprise
- Established work procedures and policies
- Size and structure of the teams/enterprise
- Group goals - team, section, enterprise
- Enterprise specific conflict resolution procedures
- Action plans
- Priority requirements
- Measurable objectives
- Resource requirements
- Methods for reaching objectives
- Timelines
- Safety requirements
- Risk assessment
- Environmental requirements

T6   Communicate recommendations

Note.

Examples may include: Feedback requirements; Corrective action and analysis; Following up recommendations and the like.

T7   Implement Monitoring encompassing:

- Identifying components to be measured
- Measurement and monitoring techniques
- Measurement and monitoring tools

2.9.79

Evidence shall show an understanding of fire protection technologies to an extent indicated by the following aspects:

REQUIRED SKILLS AND KNOWLEDGE

T1   Life and safety concerns for fire protection.

T2   Basic principles of combustion

T3   Bi-products of combustion that can be detected

T4   Basic principles of fire behaviour within and enclosure

T5   Types of fire protection systems and the difference between automatic and passive systems   and wet and dry systems.

Evidence Guide

EVIDENCE GUIDE

9)   The evidence guide provides advice on assessment and must be read in conjunction with the Performance Criteria, Required Skills and Knowledge, the Range Statement and the Assessment Guidelines for this Training Package. .

The Evidence Guide forms an integral part of this unit. It must be used in conjunction with all parts of the 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 must 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.

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 influence decisions about how/how much 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 of this Training Package.

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 – UEE11'. Evidence shall also comprise:

- A representative body of work performance 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 statement
    - Apply sustainable energy principles and practices as specified in the performance criteria and range statement
    - Demonstrate an understanding of the essential knowledge and associated skills as described in this unit. It may be required by some jurisdictions that RTOs provide a percentile graded result for the purpose of regulatory or licensing requirements.

- Demonstrate an appropriate level of skills enabling employment
- Conduct work observing the relevant Anti Discrimination legislation, regulations, polices and workplace procedures

- Demonstrated consistent performance across a representative range of contexts from the prescribed items below:

  - Find and repair faults in fire protection systems as described in 8) and including:

  a. Envisaging the likely extent of work from fault/breakdown reports and discussion with appropriate person(s).

  b. Using methodical fault finding techniques.

  c. Finding faults efficiently.

  d. Rectifying faults effectively.

  e. Completing documentation correctly.

  f. Dealing with unplanned events by drawing on essential knowledge and skills to provide appropriate solutions incorporated in a holistic assessment with the above listed items.

Note:

Successful completion of relevant vendor training may be used to contribute to evidence on which competency is deemed. In these cases the alignment of outcomes of vendor training with performance criteria and critical aspects of evidence shall be clearly identified.

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 part of 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 finding and repairing faults in fire protection systems.

Method of assessment   **9.4)**

This 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 industry to which this unit applies. 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 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 unit shall be demonstrated in relation to:

Both a fire alarm and warning systems that include at least the following system components:

- Fire alarm system with at least 50 input devices, 20 output device and 2 system interface controls
- Fire warning system with at least 50 speakers, 5 interface communication devices and 2 warning indicators.
- Voice message facilities

Note:

1. Input devices can be conventional, analogue or analogue addressable fire detectors, flow switch connections or switch connections and the like.

2. Output devices can be shutdown signal, door or system release controls, solenoid valve controls and the like.

3. System interface controls can be communication signals to remote control and indicating equipment, Building monitoring systems, paging system, colour graphics and or the like.

4. Interface communication devices can be Warden In communication phones, Remote PA inputs and the like.

5. Warning indicators are flashing lights for hearing impaired persons, fire brigade building indication and the like.

Finding and repairing any six of the following faults in fire alarm and warning systems:

- Open-circuit
- Short-circuit
- Incorrect connections
- Insulation failure
- Program failure
- Apparatus/component failure
- Related mechanical failure
- Electrical induced interference
-
- 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 Volume 2, Part 2.1.

Unit Sector(s)

Not applicable.

Competency Field

Competency Field   11)

Electronics