

**Federal Democratic Republic of Ethiopia**

**Occupational Standard**

**ELECTROMECHANICAL EQUIPMENT MAINTENANCE SUPERVISION**

**NTQF Level IV**

*Ministry of Education*

*March 2017*

**Introduction**

Ethiopia has embarked on a process of reforming its Technical and Vocational Education and Training (TVET) System. Within the policies and strategies of the Ethiopian Government, technology transformation by using current international standards and international best practices as the basis, and, adopting, adapting and verifying them in the Ethiopian context – is a pivotal element. TVET is given an important role with regard to technology transfer. The new paradigm in the outcome-based TVET system is the orientation at the current and anticipated future demand of the economy and the labor market.

The Ethiopian Occupational Standard (EOS) is the core element of the Ethiopian National TVET Strategy and an important factor within the context of the National TVET Qualification Framework (NTQF). They are national Ethiopian standards, which define the current and future occupational requirements and expected outcome related to a specific occupation using distinct Unit of Competences without taking TVET delivery into account.

The whole Package EOS document for an occupation is an integrated set of nationally endorsed core generic Unit of Competences organized in to different qualification levels built one upon the other below or side wise to make full occupational profile.

This document details the mandatory format, sequencing, wording and layout for the Ethiopia Occupational Standard which comprised of Units of Competence.

A Unit of Competence describes a distinct work activity. It is documented in a standard format that comprises:

* Occupational title and NTQF level
* Unit title
* Unit code
* Unit descriptor
* Elements and Performance criteria
* Range and Variables
* Evidence guide

Together all the parts of a Unit of Competence guide the assessor/curriculum developer in determining the candidate training and assessment.

The ensuing sections of this EOS document comprise a description of the occupation with all the key components of a Unit of Competence:

* Chart with an overview of all Units of Competence with their Unit Codes and Titles
* Detail contents of each Unit of Competence
* Occupational map providing the TVET providers with information and important requirements to consider when designing training programs using this standards and show a career path

**2. Modification History**

***2.1 Occupational Title:***

This occupational Standard is set for Electromechanical Equipment Maintenance Supervision ranging from Level 4:

**2.3 Description of the Occupation**

**2.3.1 Level Description**

### *NTQF Level IV*

Breadth, depth and complexity of knowledge and competencies would cover a broad range of varied activities or application in a wider variety of contexts most of which are complex and non-routine. Leadership and guidance are involved when organising activities of self and others as well as contributing to technical solutions of a non-routine or contingency nature.

Performance of a broad range of skilled applications including the requirement to evaluate and analyse current practices, develop new criteria and procedures for performing current practices and provision of some leadership and guidance to others in the application and planning of the skills. Applications involve responsibility for, and limited organisation of, others.

**2.3.2 Occupation Description**

The following description contains a summary of the employability competences as identified by the water sector for this qualification. Competent technician at this level is to:

* Plan, monitor and coordinate the whole process of electromechanical equipment maintenance
* Appling the Principles of Hydraulics to Pipe and Channel Flow in water sectors
* Use and Facilitate the Use of System Control and Data Acquisition (SCADA)
* Know how to comply and Produce a work activity Report in work place.

***3. Unit Code:***

There are agreed conventions for the unit codes used for unit of competences organized for any specific occupational standard. Codes are given by considering international and national benchmarks.

**Occupational Title: Electromechanical Equipment Maintenance Supervision**

**Unit Code: EIS EES4 01/02/... 0317**

**Unit Coding is Described Here Under:**

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| **Character**  | **What it stands for:** |
| EIS | First three characters signify *the priority/major industry/sector* acronym. E.g. ***Economic Infrastructure*** |
| EES4 | Four characters in the second group signify the acronym of the occupational title expressed as a work function and qualification level written in numerical form shows the unit belongs. **E.g.** **Electromechanical Equipment Maintenance Supervision** ***Level IV*** |
| 01 | Third group with two numbers signify the numerical order of the specific unit |
| 0317 | Fourth group of four characters signify the month and year of development. **E.g. March 2017** |

*4.* Version Change

The version number is either changed or not, depending on the extent of the change. This Occupational standard is organized in two levels with the same title "Electro-Mechanical Equipment Operation and Maintenance." Those who are responsible to undertake competence assessment and provide training should check for the version review of the document to confirm the latest version number before developing assessment tools and commence training respectively. Users are also advised to contact the agency for any doubts they have on the document or may refer to the website.

**The** development date is the time the document is prepared and validated by relevant industry experts and approved by relevant sector leading the industry. It indicates the effective date to use the document for training and assessment purposes and termination of use of the previous version for any purposes.

The endorsed occupational standards and their components may remain current up to five years from the date of development.

Users of this occupational standard are advised strictly to read and understand the table below for the changes made on the occupational standard during revision process.

**Occupational Title**: **Electro-Mechanical Equipment and Machinery Maintenance**

 **Previous Occupational Level**: 1-4

**Version**: I

**Date of Development**: November 2009

**Modified Occupational** **level Name/Title**: **Electromechanical Equipment Maintenance Supervision**

**New Occupational Level**: 1-4

**Version**: II

**Date of Development/Review**: March 2017

| Occupational Level | Changes on the units | Justification/Remark |
| --- | --- | --- |
|   **IV** | *Retained and Re-Approved Units:* | None  |
| *Merged Units:* | None |
| *Replaced Units:** Organize work Activities
 | Replaced by: Plan and Organize Work |
| *Removed Units:** Prepare Electro- Mechanical Equipment Maintenance Plan
 | Moved to appropriate level III |
| ***New Units Added:**** Plan and Monitor Electro-Mechanical Equipment Maintenance
* Commission Electro Mechanical Equipment and All Auxiliary System
* Develop and Supervise the Implementation of Operational Plan
* Conduct Technical Consultation
* Comply and Produce an Electro Technology Report
* Use and Facilitate the Use of System Control and Data Acquisition (SCADA)
* Monitor and Coordinate Environmental Plans and Procedures
* Apply Principles of Hydraulics to Pipe and Channel Flow
 | Added from bench mark  |

## 5. Occupational Map

## The following occupational map is the current occupational structure in this sector. It also shows titles of occupations, vertical pathways and the level of qualifications.



**UNIT OF COMPETENCE CHART**

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision**  |
| **Occupational Code: EIS EES4** |
| ***NTQF Level IV*****[EIS EES4 02 0317](#EIS_EES4_02_)**Commission Electro Mechanical Equipment and All Auxiliary System**[EIS EES4 03 0317](#EIS_EES4_03_)**Develop and Supervise the Implementation of Operational Plan **[EIS EES4 01 0317](#EIS_EES4_01_)**Plan and Monitor Electro-Mechanical Equipment Maintenance**[EIS EES4 06 0317](#EIS_EES4_06_)**Use and Facilitate the Use of System Control and Data Acquisition (SCADA)**[EIS EES4 05 0317](#EIS_EES4_05_)**Comply and Produce an Electro Technology Report**[EIS EES4 08 0317](#EIS_EES4_08_)**Plan and Organize Work**[EIS EES4 11 0317](#EIS_EES4_11)**Establish Quality Standards**[EIS EES4 14 0317](#EIS_EES4_14)** Manage Micro, Small and Medium Enterprises (MSMEs)**[EIS EES4 13 0317](#EIS_EES4_13)**Utilize Specialized Communication Skills**[EIS EES4 04 0317](#EIS_EES4_04_)**Conduct Technical Consultation |
| **[EIS EES4 07 0317](#EIS_EES4_07_)**Monitor and Coordinate Environmental Plans and Procedures**[EIS EES4 09 0317](#EIS_EES4_09)**Apply Principles of Hydraulics to Pipe and Channel Flow**[EIS EES4 10 0317](#EIS_EES4_10)**Migrate to New Technology**[EIS EES4 12 0317](#EIS_EES4_12)**Develop Individuals and Team**[EIS EES4 15 0317](#EIS_EES4_15)**Apply Problem Solving Techniques and Tools |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Plan and Monitor Electro-Mechanical Equipment Maintenance**  |
| **Unit Code** | **[EIS EES4 01 0317](#EIS_EES4_01_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required in planning maintenance activities and monitoring (oversee) the implementation of maintenance plan for electro-mechanical machineries and equipment, including utilization of resources and following safety procedures. |

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| **Elements** | **Performance Criteria** |
| 1. Plan maintenance activities | * 1. ***Objectives*** are set consistent with and linked to the whole activities and aims of the organization/enterprise
	2. Maintenance activities are identified and categorized based on complexity and internal and external capacities
	3. Workload is determined based on number and type of equipment to be taken care of
	4. Action plan is communicated to the management and end-users of the equipment before execution
	5. Follow up and evaluation mechanism are developed for the implementation of the plan
 |
| 1. Schedule work activities and finalize maintenance plan
 | * 1. Tasks/work activities to be completed are identified and prioritized as directed
	2. Tasks/work activities are broken down into stages in accordance with set time frames and achievable components
	3. ***Resources*** are allocated as per requirements of the activity
	4. ***Schedule of work activities*** is coordinated with personnel concerned
	5. Plan is prepared based on identified and categorized activities with the involvement of concerned personnel
	6. ***Work methods and practices*** are identified in consultation with personnel concerned
	7. Monitoring and performance evaluation are identified and agreed upon
	8. Feedback mechanism is determined and agreed upon
	9. ***Plan*** is reviewed, agreed by appropriate personnel, finalized and presented for approval
	10. Recommended changes to the plan are evaluated for inclusion
	11. Plan is finalized incorporating acceptable changes and in accordance with ***standard procedures***
	12. Finalized maintenance plan is delivered to concerned personnel for implementation and monitoring.
 |
| 1. Check new and used equipment
 | * 1. Materials and equipment are made sure to be regularly checked.
	2. Availability of new and used equipment is monitored.
	3. ***Stock levels*** and order ***spare parts/consumables*** are checked in accordance with company procedure.
	4. Communication between operators, company and suppliers is maintained.
	5. Manufacturer's manuals/company procedures for currency and relevance are checked.
	6. Equipment maintenance and service are organized to minimized downtime.
 |
| 1. Check implementation of maintenance plan
 | * 1. Maintenance activities and schedule are monitored and support is provided whenever necessary
	2. Made sure OHS procedures are implemented/observed
	3. ***Costs*** benefits of replacing defective equipment by purchase or lease are evaluated and recommended.
	4. Issues and problems are identified and recorded
	5. Corrective actions are undertaken at appropriate time and in accordance with company standard procedures
	6. Sources are arranged/coordinated for obtaining back up or replacement equipment
	7. Personnel are monitored to carry out maintenance tasks in regard to ***working condition*** and ***practices***.
	8. Required reports are prepared and submitted in accordance with company standards
 |
| 1. Improve work process and staff
 | * 1. Maintenance policy and procedures are documented and discussed with concerned personnel
	2. Staff upgrading schemes are planned and implemented to improve performance
	3. Team spirit and favourable working environment are established
	4. Critical issues are identified and addressed in accordance with company policy and guidelines
	5. Work improvement and processes are recommended for decision makers’ approval
	6. Necessary documentation and reporting are accomplished and submitted based on company standard procedures
 |
| 1. Notify completion of work
 | * 1. Final checks are made to ensure that work conforms with instructions and job requirements
	2. Appropriate officer and staff are notified upon completion of work
	3. Tools, equipment and any excess resources and materials are cleaned, checked and returned to storage area in accordance with enterprise procedures
	4. Work area is cleaned up and made safe in accordance with OHS requirements
	5. Necessary documentation and reporting are accomplished in accordance with enterprise standard procedures
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| **Variable** | **Range** |
| Objectives  | May include, but not limited to:* + Specific and General
 |
| Resources | May include, but not limited to:* + Personnel
	+ Equipment and technology
	+ Services
	+ Supplies and materials
	+ Sources for accessing specialist advice
	+ Budget
 |
| Schedule of work activities | May include, but not limited to:* + Daily/Weekly/Monthly
	+ Work-based
	+ Contractual
	+ Regular
	+ Job out
 |
| Work methods and practices | May include, but not limited to:* + Legislated regulations and codes of practice
	+ Industry regulations and codes of practice
	+ Occupational health and safety practices
 |
| Plan | May include, but not limited to:* + Daily work plans
	+ Project plans
	+ Program plans
	+ Resource plans
 |
| Standards procedures | May include, but not limited to:* + Performance targets
	+ Performance management and appraisal systems
	+ Employment contracts
	+ Client contracts
	+ Discipline procedures
	+ Workplace assessment guidelines
	+ Internal quality assurance
	+ Internal and external accountability and auditing requirements
	+ Safety standards
 |
| Stock levels | May include, but not limited to:* + Two bin system
	+ Re-order level system
	+ Re-order cycle system
	+ Any of the above operating with computer assistance
	+ Replenishment system
 |
| Spare parts and consumables  | May include, but not limited to:* + Spare parts catalogue and other documents
	+ Lists in manufactures' handbooks and other documents
	+ Labels, bar codes etc, on items
 |
| Costs | May include, but not limited to:* + Plant equipment and hire
	+ Fuel, materials
	+ Maintenance and downtime
 |
| Working conditions  | May include, but not limited to:* + Night time operations
	+ Day time operations
	+ Hot climates
	+ Cold climates
	+ Wet weather conditions
	+ High wind
 |
| Working practices  | May include, but not limited to:* + Individual operation and team operation
	+ Use of personal protective equipment
	+ Consideration of toxic substances
	+ Continuous communication maintained
	+ Reacting to on-site emergencies
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* + Set objectives
	+ Planned and scheduled work activities
	+ Reviewed and evaluated maintenance plan and activities
	+ Finalized maintenance plan
	+ Made schedules/timelines for equipment maintenance
	+ Planned and organized maintenance works
	+ Interpreted operational safety in compliance with appropriate legislation
	+ Arranged checklists of materials/spares parts
	+ Prepared an effective stock control system
	+ Undertaken application of estimations and calculations of time/costs of repairing, replacing, servicing
	+ Demonstrated the ability to transfer the competence to changing circumstances
 |
| Underpinning Knowledge | Demonstrates knowledge of:* + Planning concept and procedures
	+ Organization’s strategic plan, policies rules and regulations, laws and objectives for work unit activities and priorities
	+ Organizations policies, strategic plans, guidelines related to the role of the work unit
	+ Team work and consultation strategies
	+ Maintenance procedures
	+ Site and equipment safety requirements
	+ Processes for the calculation of material requirements
	+ Materials safety data sheets and materials handling methods
	+ Equipment and ancillary attachment characteristics, technical capabilities and limitation
	+ Wear parts and relative frequency of replacement
	+ Purpose of stock control
	+ Financial transactions (e.g. Cash flow, cost benefit analysis)
 |
| Underpinning Skills | Demonstrates skill of:* + Planning
	+ Leading
	+ Coordinating
	+ Communication skills
	+ Inter-and intra-person/motivation skills
	+ Presentation skills
	+ Check and maintain stocks
	+ Conduct cost benefit analysis
	+ Order equipment/consumables
	+ Complete reports
	+ Supervise maintenance procedures and processes
	+ Safe work methods
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* + Interview/Written Test
	+ Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Commission Electro Mechanical Equipment and All Auxiliary System** |
| **Unit Code** | **[EIS EES4 02 0317](#EIS_EES4_02_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, skill and attitudes in commissioning electro mechanical equipment and all auxiliary system used in industrial establishments based on the required performance standards.  |

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| **Elements** | **Performance Criteria** |
| 1. Plan and prepare commissioning activities | * 1. Work instructions are confirmed to immediate to ensure clear understanding of job requirements
	2. ***Commissioning procedures*** are planned according to job requirements
	3. Materials and ***Personal Protective Equipment (PPE)*** needed to complete job requirements are obtained in line with established procedures
	4. ***Tools, equipment and testing devices*** needed for commissioning procedures are obtained, estimated and inspected for compliance with the job specifications
	5. ***Potential hazards*** are identified and prevention and/or control measures are selected in accordance with the work plan and site procedures
	6. Commissioning activities are coordinated with the end-user or the department involved in accordance with the established procedures
 |
| 2. Commission electro mechanical equipment/systems | * 1. Safety policies and procedures are followed in accordance with duly accepted international safety standards
	2. ***Electro mechanical testing criteria*** are followed in line with job requirements and established procedures
	3. Electro mechanicalequipment/systems are commissioned in line with the established procedures
	4. Unforeseen events are responded in line with established procedures
	5. Records, electrical plans and schematic diagrams are revised /updated according to changes incurred during commissioning
	6. Test data forms are filled-out and submitted to immediate superior for evaluation
 |
| 3. Turn-over electrical equipment/systems | * 1. Final inspection is undertaken to ensure that commissioning of electrical system meets job requirements
	2. Tools, equipment and any excess resources and materials are cleaned, checked and returned to storage area in accordance with enterprise procedures
	3. Written report is prepared and submitted to immediate superior in accordance with enterprise procedures
	4. Monitoring data sheet for the newly installed system is accomplished based on the job requirements
	5. Orientation and technical assistance is provided to prospective operators based on company procedures.
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| **Variable** | **Range** |
| Commissioning procedures | May include, but not limited to:* Formulate checklist of machine and
* Equipment parts
* Check completeness of installation based on plans/diagrams
* Perform electro mechanical testing
* Perform no-load and load testing
* Perform monitoring of meters and gauges
* Orient end-user regarding systems operations
* Turn over electrical equipment to end-user
 |
| PPE | May include, but not limited to:* Working gloves
* Safety shoes
* Hard hat
* Face shield
* Insulating mat
* Ear plug
 |
| Tools, equipment and testing devices | May Include but are not limited to:* Electrical hand tools:
	+ Pliers
	+ Screwdrivers
	+ Wrenches
	+ Wire splicers
	+ Electrician knives
* Testing instruments:
	+ Multi-tester (VOM)
	+ Ammeter
	+ Insulation resistance tester
	+ Ground resistance tester
	+ Lux meter
	+ Thermal scanner
	+ Flow meter
	+ Pressure gauge
	+ Pressure Analyzer/ Gauge manifold
	+ Leak tester
* Labeling machine
* Warning signages
* Lock-out/Tag-out
* Phase-sequence indicator
* Thermometer
* Tachometer
* Telephone/telephone handset
 |
| Potential hazards | May include, but not limited to:* Live wires
* Oil spill
* Chemical hazards
* Flammable materials
* Sources of energy
* Moving machine parts
* Sharp/pointed objects
* Noise hazards
* Confined space
 |
| Electro mechanical testing criteria | May include, but not limited to:* Continuity test:
	+ Completely filled-up continuity test report
	+ Instrument calibrated and certified annually
	+ Used of appropriate test instrument (e.g. analog/digital, multi-meter or ohmmeter)
	+ All tools, instrument, equipment and materials in proper place without unnecessary things within work perimeter
* Electrical insulation test:
	+ Appropriate instrument is used in the testing
	+ Megger test data sheet filled-up completely
	+ Accuracy of test result obtained within tolerable limit
	+ Instrument calibrated and certified annually
* High potential test:
	+ Appropriate instrument is used in the testing
	+ Instrument calibrated and certified annually
	+ Test Data Sheet completely filled-up
* Earth resistance test:
	+ Appropriate instrument is used in the testing
	+ Instrument calibrated and certified annually
	+ Test report completely filled-up
	+ Test reading accuracy is obtained with tolerance limit
* Phase sequence test:
	+ Appropriate instrument is used in the testing
	+ Tagging power line in accordance of phase sequence results
	+ from the main distribution panel down to the load
	+ Completely filled-up report in accordance with the test result
* Load test:
	+ Appropriate instrument is used in the testing
	+ Load test reading accuracy within tolerance limit
	+ Test Data Sheet completely filled-up
* Voltage test:
	+ Appropriate instrument is used in the testing
	+ Accuracy of test result is obtained within tolerable limit
	+ VoltageTest Data Sheet properly filled-up
* Winding resistance test:
	+ Appropriate instrument is used in the testing
	+ Instrument calibrated and certified annually
	+ Winding Resistance Test Data Sheet completely filled-up
	+ Accuracy of test result is obtained within tolerable limit
* Polarization Index (P.I.) test:
	+ Appropriate instrument is used in the testing
	+ Polarization Index Test Data Sheet filed-up completely
	+ Followed Polarization Index Test procedures
	+ Instrumentcalibrated and certified annually
* Lock rotor test:
	+ Appropriate instrument is used in the testing
	+ Test report completely filled-up
	+ Test reading accuracy is obtained within tolerable limit
* Free running test:
	+ Appropriate instrument is used in the testing
	+ Test reading accuracy is obtained within tolerable limit
	+ Test reportcomplete filled-up
* Open/short circuit test:
	+ Appropriate instrument is used in the testing
	+ Instrument calibrated and certified annually
	+ Test reading accuracy is obtained with tolerable limit
	+ Test report completely filled-up
* Transformer turn ratio test:
	+ Appropriate instrument is used in the testing
	+ Instrument calibrated and certified annually
	+ Test reading accuracy is obtained with tolerable limit
	+ Completely filled-up TTR portion of Transformer Test Data Sheet
* Dielectric strength test:
	+ Appropriate instrument is used in the testing
	+ Test DataSheet completely filled-up
* Voltage excitation test:
	+ Appropriate instrument is used in the testing
	+ Reading accuracy of test result is obtained within tolerable limit
	+ Test Data Sheetcompletely filled-up
* Energizing electrical system:
	+ Appropriate instrument is used in the testing
	+ Final check for loose connection, wire arrangement, cleanliness, enclosure appearance insulation resistance measurement in the presence of commission’s team as per client standard requirement
	+ Energize equipment one-by-one
	+ Voltage and current measurement within tolerable limit base on equipment nameplate in the presence of commissioning team
	+ Completelyfilled-up record form for all measurement
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| **Evidence Guide** |
| Critical aspect of competency | Assessment requires evidence that the candidate:* Planned commissioning procedures in line with job requirements
* Prepared/obtained materials, PPE, tools, equipment and testing devices in line with established procedures and job specifications
* Demonstrated compliance with safety regulations applicable to worksite operations
* Performed commissioning activities in line with established procedures
* Undertaken final inspection to ensure commissioning electro mechanical system meet job requirements
* Communicated effectively with others to ensure safe and

effective work operations* Prepared complete report of commissioned electro mechanical equipment/ system
* Demonstrated good working attitudes
 |
| Underpinning knowledge | Demonstrates knowledge of:* Handling of equipment, tools, materials and consumables
* Standard operating procedure in energizing electrical system
* Measurement
* Knowledge on how to operate the test instruments
* Interpretation of electrical plans/shop drawings
* Electrical Laws and Principles
* Pneumatics and Electro-Pneumatics/Hydraulic
* Computer Operations
* Environmental laws
* Occupational Health and Safety procedures
 |
| Underpinning skills | Demonstrates skills in:* Interpreting plan and details
* Tracing circuits
* Performing electrical test
* Using test instruments
* Troubleshooting skills
* Performing first-aid
* Hazards prevention/control measures
* Practicing safe working habits
* Operating computers
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Develop and Supervise the Implementation of Operational Plan** |
| **Unit Code** | **[EIS EES4 03 0317](#EIS_EES4_03_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required to develop and supervise the implementation of operational plan and to provide efficient and effective workplace practices within the organization’s productivity and profitability plans.  |

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| **Elements** | **Performance Criteria** |
| 1. Develop operational plan
 | * 1. Resource requirements are researched, analyzed and documented and an operational plan is developed and/or implemented in consultation with ***relevant personnel, colleagues and specialist resource managers***
	2. ***Consultation processes*** are developed and/or implemented as an integral part of the operational planning process
	3. ***Operational plans*** are developed to contribute to the achievement of the organization’s performance/business plan
	4. Details of the operational plan has included the development of ***key performance*** ***indicators*** to measure organizational performance
	5. ***Contingency plans*** are developed and implemented at appropriate stages of operational planning
	6. The development and presentation of proposals for resource requirements are assisted by a variety of information sources, and specialist advice is sought as required
 |
| 1. Plan and schedule work activities
 | * 1. Tasks/work activities to be completed are identified and prioritized as directed
	2. Tasks/work activities are broken down into achievable components in accordance with set time frames
	3. Resourcesare allocated as per requirements of the activity
	4. Schedule of work activitiesis coordinated with personnel concerned
 |
| 1. Plan and manage resource acquisition
 | * 1. Strategies are developed and implemented to ensure that employees are recruited and/or inducted within the organization’s human resource management policies and practices
	2. Strategies are developed and implemented to ensure that physical resources and services are acquired in accordance with the ***organization’s policies, practices and procedures***
 |
| 1. Monitor and review operations
 | * 1. Performance systems and processes are developed, monitored and reviewed to assess progress in achieving profit and productivity plans and targets
	2. Budget and actual financial information is analyzed and interpreted to monitor and review profit and productivity performance
	3. Areas of underperformance are identified, solutions recommended, and prompt action is taken to rectify the situation
	4. Implementation of developed systems are monitored to ensure that mentoring and coaching are provided to support individuals and teams to use resources effectively, economically and safely
	5. Recommendations for variations to operational plans are negotiated and approved by ***designated persons/groups***
	6. Systems are developed and implemented to ensure that procedures and records associated with documenting performance are managed in accordance with the organization’s requirements
 |
| 1. Review and evaluate work performance
 | * 1. Work plans, strategies and implementation are reviewed based on accurate, relevant and current information
	2. Outcomes of work plans and reliable feedback are reviewed based on comprehensive consultation with appropriate personnel on
	3. Results of review are provided to concerned parties and formed as the basis for adjustments/simplifications to be made to policies, processes and activities
	4. Performance appraisal is conducted in accordance with organization rules and regulations
	5. Performance appraisal report is prepared and documented regularly as per organization requirements.
	6. Recommendations are prepared and presented to appropriate personnel/authorities
	7. ***Feedback mechanisms*** are implemented in line with organization policies
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| **Variable** | **Range** |
| Relevant personnel, colleagues and specialist resource managers | May include, but not limited to:* Managers
* Supervisors
* Other employees
* OHS committee(s) and other people with specialist responsibilities
* Union or employee representatives
* People at the same level or more senior managers
* People from a wide range of social, cultural and ethnic backgrounds
 |
| Consultation processes | May include, but not limited to:* Meetings, interviews, brainstorming sessions, email/internet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans
* Mechanisms used to provide feedback to the work team in relation to outcomes of consultation
 |
| Operational plans | May include, but not limited to:* Tactical plans developed by the department or section to detail product and service performance
* Organizational plans
 |
| Key performanceindicators | Include but not limited to:* Measures for monitoring or evaluating the efficiency or effectiveness of a system which may be used to demonstrate accountability and to identify areas for improvements
 |
| Contingency plans | May include, but not limited to:* Rental, hire purchase or alternative means of procurement of required materials, equipment and stock
* Contracting out or outsourcing human resource and other functions or tasks
* Strategies for reducing costs, wastage, stock or consumables
* Diversification of outcomes
* Recycling and re-use
* Finding cheaper or lower quality raw materials and consumables
* Seeking further funding
* Increasing sales or production
* Risk identification, assessment and management processes
* Succession planning
 |
| Organization’s policies, practices and procedures | May include, but not limited to:* Those organizational guidelines which govern and prescribe operational functions, such as the acquisition and management of human and physical resources
* Standard operating procedures
* Undocumented practices in line with organizational operations
* Organizational culture
 |
| Designated persons/groups | May include, but not limited to:* Managers or supervisors whose roles and responsibilities include decision making on operations
* Other work groups or teams whose work will be affected by recommendations for variations
* Groups designated in workplace policies and procedures
* Other stakeholders such as Board members
 |
| Feedback mechanisms | May include but not limited to: |
| * Verbal feedback
* Informal feedback
* Formal feedback
* Questionnaire
* Survey and Group discussion
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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge in:* Developing operational plan
* Planning and managing resource acquisition
* Monitoring and reviewing operational performance
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Relevant legislation from all levels of government that affects business operation, especially in regard to occupational health and safety and environmental issues, equal opportunity, industrial relations and anti-discrimination
* The principles and techniques involved in the management and organization of:
* Planning and managing operations
* Consultation and communication
* Contingency planning
* Resource planning and acquisition
* Resource management systems
* Budgeting and financial analysis and interpretation
* Monitoring and review of performance systems and processes
* Reporting performance
* Problem identification and resolution
* Alternative approaches to improving resource usage and eliminating resource inefficiencies and waste
* Ways of supporting individuals/teams who have difficulty in performing to the required standard
 |
| Underpinning Skills | Demonstrates skills to:* Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
* Functional literacy skills to access and use workplace information
* Monitor and review a safe workplace and environment
* Access and use feedback to improve operational performance
* Prepare recommendations to improve operational plans
* Access and use established systems and processes
* Coach and mentor skills to provide support to colleagues
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Conduct Technical Consultation** |
| **Unit Code** | **[EIS EES4 04 0317](#EIS_EES4_04_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, attitudes and skills required to conduct technical consultation, provide recommendation and solution for technical problems and operation procedures, improve the performance of operation & maintenance services and proposed guidelines and systematic approach on maintenance practices within the organization and to enhance the productivity and smooth operation of the industry. |

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| **Elements** | **Performance Criteria** |
| 1. Conduct inspection
 | * 1. Industry are inspected and technical problems addressed, analysed and document prepared for evaluation and consultation with ***technical personnel, specialist and technical manager***
	2. ***Consultation processes*** are developed and/or implemented as an integral part of the operational planning process
	3. ***Evaluation and work plans*** are developed to create a systematic solution for the technical problems
 |
| 1. Evaluate technical problems
 | * 1. Technical problems are identified, evaluated and systematic solution/remedy is created and prioritized as directed
	2. ***Required resources*** are allocated as per requirements of the activity
 |
| 1. Prepare technical recommendation
 | * 1. ***Established OHS*** and risk control measures and procedures are followed in preparation for the work.
	2. ***Policies and procedures*** are developed to include OHS practices, skills required and frequency and level of maintenance work.
	3. Project proposal are reviewed and ensure that all necessary documents, manuals and checklist are obtained
	4. ***Schedule of work activities*** is prepared according to manufacturer’s recommendations
	5. Appropriately competent persons are engaged to assess the risks associated with individual equipment failure.
	6. Level and frequency of repair/replace to be done under maintenance work is established from risk assessment reports and manufacture’s recommendations and standards reflecting acceptable exposure to risk of equipment failure.
	7. Systems are established to manage and record technical work activities in accordance with organization and regulatory requirements
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| **Variable** | **Range** |
| Technical personnel, specialist and technical manager | May include, but not limited to:* Managers
* Supervisors
* Other employees
* OHS committee(s) and other people with specialist
* Responsibilities
* Union or employee representatives
* People at the same level or more senior managers
* People from a wide range of social, cultural and ethnic backgrounds
 |
| Consultation processes | May include, but not limited to:* Meetings, interviews, brainstorming sessions, email/internet communications, newsletters or other processes and devices which ensure that all employees have the opportunity to contribute to team and individual operational plans
* Mechanisms used to provide feedback to the work team in relation to outcomes of consultation
 |
| Evaluation and work plans | May include, but not limited to:* Measures for monitoring or evaluating the efficiency or effectiveness of a which may be used to demonstrate accountability and to identify areas for improvements
 |
| Required resources | May include, but not limited to:* Work description are establish and prepared
* Tools and material
* Designated persons/group based on their own specialization
* Manuals and manufacturers guide
 |
| Established OHS | May include, but not limited to:* Hazard and risk assessment mechanisms
* Implementation of safety regulations
* Safety training and systems incorporating,
* Work clearance procedures
* Isolation procedures
* Gas and vapor
* Monitoring/testing procedures
* Use of protective equipment and clothing
* Use of codes of practice
 |
| Policies and procedures | Include but not limited to:* Pro-active maintenance procedures
* Re-active maintenance procedure
* Operation and servicing procedures
* Health and safety procedures
 |
| Schedule of work activities | May include, but not limited to:* Tasks/work activities to be completed are identified and prioritized as directed
* Tasks/work activities are set into achievable components in accordance with time frames
* Resources are allocated as per requirements of the activity
* Schedule of work activities is coordinated with personnel concerned
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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge in:* Analyzing electrical and mechanical faults
* Operation and servicing procedures
* Provide technical recommendation
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Electromechanical device and equipment installation
* Maintaining and servicing Industrial Electromechanical device and/or Machines & Drives
* Fundamentals of troubleshooting and repair of Electromechanical device and/or Machines & Drives
* Code of practice in industrial Electromechanical device and/or Machines & Drives installation
* Basic consultancy training
* Codes of practice and guidelines for the organization
* Organizations policy and procedures for negotiations
* Decision making and conflict resolution strategies procedures
* Problem solving strategies on how to deal with unexpected questions and attitudes during negotiation
* Flexibility& Empathy
 |
| Underpinning Skills | Demonstrates skills in:* Trouble shoot and repair electro mechanical equipment
* Interpersonal skills to develop rapport with other parties
* Communication skills (verbal and listening)
* Observation skills
* Negotiation skills
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title** | **Comply and Produce an Electro Technology Report** |
| **Unit Code** | **[EIS EES4 05 0317](#EIS_EES4_05_0317)** |
| **Unit Descriptor** | This unit covers complying and producing an electro technology report. It encompasses determining the safety requirements are met and all regulatory responsibilities are adhered to. The person competent in this unit must demonstrate an ability to identify information sources and collect, analyze& format information applicable to the electro technology industry and produce a report as required. |

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| **Element**  | **Performance criteria** |
| 1 Prepare to develop a report | * 1. ***Occupational Health and Safety(OHS)*** processes and procedures for a given work area are identified, obtained and understood.
	2. Established techniques for report writing are reviewed and adopted in accordance with organization policies.
	3. The scope of the report is evaluated and report parameters/***material*** established using a formal evaluation/survey processes.
	4. Criteria from other related works impacting on the report are determined from other sources.
	5. Identify source and availability of information
 |
| 2. Develop report. | * 1. Report is developed to include scenarios/requirements established in consultation with appropriate person(s), and regulatory requirements.
	2. Report is developed in collaboration with all relevant personnel.
	3. Competent persons are identified to assist in the compilation of the report.
	4. Report is reviewed against all inputs and adjusted to rectify any anomalies.
	5. Compile report in accordance with organization policies and procedures.
 |
| 3 Obtain approval for final report | * 1. Report is presented and discussed with higher concerned person(s)
	2. Alterations to the report resulting from the presentation/discussion are negotiated with higher concerned person(s) within the constraints of organization policy.
	3. Final report is presented and approval obtained from appropriate person(s).
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| **Variables** | **Range**  |
| OHS | May include, but not limited to:* Apply OHS requirements in accordance with regulations/codes of practice and enterprise safety policies and procedures. This may include:
* Using of relevant protective clothing and equipment,
* Use of tooling and equipment, workplace environment and safety handling of material,
* Use of firefighting equipment, enterprise first aid, hazard control and hazardous materials and substances.
* Using Chemical prove gowns, rubber boots of appropriate size, Goggles, respirators, helmet, and head phones , gloves etc,
* Following Occupational health and safety procedures designated for the task
* Checking and fulfilling required safety devices before starting operation
* Apply safe operating procedures regarding:
* Electrical safety,
* Machinery movement and operation,
* Manual and mechanical lifting and shifting,
* Working in proximity to others and site visitors.
* Apply emergency procedures:
* Emergency shutdown and stopping of equipment,
* Using extinguishing fires, first aid application and site evacuation
 |
| Material  | May include, but not limited to:* Manual
* Catalogues
* Internet
* Equipment-performance and manufacturer’s information background
* Procurement directives
* Regulatory information & standards, and senior expertise, reference books, enterprise quality management system procedures
 |
| Tools and equipment | May include, but not limited to:* Computer, printer and auxiliary equipment
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| **Evidence Guide** | **Description** |
| Critical aspects of Assessment | Assessment requires evidence that the candidate:* 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
* Compile and produce an electro mechanical technology report as described in unit scope and including:
* Typical organisation policies and procedures.
* Access to a report brief to established report parameters.
* Access to appropriate person(s) to establish report requirements.
* Establishing the scope and parameters of the report.
* Determining the impact of other related works.
* Developing design brief incorporating scenarios and all requirements.
* Appropriate computer application.
* Identifying competencies required for the report.
* Documenting report proposal.
* Negotiating alterations to the proposed report successfully.
 |
| Underpinning knowledge | Demonstrates knowledge of:* Enterprise communication methods
* Technical report writing concepts
* Occupational Health and Safety, enterprise responsibilities
 |
| Underpinning skill  | Demonstrates skills to:* Record enterprise work activities
* Use computer basics
* Engineer analysis, decision making and reporting
* Work in a team
* Use data collection techniques
* Apply data analysis and presentation
* Follow Occupational Health and Safety, enterprise responsibilities
* Develop technical report
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Use and Facilitate the Use of System Control and Data Acquisition (SCADA)** |
| **Unit Code** | **[EIS EES4 06 0317](#EIS_EES4_06_0317)** |
| **Unit Descriptor** | This unit of competency covers the skills and knowledge required by a team leader or technical expert to personally use and facilitate the use of System Control and Data Acquisition (SCADA), or other similar systems, and support the team in their use of SCADA. |

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| **Elements** | **Performance Criteria** |
| 1. Identify scope of SCADA system | * 1. Categories of information held in and ***control options*** ***of SCADA*** system relevant to team or area are identified.
	2. Range of information able to be provided to SCADA system by team are identified.
	3. Range of information able to be provided to team by SCADA system are identified.
	4. Team or area functions impacted by SCADA system are identified.
 |
| 2.Communicate using SCADA system | * 1. Information and messages are sent and received using SCADA.
	2. Telephone Modem, (PLL), (DDS) and ISP are chosen.
	3. Radio Transmission System is chosen.
	4. Satellite Transmission System is chosen.
	5. Dedicated Wire/Power Line Modems are chosen.
 |
| 3. Make decisions using SCADA | * 1. The SCADA system is interrogated to find required current, historical or predicted information.
	2. Actions appropriate to the information are taken.
 |
| 4. Monitor the use of SCADA | 1. SCADA information is routinely monitored.
2. ***Poor uses of SCADA*** system are identified within team and system inadequacies.
3. System improvements required are identified.
4. Action is taken to improve SCADA system and its use.
 |
| 5. Support team use of SCADA | 1. Team is regularly communicated with, both using SCADA-based communication and face to face.
2. Skill improvement needs are identified.
3. Team members who require additional support are identified.
4. Action is taken to provide support according to procedures.
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| **Variable** | **Range** |
| Control options of SCADA | May include, but not limited to:* Push-buttons and switches.
* Programmable controllers.
* I/O modules.
* Operator interfaces.
* Development software packages.
* Industrialized computers.
* specialized PLC-based hardware and software that support process
* Control, motion control, and AC/DC drives.
 |
| SCADA | May include, but not limited to:* General term applied to a number of systems which automatically collect critical process data, perform required mathematical manipulations on it and then make control decisions and/or give required information personnel for action.
* Systems often used in manufacturing but can also be used in other industries. In the continuous sector, the SCADA system is sometimes integrated into other sophisticated computer control systems, such as Distributed Control System (DCS) and these systems do merge in advanced systems. These organisations may simply refer to their SCADA as the DCS or other similar term (such as the proprietary name of the computer system)
* Water treatment and distribution
* Waste water collection and treatment
* Electrical power transmission and distribution oil and gas pipeline monitoring and control
 |
| Poor uses of SCADA | May include, but not limited to:* Transmission is costly for long, frequent data collection from remote sites.
* The lines can contain impairments that can cause modems to have error
* Rates of less than 1 error per 1,000,000 bits.
* The media cannot be used in areas that do not have access to the network,
* Such as an offshore oil or gas well.
* Time is required to dial and establish each connection.
* Additional logic is required to automatically initiate a connection.
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| **Evidence Guide** |
| Critical Aspects of Competence | Assessment requires evidence that the candidate:* Identify team or area information and operations requirements and relate to SCADA system
* Lead and motivate others in using SCADA system
* Obtain regular and one-off information from SCADA system
* Make decisions using SCADA generated information.
 |
| Underpinning Knowledge | Demonstrates knowledge of:* Hierarchy of SCADA system and operation
* Information available from and controls exercised by/through the SCADA system
* Query, control and other facilities and information offered
* Support skill development mechanisms available for access by team member
 |
| Underpinning Skills | Demonstrates skills of:* Entering and receiving information via SCADA terminals
* Communicating with team and organisation SCADA support personnel
* Engaging and motivating team in use of SCADA system
* Identifying team or work area information requirements
* Identifying scope of team or area processes controlled by SCADA system
* Planning and organizing improvements in team’s use of SCADA
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Monitor and Coordinate Environmental Plans and Procedures** |
| **Unit Code** | **[EIS EES4 07 0317](#EIS_EES4_07_0317)** |
| **Unit Descriptor** | This unit of competency describes the outcomes required to monitor and coordinate the application of environmental plans and procedures to specific projects and to develop environmental procedures for the local work area. |

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| **Elements** | **Performance Criteria** |
| 1. Determine relevant environmental plans and procedures**.**
 | 1. Environmental plans and procedures are identified and relevance to specific projects or work sites is determined.
2. Relevant environmental plans and procedures are interpreted in relation to specific project or site activities.
 |
| 1. Implement environmental plans and procedures**.**
 | 1. Environmental risks and impacts are identified.
2. Environmental risks are managed and minimised.
3. Emergency procedures are applied.
4. Activities are carried out according to environmental plans and procedures.
5. Effective participation and contribution are maintained.
 |
| 1. Develop project or site specific environmental procedures**.**
 | 1. The need for project or site specific environmental procedures is assessed.
2. Stakeholders are consulted and issues and concerns addressed.
3. Specific project or site environmental procedures are developed.
4. Specific project or site environmental procedures are reviewed and reported according to organisational procedures and statutory requirements.
 |
| 1. Control environmental incidents**.**
 | 1. Environmental incidents are identify and appropriate control measures applied.
2. Environmental incidents are analysed to prevent recurrence.
3. Environmental incidents are recorded and reported; and environmental management documentation completed according to organisational requirements.
 |
| 1. Monitor and report on environmental plans and procedures**.**
 | 1. The implementation of environmental plans and procedures is monitored and reported according to organisational requirements.
2. Environmental risks are reported according to organisational procedures.
3. Participation is ensured by the relevant work force in reviews of environmental procedures and reported according to organizational requirements.
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| **Variable** | **Range** |
| Environmental plans and procedures | May include, but not limited to:* National, state or local government policies or local government or regional development plans concerning:
* Water resources
* Industry and cross industry issues
* Business, corporate or enterprise issues
* Cultural and heritage issues
* Conservation
* Flora and fauna
* Waste disposal
* Coastal protection
* Groundwater protection
* Irrigation
* Salination control
* Pollution and litter control
* River and surface water systems
* Chemical management and Biological control
* Organisational procedures, including:
* Minimization of waste materials
* Proper disposal of waste materials
* Restriction of burning off
* Correct handling of toxic substances
* Containment of chemicals such as chlorofluorocarbons
* Minimization of factors that contribute, directly or indirectly, to the production of greenhouse gases
* Correct use of enterprise vehicles and machinery
* Reuse or recycling of trade materials where possible
* Overall reduction of energy usage through general awareness and the use of appropriate technologies
 |
| Specific projects or work sites | May include, but not limited to:* Buildings
* Plants
* Construction and maintenance sites
* Workshops
* Laboratories
* Bulk water storage sites
* Surface or groundwater sites
* Catchments
* Flood plains irrigation sites
* Wetlands
* Drainage sites
* Waste disposal sites
 |
| Environmental risks and impacts | May include, but not limited to:* Risks, including:
* Impact of mismanagement of chemicals
* Impact of mismanagement of biological agents
* Detrimental impact on limited water resources
* Spillage
* Waste disposal
* Detrimental impact on water catchment areas (urban and non-urban)
* Detrimental impact on rivers, waterways and channels
* Unsatisfactory water and wastewater treatment processes
* Unsatisfactory trade waste treatment and disposal processes
* Poor construction processes
* Planning deficiencies
* Incidents of environmental impact, including:
* Emissions to air
* Releases to/of water
* Releases to land
* Vibration and noise
* Disposal of waste
* Contamination of land
* Impact on communities
* Destruction of habitat
* Use of energy sources
* Waste generation processes and technologies
* Impact on culturally significant sites
* Incidents may involve the implementation of emergency responses
 |
| Stakeholders | May include, but not limited to:* The enterprise
* All levels of government
* Industry (e.g. Extractive, other utilities, manufacturing)
* Community action groups
* Environmental conservation groups
* Land care groups
* Primary producers
* The general community and individuals
* Indigenous and Torres Strait Islander groups
 |
| Organisational and procedures and statutory requirements | May include, but not limited to:* Environmental legislation, including:
* Relevant federal legislation
* Relevant state or territory legislation
* Relevant local government by-laws
* Relevant government and quasi government policies and regulations
 |
| Environmental management documentation | May include, but not limited to:* Information on applicable environmental laws or other requirements
* Complaint records
* Training records
* Process information
* Process operational logbooks
* Inspection, maintenance and calibration records
* Relevant contractor and supplier information
* Incident reports
* Information on emergency preparedness and response
* Records of significant environmental impacts
* Chain of custody and compliance records
* Audit results and Management reviews
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| **Evidence Guide** |
| Critical Aspects of Competence | Must demonstrate knowledge and skills competence to:* Identifying and analysing environmental plans and procedures relevant to a representative variety of projects and work sites
* Interpreting and implementing relevant environmental plans and procedures for a typical project or work site
* Developing site- or project-specific environmental plans and procedures for an atypical project or work site, including consultation with stakeholders
* Managing environmental incidents
* Monitoring, reporting and reviewing the implementation of environmental plans and procedures
* Coordinating participation by relevant sectors of the workforce
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Relevant legislative requirements
* Standard operating procedures
* Environmental plans and procedures
* Sedimentation and erosion control
* Risk assessment procedures
* Rare and endangered plants
* Recording procedures
* Reporting procedures
* Monitoring procedures
* Identification of risks and impacts
* Consultation procedures
* Incident management procedures
* Potential environmental risks and incidents
* Disposal of dangerous and contaminated soils
* Environmental auditing
* Concepts of due diligence
* Principles of environmental protection
* Endangered species and habitat protection
* Environmental impact assessment
* Control procedures for environmental risks and incidents
* Waste management
 |
| Underpinning Skills | Demonstrate skills to:* Apply control procedures at environmental risks and incidents
* Access, interpret and apply relevant legislation and standard operating procedures
* Assess environmental risks at the specific project or site
* Apply environmental plans and procedures
* Report and record environmental procedures
* Develop local workplace environmental procedures
* Identify risks and impacts
* Apply consultation processes
* Manage environmental incidents
* Conduct environmental audits
* Apply due diligence
* Monitor a specific project or site
* Identify possible cultural or heritage sites
* Identify potential pollutants
* Analyse personal and team performance against work objectives
* Solve operational problems
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Plan and Organize Work** |
| **Unit Code** | **[EIS EES4 08 0317](#EIS_EES4_08_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitude required in planning and organizing work activities in a production application. It may be applied to a small independent operation or to a section of a large organization. |

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| **Elements** | **Performance Criteria** |
| 1. Set objectives
 | * 1. ***Objectives*** are planned consistent with and linked to work activities in accordance with organizational aims.
	2. Objectives are stated as measurable targets with clear time frames.
	3. Support and commitment of team members are reflected in the objectives.
	4. Realistic and attainable objectives are identified.
 |
| 1. Plan and schedule work activities
 | * 1. Tasks/work activities to be completed are identified and prioritized as directed.
	2. Tasks/work activities are broken down into steps in accordance with set time frames and achievable components.
	3. Task/work activities are assigned to appropriate team or individuals in accordance with agreed functions.
	4. ***Resources*** are allocated as per requirements of the activity.
	5. ***Schedule of work activities*** is coordinated with personnel concerned.
 |
| 1. Implement work plans
 | * 1. ***Work methods and practices*** are identified in consultation with personnel concerned.
	2. ***Work plans*** are implemented in accordance with set time frames, resources and ***standards***.
 |
| 1. Monitor work activities
 | * 1. Work activities are monitored and compared with set objectives.
	2. Work performance is monitored.
	3. Deviations from work activities are reported and recommendations are coordinated with appropriate personnel and in accordance with set standards.
	4. Reporting requirements are complied with in accordance with recommended format.
	5. Timeliness of report is observed.
	6. Files are established and maintained in accordance with standard operating procedures.
 |
| 1. Review and evaluate work plans and activities
 | * 1. Work plans, strategies and implementation are reviewed based on accurate, relevant and current information.
	2. Review is done based on comprehensive consultation with appropriate personnel on outcomes of work plans and reliable feedback.
	3. Results of review are provided to concerned parties and formed as the basis for adjustments/simplifications to be made to policies, processes and activities.
	4. Performance appraisal is conducted in accordance with organization rules and regulations.
	5. Performance appraisal report is prepared and documented regularly as per organization requirements.
	6. Recommendations are prepared and presented to ***appropriate personnel/authorities***.
	7. ***Feedback mechanisms*** are implemented in line with organization policies.
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| **Variable** | **Range** |
| Objectives  | May include, but not limited to:* Specific
* General
 |
| Resources | May include, but not limited to:* Personnel
* Equipment and technology
* Services
* Supplies and materials
* Sources for accessing specialist advice
* Budget
 |
| Schedule of work activities | May include, but not limited to:* Daily
* Work-based
* Contractual and Regular
 |
| Work methods and practices | May include, but not limited to:* Legislated regulations and codes of practice
* Industry regulations and codes of practice
* Occupational health and safety practices
 |
| Work plans | May include, but not limited to:* + Daily work plans
	+ Project plans
	+ Program plans
	+ Resource plans
	+ Skills development plans
	+ Management strategies and objectives
 |
| Standards | May include, but not limited to:* + Performance targets
	+ Performance management and evaluation systems
	+ Occupational standards
	+ Employment contracts
	+ Client contracts
	+ Discipline procedures
	+ Workplace assessment guidelines
	+ Internal quality assurance
	+ Internal and external accountability and auditing requirements
	+ Training Regulation Standards and Safety Standards
 |
| Appropriate personnel/ authorities | May include, but not limited to:* Appropriate personnel include:
* Management and Line Staff
 |
| Feedback mechanisms | May include, but not limited to: |
| * Verbal feedback
* Informal feedback
* Formal feedback
* Questionnaire
* Survey and Group discussion
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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* Set objectives
* Plan and schedule work activities
* Implement work plans
* Monitor work activities
* Review and evaluate work plans and activities
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| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Organization’s strategic plan, policies rules and regulations, laws and objectives for work unit activities and priorities
* Organizations policies, strategic plans, guidelines related to the role of the work unit
* Team work and consultation strategies
 |
| Underpinning Skills | Demonstrates skill to:* Plan
* Lead
* Organize
* Coordinate
* Communicate
* Inter-and intra-person/motivation skills
* Present
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Apply Principles of Hydraulics to Pipe and Channel Flow** |
| **Unit Code** | **[EIS EES4 09 0317](#EIS_EES4_09_0317)** |
| **Unit Descriptor** | This unit describes the competencies required to use hydraulic principles and calculations of theoretical flows. An understanding of the processes required to collect data accurately, interpret data, verify data and apply theoretical techniques to produce flow data are essential to performance. |

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| **Elements** | **Performance Criteria** |
| 1. Calculate energy losses in pipe flow**.**
 | * 1. Measurements are reviewed and compared against expected trends.
	2. Standard processes and software are used to check, edit, verify and audit data.
	3. Standard processes are used to identify, estimate, adjust and justify data and review inconsistent data on flow conditions.
	4. Records are prepared in a format suitable for dissemination.
 |
| 1. Calculate hydraulic and energy gradient for pipelines**.**
 | * 1. Pipeline design charts are prepared using standard formulae.
	2. The limitations of formulae are identified.
	3. Variations in roughness coefficients are identified.
	4. The pressure in pipeline systems is calculated using the hydraulic gradient line.
	5. The pipe discharge is calculated from reservoirs.
 |
| 1. Calculate flow in open channels**.**
 | * 1. The methods used for measuring flows in open channels are identified.
	2. The formulae for calculating flows in open channels are used.
	3. The characteristics of open channels are distinguished.
	4. The uses of different measuring instruments and devices used in open channels are distinguished.
	5. The hydraulic principles which apply to different meters are assessed.
	6. The limitations of the meters are identified.
 |
| 1. Calculate flows through notches and weirs**.**
 | * 1. The methods used for measuring flows in notches and weirs are identified.
	2. The formulae are used for calculating flows in notches and weirs.
	3. The applications and characteristics of notches and weirs are distinguished.
	4. The uses of different measuring instruments and devices used for notches and weirs are distinguished.
	5. The hydraulic principles which apply to different meters are assessed.
	6. The limitations of the meters are identified.
 |
| 1. Calculate proportions for an economic section**.**
 | * 1. The proportions of rectangular, trapezoidal and circular channels are calculated for maximum discharge.
	2. A partial flow chart is used to identify the depth of flow for maximum discharge and maximum velocity.
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| **Variable** | **Range** |
| Standard processes and software | May include, but not limited to:* Standards relevant to the monitoring network including AS 3778 for discharge ratings, WMO, best practice methodology where standards are not available or applicable
* Procedures for the measurement of surface slopes and flood slopes
* Procedures for the development, maintenance and extension of rating curves
* Computation of flow from stage data and rating curves
* Software:
* Kisters - Hydstra
* Scientific Software Group - AquaChem,
* Microsoft - Excel
* Web-based development tools for presentation and reporting of data
 |
| Flow conditions | May include, but not limited to:* Laminar flow
* Turbulent flow
* Smooth and rough pipe and channel surfaces
* Full pipe flow
* Submerged flow conditions
* Backwater
* Critical flow, sub critical and supercritical
* Uniform flow
* Rapidly changing flow
* Weir and flumes behaviour under various flow conditions
 |
| Charts | May include, but not limited to:* Colebrook-White charts
* Hazen and Williams charts
* Manning charts
 |
| Roughness coefficients | May include, but not limited to:* Biological growths and other obstructions
* Slime deposits
* Incrustations
* Detritus
* General debris
* Deterioration of unlined ferrous surfaces, because the bore may be diminished by oxide formations
* Irregularities at joints:
* Eccentricity
* Abrupt decrease of diameter
* Protrusions of mortar or other jointing materials
* Inadequate closure, especially if this has permitted tree roots to enter
* Amount and size of solids being transported
* Disturbances by flow from branch lines especially in sewers
 |
| Methods used for measuring flows | May include, but not limited to:* Container method
* Tilt tank method
* Trajectory method
 |
| Formulae for calculating flows | May include, but not limited to:* Chezy equation
* Colebrook-White
* Hazen and Williams
* Darcy-Weisbach
* Manning equation
 |
| Characteristics of open channels | May include, but not limited to:* Types of open channel
* Steadiness
* Uniformity
* State of open channel flow
* Laminar, transitional and turbulent flow
* Critical, subcritical and supercritical flow
 |
| Hydraulic principles | May include, but not limited to:* Standards relevant to the monitoring network including AS 3778 Measurement of water flow in open channels and AS 2200 Design Charts for water supply and sewerage for calculating pipe and channel flows
* Archimedes's Principle
* Bernoulli's Equation
* Newton's Laws of Motion
* Hydraulic gradient and total energy line
* Boundary layer theory
* Reynold's number
* Pascal's law
* Theory of gated structures
* Hydrostatic pressure
* Fluid dynamics
* Moody Diagram
* Manning's Formula
* Chezy's Formula
* specific energy formula
* Darcy-Weisbach Equation
* Hagen-Poisseulle Equation
 |
| Meters | May include, but not limited to:* mechanical meters such as:
* the displacement type
* the inferential type
* pressure meters such as:
* pitot tube
* orifice plate
* Venturi meter
 |
| Characteristics of notches and weirs | May include, but not limited to:* Type of the crest
* Shape of the notch
* Crest and conditions
 |

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| **Evidence Guide** |
| Critical aspects of Competence | Assessment requires evidence that the candidate:* Calculating energy in pipe flows
* Calculating hydraulic and energy gradient for pipelines
* Calculating flow in open channels
* Calculating flows through notches and weirs
* Calculating proportions for an economic section
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* Application of matrix algebra to systems of linear equations
* Graphical and algebraic methods for solving systems of linear, quadratic, exponential, logarithmic and trigonometric equations
* Principles of fluid statics, fluid dynamics and hydraulic mechanics
* Pascal's Law and hydrostatic effect on submerged surfaces
* Distinction between laminar and turbulent flow
* Hagen-Poisseulle equation
* Darcy-Weisbach equation
* Bernoullii's equation
* The effect of velocity variation on velocity head
* Equations for calculating the approximate value of the friction factor
* Smooth and rough wall turbulent flow
* Minimise pipeline losses
* The characteristics of flow through notches/weirs including the use of these in channel flow measurement
* Sampling and testing procedures
* Policies and standard operating procedures
 |
| Underpinning Skills | Demonstrates skills to:* Draw velocity distribution curves for fluids in pipes or channels with both laminar flow and turbulent flow
* Use the moody diagram
* Use data to determine the value of roughness
* Use simple equations for determining pipe friction with their appropriate application
* Calculate head losses in non-circular pipes
* Calculate minor energy losses associated with enlargements, contractions, valves, fittings and bends
* Calculate the flow in a pipe using data regarding minor energy losses
* Use AS 2200 for calculating minor losses
* apply flow formulae to different open channel cross-sections in developing the proportions for an economic section
* Calculate the flow in pipelines
* Calculate the gradual varied flow profiles in uniform channels when the discharge is known
* Use analytical tools and formulae
* Interpret and apply technical documentation to the collection, analysis and reporting of hydrometric data
* Identify potential or actual operational problems
* Use computer systems
* Use recording and reporting systems
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Migrate to New Technology** |
| **Unit Code** | **[EIS EES4 10 0317](#EIS_EES4_10_0317)** |
| **Unit Descriptor** | This unit defines the competence required to apply skills and knowledge in using new or upgraded technology. The rationale behind this unit emphasizes the importance of constantly reviewing work processes, skills and techniques in order to ensure that the quality of the entire business process is maintained at the highest level possible through the appropriate application of new technology. To this end, the person is typically engaged in on-going review and research in order to discover and apply new technology or techniques to improve aspects of the organization’s activities. |

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| **Elements** | **Performance Criteria** |
| 1. Apply existing knowledge and techniques to technology and transfer
 | 1. Situations are identified where existing knowledge can be used as the basis for developing new skills.
2. New or upgraded technology skills reacquired and used to enhance learning.
3. New or upgraded equipment are identified, classified and used where appropriate, for the benefit of the organization.
 |
| 1. Apply functions of technology to assist in solving organizational problems
 | 1. Testing of new or upgraded equipment is conducted according to the specification manual.
2. Features of new or upgraded equipment are applied within the organization.
3. Features and functions of new or upgraded equipment are used for solving organizational problems.
4. Sources of information relating to new or upgraded equipment are accessed and used.
 |
| 1. Evaluate new or upgraded technology performance
 | 1. New or upgraded equipment is evaluated for performance, usability and against OHS standards.
2. ***Environmental considerations*** are determined from new or upgraded equipment.
3. ***Feedback*** is sought from users where appropriate.
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| **Variables** | **Range** |
| Environmental Considerations | May include, but not limited to:* Recycling, safe disposal of packaging (e.g. Cardboard, polystyrene, paper, plastic) and correct disposal of waste materials by an authorized body
 |
| Feedback | May include, but not limited to:* Surveys,
* Questionnaires,
* interviews and meetings.
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| **Evidence Guide** |
| Critical Aspects of Competence | Competence must confirm the ability to transfer the application of existing skills and knowledge to new technology |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Broad awareness of current technology trends and directions in the industry (e.g. systems/procedures, services, new developments, new protocols)
* Vendor product directions
* Ability to locate appropriate sources of information regarding metal manufacturing and new technologies
* Current industry products/services, procedures and techniques with knowledge of general features
* Information gathering techniques
 |
| Underpinning Skills | Demonstrate skills of:* Research skills for identifying broad features of new technologies
* Ability to assist in the decision making process
* Literacy skills in regard to interpretation of technical manuals
* Ability to solve known problems in a variety of situations and locations
* Evaluate and apply new technology to assist in solving organizational problems
* General analytical skills in relation to known problems
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Establish Quality Standards**  |
| **Unit Code** | **[EIS EES4 11 0317](#EIS_EES4_11_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to establish quality specifications for work outcomes and work performance. It includes monitoring and participation in maintaining and improving quality, identifying critical control points in the production of quality output and assisting in planning and implementing of quality assurance procedures. |

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| **Elements** | **Performance Criteria** |
| 1. Establish quality specifications for product
 | 1. Market specifications are ***sourced*** and ***legislated requirements*** identified.
2. Quality specifications are developed and agreed upon.
3. Quality specifications are documented and introduced to organization staff / personnel in accordance with the organization policy.
4. Quality specifications are updated when necessary.
 |
| 1. Identify hazards and critical control points
 | 1. Critical control points impacting on quality are identified.
2. Degree of risk for each hazard is determined.
3. Necessary documentation is accomplished in accordance with organization quality procedures
 |
| 1. Assist in planning of quality assurance procedures
 | 1. Procedures for each identified control point are developed to ensure optimum quality.
2. Hazards and risks are minimized through application of appropriate controls.
3. Processes are developed to monitor the effectiveness of quality assurance procedures.
 |
| 1. Implement quality assurance procedures
 | 1. Responsibilities for carrying out procedures are allocated to staff and contractors.
2. Instructions are prepared in accordance with the enterprise’s quality assurance program.
3. Staff and contractors are given induction training on the quality assurance policy.
4. Staff and contractors are given in-service training relevant to their allocated ***safety procedures***.
 |
| 1. Monitor quality of work outcome
 | 1. Quality requirements are identified.
2. Inputs are inspected to confirm capability to meet quality requirements.
3. Work is conducted to produce required outcomes.
4. Work processes are monitored to confirm quality of output and/or service.
5. Processes are adjusted to maintain outputs within specification.
 |
| 1. Participate in maintaining and improving quality at work
 | 1. Work area, materials, processes and product are routinely monitored to ensure compliance with quality requirements.
2. Non-conformance in inputs, process, product and/or service is identified and reported according to workplace reporting requirements.
3. Corrective action is taken within level of responsibility, to maintain quality standards.
4. Quality issues are raised with designated personnel.
 |
| 1. Report problems that affect quality
 | 1. Potential or existing quality problems are recognized.
2. Instances of variation in quality are identified from specifications or work instructions.
3. Variation and potential problems are reported to supervisor/manager according to enterprise guidelines.
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| **Variable** | **Range** |
| Sourced | May include, but not limited to:* End-users
* Customers or stakeholders
 |
| Legislated requirements  | May include, but not limited to:* Verification of product quality as part of consumer legislation or specific legislation related to product content or composition.
 |
| Safety procedures. | May include, but not limited to:* Use of tools and equipment for fabrication/production/ manufacturing works
* Workplace environment and handling of material safety,
* Following occupational health and safety procedures designated for the task
* Respect the policies, regulations, legislations, rule and procedures for manufacturing/production/fabrication works
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| **Evidence Guide** |
| Critical Aspect of Competence | Demonstrates skills and knowledge to:* Monitor quality of work
* Establish quality specifications for product
* Participate in maintaining and improving quality at work
* Identify hazards and critical control points in the production of quality product
* Assist in planning of quality assurance procedures
* Report problems that affect quality
* Implement quality assurance procedures
 |
| Underpinning Knowledge  | Demonstrates knowledge of: * Work and product quality specifications
* Quality policies and procedures
* Improving quality at work
* Hazards and critical points of operation
* Obtaining and using information
* Applying federal and regional legislation within day-today work activities
* Accessing and using management systems to keep and maintain accurate records
* Requirements for correct preparation and operation
* Technical writing
 |
| Underpinning Skills | Demonstrates skills to:* Monitor quality of work
* Establish quality specifications for product
* Participate in maintaining and improving quality at work
* Identify hazards and critical control points in the production of quality product
* Assist in planning of quality assurance procedures
* Report problems that affect quality
* Implement quality assurance procedures
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Develop Individuals and Team** |
| **Unit Code** | **[EIS EES4 12 0317](#EIS_EES4_12_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to determine individual and team development needs and facilitate the development of the workgroup. |

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| **Elements** | **Performance Criteria** |
| 1. Provide team leadership
 | * 1. ***Learning and development needs*** are systematically identified and implemented in line with ***organizational requirements***.
	2. Learning plan to meet individual and group training and developmental needs is collaboratively developed and implemented.
	3. Individuals are encouraged to self-evaluate performance and identify areas for improvement.
	4. ***Feedback on performance*** of team members is collected from relevant sources and compared with established team learning process.
 |
| 1. Foster individual and organizational growth
 | * 1. Learning and development program goals and objectives are identified to match the specific knowledge and skills requirements of Competence standards.
	2. ***Learning delivery methods*** are made appropriate to the learning goals, the learning style of participants and availability of equipment and resources.
	3. Workplace learning opportunities and coaching/ mentoring assistance are provided to facilitate individual and team achievement of competencies.
	4. Resources and timelines required for learning activities are identified and approved in accordance with organizational requirements.
 |
| 1. Monitor and evaluate workplace learning
 | * 1. Feedback from individuals or teams is used to identify and implement improvements in future learning arrangements.
	2. Outcomes and performance of individuals/teams are assessed and recorded to determine the effectiveness of development programs and the extent of additional support.
	3. Modifications to learning plans are negotiated to improve the efficiency and effectiveness of learning.
	4. Records and reports of competence are maintained within organizational requirement.
 |
| 1. Develop team commitment and cooperation
 | * 1. Open communication processes to obtain and share information is used by team.
	2. Decisions are reached by the team in accordance with its agreed roles and responsibilities.
	3. Mutual concern and camaraderie are developed in the team.
 |
| 1. Facilitate accomplishment of organizational goals
 | * 1. Team members are actively participated in team activities and communication processes.
	2. Individual and joint responsibility is developed by team’s members for their actions.
	3. Collaborative efforts are sustained to attain organizational goals.
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| **Variable** | **Range** |
| Learning and development needs | May include, but not limited to:* + Coaching, monitoring and/or supervision
	+ Formal/informal learning program
	+ Internal/external training provision
	+ Work experience/exchange/opportunities
	+ Personal study
	+ Career planning/development
	+ Performance evaluation
	+ Workplace skills assessment
	+ Recognition of prior learning
 |
| Organizational requirements | May include, but not limited to:* Quality assurance and/or procedures manuals
* Goals, objectives, plans, systems and processes
* Legal and organizational policy/guidelines and requirements
	+ Safety policies, procedures and programs
	+ Confidentiality and security requirements
	+ Business and performance plans
	+ Ethical standards
	+ Quality and continuous improvement processes and standards
 |
| Feedback on performance | May include, but not limited to:* Formal/informal performance evaluation
* Obtaining feedback from supervisors and colleagues
* Obtaining feedback from clients
* Personal and reflective behavior strategies
* Routine and organizational methods for monitoring service delivery
 |
| Learning delivery methods | May include, but not limited to:* + On the job coaching or monitoring
	+ Problem solving
	+ Presentation/demonstration
	+ Formal course participation
	+ Work experience and involvement in professional networks
	+ Conference and seminar attendance
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* + Identify and implement learning opportunities for others
	+ Give and receive feedback constructively
	+ Facilitate participation of individuals in the work of the team
	+ Negotiate plans to improve the effectiveness of learning
	+ Prepare learning plans to match skill needs
	+ Access and designate learning opportunities
 |
| Underpinning Knowledge and Attitude | Demonstrates knowledge of:* + Coaching and monitoring principles
	+ How to work effectively with team members who have diverse work styles, aspirations, cultures and perspective
	+ How to facilitate team development and improvement
	+ Methods and techniques to obtain and interpreting feedback
	+ Methods for identifying and prioritizing personal development opportunities and options
	+ Career paths and competence standards in the industry
 |
| Underpinning Skills | Demonstrates skills to:* + Read and understand a variety of texts, preparing general information and documents according to target audience; spell with accuracy; use grammar and punctuation effective relationships and conflict management
	+ Communicate including receiving feedback and reporting, maintaining effective relationships and conflict management
	+ Plan and organize required resources and equipment to meet learning needs
	+ Coach and mentor skills to provide support to colleagues
	+ Report to organize information; assess information for relevance and accuracy; identify and elaborate on learning outcomes
	+ Facilitate and conduct small group training sessions
	+ Relate to people from a range of social, cultural, physical and mental backgrounds
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* + Interview/Written Test
	+ Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Utilize Specialized Communication Skills** |
| **Unit Code** | **[EIS EES4 13 0317](#EIS_EES4_13_0317)** |
| **Unit Descriptor** | This unit covers the knowledge, skills and attitudes required to use specialized communication skills to meet specific needs of internal and external clients, conduct interviews, facilitate group discussions, and contribute to the development of communication strategies. |

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| **Elements** | **Performance Criteria** |
| 1. Meet common and specific communication needs of clients and colleagues
 | 1. Specific communication needs of clients and colleagues are identified and met.
2. Different approaches are used to meet communication needs of clients and colleagues.
3. Conflict is addressed promptly and in a timely way and in a manner which does not compromise the standing of the organization.
 |
| 1. Contribute to the development of communication strategies
 | 1. ***Strategies*** for internal and external dissemination of information are developed, promoted, implemented and reviewed as required.
2. Channels of communication are established and reviewed regularly.
3. Coaching in effective communication is provided
4. Work related network and relationship are maintained as necessary.
5. Negotiation and conflict resolution strategies are used where required.
6. Communication with clients and colleagues is made appropriate to individual needs and organizational objectives.
 |
| 1. Represent the organization
 | * 1. When participating in internal or external fora, presentation is relevant, appropriately researched and presented in a manner to promote the organization.
	2. Presentation is made clear and sequential and delivered within a predetermined time.
	3. Appropriate media is utilized to enhance presentation.
	4. Differences in views are respected.
	5. Written communication is made consistent with organizational standards.
	6. Inquiries are responded in a manner consistent with organizational standard.
 |
| 1. Facilitate group discussion
 | * 1. Mechanisms which enhance ***effective group interaction*** are defined and implemented.
	2. Strategies which encourage all group members to participate are used routinely.
	3. Objectives and agenda are routinely set and followed for meetings and discussions.
	4. Relevant information are provided to group to facilitate outcomes.
	5. Evaluation of group communication strategies is undertaken to promote participation of all parties.
	6. Specific communication needs of individuals are identified and addressed.
 |
| 1. Conduct interview
 | * 1. A range of appropriate communication strategies are employed in ***interview situations***.
	2. Different ***types of interview*** is conducted in accordance with the organizational procedures.
	3. Records of interviews are made and maintained in accordance with organizational procedures.
	4. Effective questioning, listening and nonverbal communication techniques are used to ensure that required message is communicated.
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| **Variable** | **Range** |
| Strategies  | May include, but not limited to:* + Recognizing own limitations
	+ Utilizing techniques and aids
	+ Providing written drafts
	+ Verbal and non verbal communication
 |
| Effective group interaction | May include, but not limited to:* + Identifying and evaluating what is occurring within an interaction in a non-judgmental way
	+ Using active listening
	+ Making decision about appropriate words, behavior
	+ Putting together response which is culturally appropriate
	+ Expressing an individual perspective
	+ Expressing own philosophy, ideology and background and exploring impact with relevance to communication
 |
| Interview situations  | May include, but not limited to:* + Establish rapport
	+ obtain facts and information
	+ Facilitate resolution of issues
	+ Develop action plans
	+ Diffuse potentially difficult situation
 |
| Types of Interview | May include, but not limited to:* + Related to staff issues
	+ Routine
	+ Confidential
	+ Evidential
	+ Non-disclosure
	+ Disclosure
 |

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| **Evidence Guide** |
| Critical Aspects of Competence | Demonstrates skills and knowledge to:* + Demonstrate effective communication skills with clients and work colleagues accessing service
	+ Adopt relevant communication techniques and strategies to meet client particular needs and difficulties
 |
| Underpinning Knowledge and Attitudes | Demonstrates knowledge of:* + Communication process
	+ Dynamics of groups and different styles of group leadership
	+ Communication skills relevant to client groups
 |
| Underpinning Skills | Demonstrates skills to:* + Full range of communication techniques including:
* active listening
* feedback
* interpretation
* role boundaries setting
* negotiation
* establishing empathy
* communication strategies
	+ Communicate to fulfill job roles as specified by the organization
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| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* + Interview/Written Test
	+ Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title**  | **Manage Micro, Small and Medium Enterprises (MSMEs)** |
| **Unit Code** | **[EIS EES4 14 0317](#EIS_EES4_14_0317)** |
| **Unit Descriptor** | This unit covers knowledge, skills and attitude required in running Micro, Small and Medium enterprises. The strategies involve developing, monitoring and managing work activities and financial information, developing effective work habits, and adjusting work schedules as needed.  |

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| **Elements** | **Performance Criteria** |
| 1. Develop and communicate Strategic work plan
 | * 1. The importance of planning is sensitized before acting and about the importance of plans to reduce risks and to inhibit impulsive actions and discussed.
	2. The basics of planning and beginning with goal setting are communicated.
	3. The achievement of measurable and realistic short-term business objective is addressed.
	4. How to develop realistic activities plans and schedule is discussed.
	5. ***Major components of work plan*** are introduced and understood.
	6. The importance of constant reviewing their plans is understood by monitoring the results.
 |
| 1. Identify daily work requirements and Develop effective work habits
 | * 1. Basic concept about effect working culture is discussed and understood.
	2. Different approaches to work culture are developed and understood.
	3. Work requirements are identified for a given time period by taking into consideration of ***resources*** and constraints.
	4. Work activities are prioritized based on business needs, requirements and deadlines.
	5. If appropriate, work is allocated to relevant staff or contractors to optimize efficiency.
	6. Work and personal priorities are identified and a balance is achieved between competing priorities using appropriate ***time management strategies***.
	7. Input is sought from ***internal and external sources*** and used to develop and refine new ideas and approaches.
	8. Business or inquiries is/are responded to promptly and effectively.
	9. Information is presented in a format appropriate to the industry and audience.
 |
| 1. Manage Marketing of MSMEs
 | * 1. Information on market and business needs is analyzed and market opportunities identified.
	2. Marketing mix and components are evaluated.
	3. Marketing mix for specific target market is determined.
	4. Marketing mix is monitored and continual adjusted against marketing performance.
 |
| 1. Manage Human Resources
 | * 1. ***Human resource rules, regulations law and procedures*** are identified and determined.
	2. The existing human resource is audited, and gaps are identified.
	3. Recruitment and selection are conducted based on the organizational requirements.
	4. Selected candidates are oriented and placed for the appropriate position.
	5. Appraisal of employees’ performance is conducted.
	6. Appraisal result is used for training and development, promotion, compensation, disciplinary measures and other purposes as required.
	7. ***Employee relations*** are maintained.
 |
| 1. Manage production and Operation
 | * 1. Production /operation plan is developed and implemented.
	2. Required inputs are purchased and adequate inventories maintained.
	3. Production /operation process is checked and controlled.
	4. Quality control is applied and maintained.
 |
| 1. Maintain financial records and use for decision making
 | * 1. The objective and benefits of financial records are discussed and understood.
	2. Asset, liabilities and capital are identified and recorded.
	3. Balance sheet and different journals are discussed.
	4. Business transactions are discussed, analyzed, classified and recorded.
	5. Daily financial records are maintained correctly in accordance with legal and accounting requirements.
	6. Invoices and payments are prepared and distributed in timely manner and in accordance with legal requirements.
	7. Outstanding accounts are collected or followed-up.
	8. Revenue, expense and costs are identified and discussed.
	9. Different ledgers and subsidiary ledgers are discussed and maintained.
	10. Profit and loss report is prepared.
	11. Financial interpretation is conducted with assistant from the appropriate person.
	12. Financial manual is prepared.
 |
| 1. Monitor, Manage and Evaluate work performance
 | * 1. People, resources and/or equipment are coordinated to provide optimum results.
	2. Staff, clients and/or contractors are communicated within a clear and regular manner, to monitor work in relation to ***business goals*** or timelines.
	3. ***Problem solving techniques*** are applied to work situations to overcome difficulties and achieve positive outcomes.
	4. Opportunities for improvements are monitored according to business demands.
	5. Work schedules are adjusted to incorporate necessary modifications to existing work and routines or changing needs and requirements.
	6. Proposed changes are clearly communicated and recorded to aid in future planning and evaluation.
	7. Relevant codes of practice are used to guide an ethical approach to workplace practices and decisions.
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| **Variable** | **Range** |
| Major components of work plan | May include, but not limited to:* Objective
* Responsibilities
* Resources (human, materials, finance, time, etc)
* Activities
 |
| Resources  | May include, but not limited to:* Human resource
* Money
* Time
* Machines
* Equipment
* Space
 |
| Time managementstrategies  | May include, but not limited to:* Prioritizing and anticipating
* Short term and long term planning and scheduling
* Creating a positive and organized work environment
* Clear timelines and goal setting that is regularly reviewed and adjusted as necessary
* Breaking large tasks into smaller tasks
* Getting additional support if identified and necessary
 |
| Internal and external sources  | May include, but not limited to:* Staff and colleagues
* Management, supervisors, advisors or head office
* Relevant professionals such as lawyers, accountants, management consultants
* Professional associations
 |
| Human resource rules , regulations law and procedures | May include, but not limited to:* Recruitment and selection
* Orientation and placement
* Training and development
* Performance appraisal and reward system
* Disciplinary procedures
* Movement and separation
* Industrial relation
 |
| Employee relations | May include, but not limited to:* Relationship within employees
* Relationship among employees and management and labor union
* Relationship between labor union and government
 |
| Business goals  | May include, but not limited to:* Sales targets
* Budgetary targets
* Team and individual goals
* Production targets
* Reporting deadlines
 |
| Problem solving techniques  | May include, but not limited to:* Brainstorming
* Fish bone
* Focus group discussion and Problem tree
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| **Evidence Guide** |
| Critical Aspects of Competence | A person must be able to demonstrate:* Ability to identify daily work requirements and allocate work appropriately
* Ability to interpret financial documents in accordance with legal requirements
* The ability to prepare strategic plan
* The ability to develop effective work habit
* The ability to manage marketing of MSEs
* The ability to manage human resources of MSEs
* the ability to manage production/operation of MSEs
* The ability to maintain financial records of MSEs
* The ability to manage, monitor and evaluate work performance of MSMEs
 |
| Underpinning Knowledge and Attitudes | Demonstrate knowledge of:* Strategic plan
* Working culture
* Time management strategy
* Marketing Mix
* Relevant marketing, operation/production, human resource and financial management
* Human resource functions
* Production/operation functions
* Monitoring and evaluation
* Problem solving techniques
* Federal and Local Government legislative requirements affecting business operations, especially in regard to OHS, equal employment opportunity, industrial relations and anti-discrimination
* Relevant industry code of practice
* Planning techniques to establish realistic timelines and priorities
* Identification of relevant performance measures
* Quality assurance principles and methods
 |
| Underpinning Skills | Demonstrate skills to:* Technical or specialist skills relevant to the business operation
* Interpret legal requirements, company policies and procedures and immediate, day-to-day demands
* Strategic planning skills
* Human relation skills
* Communicate using questioning, clarifying, reporting, and giving and receiving constructive feedback
* Numeracy skills for performance information, setting targets and interpreting financial documents and reports
* Technical skills to interpret business document, reports and financial statements and projections
* Relate to people from a range of social, cultural and ethnic backgrounds and physical and mental abilities
* Solve problem and develop contingency plans
* Using computers and software packages to record and manage data and to produce reports
* Evaluate using assessment work and outcomes
* Observe for identifying appropriate people, resources and to monitor work
 |
| Resource Implications | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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| **Occupational Standard: Electromechanical Equipment Maintenance Supervision Level IV** |
| **Unit Title** | **Apply Problem Solving Techniques and Tools** |
| **Unit Code** | **[EIS EES4 15 0317](#EIS_EES4_15_0317)** |
| **Unit Descriptor** | This unit of competency covers the knowledge, skills and attitude required to apply scientific problem solving techniques and tools to enhance quality, productivity and other kaizen elements on continual basis.  |

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| **Elements** | **Performance criteria** |
| 1. Identify and select theme/problem.
 | * 1. ***Safety requirements*** are followed in accordance with safety plans and procedures.
	2. All possible problems related to the process /Kaizen elements are listed using ***statistical tools and techniques***.
	3. All possible problems related to kaizen elements are identified and listed on Visual Management Board/Kaizen Board.
	4. Problems are classified based on obviousness of cause and action.
	5. Critical factors like the number of customers affected, Potentials for bottlenecks, and number of complaints etc… is selected.
	6. Problems related to priorities of ***Kaizen Elements*** are given due emphasis and selected.
 |
| 1. Grasp current status and set goal.
 | 1. The extent of the problem is defined.
2. Appropriate and achievable goal is set.
 |
| 1. Establish activity plan.
 | * 1. The problem is confirmed.
	2. High priority problem is selected.
	3. The extent of the problem is defined.
	4. Activity plan is established as per ***5W1H***.
 |
| 1. Analyze causes of a problem.
 | 1. All possible causes of a problem are listed.
2. Cause relationships are analyzed using***4M1E***.
3. Causes of the problems are identified*.*
4. Root causes are selected.
5. The root cause which is most directly related to the problem is selected.
6. All possible ways are listed using ***creative idea generation*** to eliminate the most critical root cause.
7. The suggested solutions are carefully tested and evaluated for potential complications.
8. Detailed summaries of the action plan are prepared to implement the suggested solution.
 |
| 1. Examine countermeasures and their implementation.
 | 1. Action plan is implemented by ***medium KPT*** members.
2. Implementation is monitored according to the agreed procedure and activities are checked with preset plan.
 |
| 1. Assess effectiveness of the solution.
 | 1. ***Tangible and intangible results*** are identified.
2. The results are verified over time.
3. Tangible results are compared with targets using ***various types of diagram***.
 |
| 1. Standardize and sustain operation.
 | 1. If the goal is achieved, the new procedures are standardized and made part of daily activities.
2. All employees are trained on the new ***Standard Operating Procedures (SOPs)***.
3. SOP is verified and followed by all employees.
4. The next problem is selected to be tackled by the team.
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| **Variables** | **Range**  |
| Safety requirements | May include, but not limited to:* OHS requirements include legislation, material safety, managements system, hazardous substances and dangerous goods code and local safe operating procedures
* Work is carried out in accordance with legislative obligations, environmental legislations, relevant health regulation, manual handling procedure and organization insurance requirements
 |
| Statistical tools and techniques | May include, but not limited to:* 7 QC tools may include:
* Stratification
* Pareto Diagram
* Cause and Effect Diagram
* Check Sheet
* Control Chart/Graph
* Histogram and Scatter Diagram
* QC techniques may include:
* Brain storming
* Why analysis
* What if analysis
* 5W1H
 |
| Kaizen Elements | May include, but not limited to:* Quality
* Cost
* Productivity
* Delivery
* Safety
* Moral
* Environment and Gender equality
 |
| 5W1H | May include, but not limited to:* Who: person in charge
* Why: objective
* What: item to be implemented
* Where: location
* When: time frame
* How: method
 |
| 4M1E | May include, but not limited to:* Man
* Machine
* Method
* Material and Environment
 |
| Creative idea generation | May include, but not limited to:* Brainstorming
* Exploring and examining ideas in varied ways
* Elaborating and extrapolating
* Conceptualizing
 |
| Medium KPT | May include, but not limited to:* 5S
* 4M (Machine, Method, Material and Man)
* 4p (Policy, Procedures, People and Plant)
* PDCA cycle
* Basics of IE tools and techniques
 |
| Tangible and intangible results | May include, but not limited to:* Tangible result may include quantifiable data
* Intangible result may include qualitative data
 |
| Various types of diagram | May include, but not limited to:* Line graph
* Bar graph
* Pie-chart
* Scatter and Affinity diagrams
 |
| Standard Operating Procedures (SOPs) | May include, but not limited to:* The customer demand
* The most efficient work routine (steps)
* The cycle times required to complete work elements
* All process quality checks required to minimize defects/errors
* The exact amount of work in process required
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| **Evidence Guide** |
| Critical Aspects of Assessment | Demonstrates skills and knowledge competencies to:* Apply all relevant procedures and regulatory requirements to ensure quality and productivity of an organization.
* Detect non-conforming products/services in the work area
* Apply effective problem solving approaches/strategies.
* Implement and monitor improved practices and procedures
* Apply statistical quality control tools and techniques.
 |
| Underpinning Knowledge and Attitude | Demonstrates knowledge of:* QC story/PDCA cycle/
* QC story/ Problem solving steps
* QCC techniques
* 7 QC tools
* Basic IE tools and techniques.
* SOP
* Quality requirements associated with the individual's job function and/or work area
* Workplace procedures associated with the candidate's regular technical duties
* Relevant health, safety and environment requirements
* organizational structure of the enterprise
* Lines of communication
* Methods of making/recommending improvements.
* Reporting procedures
 |
| Underpinning Skills | Demonstrates skills to:* Apply problem solving techniques and tools
* Apply statistical analysis tools
* Apply Visual Management Board/Kaizen Board.
* Detect non-conforming products or services in the work area
* Document and report information about quality, productivity and other kaizen elements.
* Contribute effectively within a team to recognize and recommend improvements in quality, productivity and other kaizen elements.
* Implement and monitor improved practices and procedures.
* Organize and prioritize activities and items.
* Read and interpret documents describing procedures
* Record activities and results against templates and other prescribed formats.
 |
| Resources Implication | Access is required to real or appropriately simulated situations, including work areas, materials and equipment, and to information on workplace practices and OHS practices. |
| Methods of Assessment  | Competence may be assessed through:* Interview/Written Test
* Observation/Demonstration with Oral Questioning
 |
| Context of Assessment | Competence may be assessed in the work place or in a simulated work place setting. |

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This occupational standard was developed on April 2017 at Adama, Dire International Hotel. The Experts participated in the development of this occupation standard are:

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| **Profile of Participants on Occupational Standard Development in Electromechanical**  |
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