



Australian Government

MEM23125 Evaluate maintenance systems

Release: 1

MEM23125 Evaluate maintenance systems

Modification History

Release 1. Supersedes and is equivalent to MEM23125A Evaluate maintenance systems.

Application

This unit of competency defines the skills and knowledge required to evaluate corrective and preventative maintenance management systems including analysing the effect of any action or breakdown on achieving strategic objectives. It requires evaluation of the wide range of interrelated factors that contribute to effective maintenance systems.

The unit is suitable for operations managers, maintenance personnel and those pursuing maintenance or manufacturing, engineering or related technical qualifications and careers.

No licensing, legislative or certification requirements apply to this unit at the time of publication.

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM14088 Apply maintenance engineering techniques to equipment and component repairs and modifications

MEM14092 Integrate maintenance fundamentals into an engineering task

Competency Field

Engineering science

Elements and Performance Criteria

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
1. Determine scope of maintenance processes	1.1 Determine parameters of maintenance management system to be evaluated 1.2 Assess engineering principles, skills and techniques required by tasks 1.3 Assess software and software techniques required for evaluation task 1.4 Identify stakeholders to be consulted 1.5 Determine compliance requirements of WHS and regulatory

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	requirements, codes of practice, standards and risk assessment requirements for maintenance processes 1.6 Investigate sustainability implications of maintenance processes
2. Identify principles and techniques required by evaluation	2.1 Review trends in maintenance practice and equipment including those related to integrated management systems 2.2 Review maintenance system and implementation strategies for relevance to evaluation 2.3 Identify features and functions of maintenance information systems
3. Evaluate maintenance management systems	3.1 Evaluate organisational maintenance safety and risk management procedures 3.2 Evaluate maintenance processes for sustainability 3.3 Evaluate asset reliability, maintainability and performance against lean indices, production targets and system design parameters 3.4 Audit plant, facilities, services and systems for provision of parts and consumables, adequacy of labour, skills and technical support 3.5 Evaluate maintenance system data generation and collection and reporting for performance analysis required for process improvement 3.6 Evaluate the use of maintenance management software 3.7 Evaluate manual and automated condition monitoring, testing and analysis 3.8 Evaluate implementation of maintenance management systems techniques, including up-time preparations, spares availability, tooling and equipment readiness 3.9 Evaluate asset categorisation, maintenance scheduling and prioritising 3.10 Evaluate implementation of maintenance continuous improvement processes
4. Report results	4.1 Record results of scoping, principles and techniques used and evaluation of maintenance systems 4.2 Provide documentation including layouts, schedules, performance analysis and flow charts

Foundation Skills

This section describes those language, literacy, numeracy and employment skills that are essential to performance.

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

This field allows for different work environments and conditions that may affect performance. Essential operating conditions that may be present (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) are included.

Appropriate technical and professional assistance includes:	• technical support and advice relating to elements which have intrinsic dangers including • professional support for technologies.
WHS, regulatory requirements and organisational procedures includes:	• WHS acts, regulations and relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • ministerial directives • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements.
Continuous improvement includes one or more of the following techniques:	• balanced scorecard • current and future state mapping • measuring performance against benchmarks • process improvement, problem solving and decision making • data management, generation, recording, analysing, storing and use of software • training for improvement systems participation • technical training.
Constraints and contingencies include one or more of the following:	• financial • organisational • procedural • cultural • physical (resource, access and logistical limitations).
Maintenance systems include:	• breakdown maintenance • preventive maintenance • predictive maintenance (on-condition) • precision maintenance • proactive maintenance • reliability centred maintenance

	total productive maintenance.
Lean systems maintenance includes:	- maximising machine and process up-time - minimising waste and costs - maintaining quality, delivery and customer service - complementing engineering business objectives.
Integrated maintenance management systems (terotechnology) includes:	- an integrated maintenance management system combining management, financial, engineering and other practices for cost-effective maintenance of assets including plant, equipment and facilities - the design for reliability and maintainability, manufacture, installation, commissioning and eventual write-off and replacement of the assets - collection and analysis of data to assess the reliability, life cycle costs and productivity of the assets against the design criteria - reliability of the productivity of assets, that is, the maintenance of service or product output (quantities) and its quality within cost parameters. In the context of terotechnology, the cost parameters include life cycle costs.
Priority for maintenance includes:	- critical assets including: - high cost of replacement - unavailability of replacement or spares - failure will or may immediately endanger life and property - essential to quality - high cost of disruption to production or service delivery - failure would require an immediate response - semi-critical assets including: - shutdown produces partial loss of capacity - asset is regulated - difficult to repair - alternative asset may be available - some spare parts are stored - medium priority for response - non-critical assets including: - breakdown affects minimal production loss - asset used infrequently - parts readily available - lowest priority attended to as time and resources allow.
Maintenance activity audit includes:	- criticality - locality - machine type and maintenance activities required - skills and techniques required for corrective actions

	• sources and availability of spares • specialised corrective skills and techniques for specific equipment.
Monitoring and testing includes:	• manual inspections • instrumented monitoring • lubricant testing (tribology) • lidar (light for atmospheric particle detection) • gas chromatography • mandatory inspections • performance and condition monitoring • radiographic examination for material imperfections • microwave for non-metallic solid or liquid test • camera and scope techniques.
Maintenance system data includes:	• asset ID and plant warranties • procedural documents: • monitoring and preventative maintenance schedules • safe work method statements (SWMS) • safety data sheets (SDS) • work permits • monitoring reports and system measurements • maintenance actions and costs • spares inventory control.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM23125A Evaluate maintenance systems.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=b7050d37-5fd0-4740-8f7d-3b7a49c10bb2>

Assessment Requirements for MEM23125 Evaluate maintenance systems

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include:

- investigating sustainability implications of maintenance processes
- identifying and reviewing features, functions and trends of maintenance and information systems and their associated implementation strategies and software
- evaluating work health and safety (WHS), regulatory, risk management, and sustainability requirements
- evaluating maintenance systems, scheduling and prioritising, and continuous improvement and implementation on at least two occasions
- auditing plant, facilities and services, provision of parts and consumables, labour, skills and technical support on at least two occasions
- reporting and documenting results of scoping, principles and techniques identification and evaluation of maintenance systems, layouts, schedules, performance analysis, flow charts, calculations, programs and files.

Note: Where a volume and/or frequency is not specified, demonstration must be provided at least once.

Knowledge Evidence

Evidence required to demonstrate the required knowledge for this unit must be relevant to and satisfy the requirements of the elements and performance criteria and include knowledge of:

- maintenance requirements of different organisations and industry trends
- features of integrated management systems within organisations, and industry trends including:
 - monitoring, adjustment, lubrication, consumables, breakdown maintenance required by typical plant equipment and facilities
 - labour and training requirements for typical maintenance systems
 - maintenance performance indices including mean time between failure (MTBF) and overall equipment efficiency (OEE), and relationship to maintenance strategies, business financial objectives and maintenance system design criteria, including life cycle cost and break-even point
 - maintenance management systems including terotechnology
 - maintenance management within integrated logistics support (ILS)
- sources of information, software and hardware required by maintenance systems

- systems thinking in relation to maintenance, failure analysis, problem-solving and decision-making processes, constraint and contingency management
- compliance requirements of WHS, regulations and standards relevant to maintenance
- risk management requirements and analyses for maintenance of plant including failure mode effects analyses (FMEA)
- maintainability and reliability related to life cycle costing, system design, cost predictions and break-even analysis
- audit processes for plant, facilities and services, provision of parts and consumables, labour, skills and technical support
- maintenance system data generation and collection, reporting and response processes
- data storage and performance analysis for process improvement against performance parameters including MTBF and OEE
- manual and automated condition monitoring, testing and analysis
- maintenance system and implementation strategies including corrective, preventative, predictive, precision, proactive, total productive and reliability-centred maintenance
- facilities and service maintenance response systems
- asset categorisation and maintenance scheduling and prioritising
- organisational maintenance safety procedures including:
 - risk management procedures
 - WHS committees
 - standard operating procedures (SOPs)
 - safe work method statements (SWMS)
 - material safety data sheets (MSDS)
 - permits
 - standards related to significant maintenance or plant modifications
- terotechnology
- engineering, plant, facilities and services maintenance requirements
- continuous process improvement
- data generation, analysis, storage and feedback
- reporting techniques and documentation requirements.
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Assessment Conditions

- Assessors must:
 - have vocational competency in evaluating maintenance systems at least to the level being assessed with relevant industry knowledge and experience
 - satisfy the assessor requirements in the *Standards for Registered Training Organisations 2015 or its replacement* and comply with the *National Vocational Education and Training Regulator Act 2011*, its replacement or equivalent legislation covering VET regulation in a non-referring state/territory as the case requires.

- Where possible assessment must occur in operational workplace situations. Where this is not possible or where personal safety or environmental damage are limiting factors, assessment must occur in a sufficiently rigorous simulated environment that reflects realistic operational workplace conditions that cover all aspects of workplace performance, including environment, task skills, task management skills, contingency management skills and job role environment skills.
- Conditions for assessment must include access to all tools, equipment, materials and documentation required including relevant workplace procedures, product and manufacturing specifications.
- Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.
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