



Australian Government

MEM14092 Integrate maintenance fundamentals into an engineering task

Release: 1

MEM14092 Integrate maintenance fundamentals into an engineering task

Modification History

Release 1. Supersedes and is equivalent to MEM14092A Integrate maintenance fundamentals into an engineering task.

Application

This unit defines the skills and knowledge required to identify, apply and integrate maintenance engineering fundamentals to achieve an engineering or related task and includes identifying task parameters, personal and team functions, chain of responsibility and work health and safety (WHS) guidelines. It applies to situations where maintenance skills and knowledge must be applied across more than one engineering, system or application area to achieve a task objective. The unit is suitable for people working as maintenance technicians and draftspersons and for those pursuing careers and qualifications in maintenance engineering.

This unit should be undertaken in conjunction with technical units relevant to the equipment and processes used in the organisation.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

Competency Field

Planning

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. Investigate scope of engineering task	1.1 Follow standard operating procedures (SOPs) 1.2 Comply with WHS requirements at all times 1.3 Identify the breakdown and preventative maintenance and other related fundamentals to be integrated into engineering task 1.4 Identify stakeholders to be consulted 1.5 Identify maintainable features of plant, facilities and services

Elements	Performance Criteria
<i>Elements describe the essential outcomes.</i>	<i>Performance criteria describe the performance needed to demonstrate achievement of the element.</i>
	affected by integration task 1.6 Identify methods, processes and workshop techniques required by task 1.7 Review sustainability implications for task 1.8 Review software techniques required for task analysis and graphics 1.9 Plan task to maximise performance and reliability and prevent future breakdowns
2. Integrate maintenance fundamentals	2.1 Evaluate mathematical fundamentals, scientific principles, workshop skills, materials and processes, and software required by the task 2.2 Use systems thinking to address contingencies and constraints, problem-solving and decision-making, and continuous improvement to achieve integration task 2.3 Consult with stakeholders on timing and scope of integration task 2.4 Integrate maintenance fundamentals to achieve task objectives 2.5 Identify and seek required technical and professional assistance or clarification of design information
3. Report results	3.1 Record results of investigation, evaluation and integration 3.2 Provide supporting documentation that includes accurate and comprehensive details about maintenance fundamentals used

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 licensed technical and professional assistance includes one or more of the following:	• technical support and advice relating to elements which have intrinsic dangers • professional support for technologies.
WHS, regulatory requirements and enterprise procedures include:	• WHS acts, regulations and relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements.
Continuous improvement implementation includes one or more of the following:	• 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:	• financial • organisation procedural or culture • physical constraints including limits to resources, limits to site access or logistical limitations.
Maintenance system data includes:	• asset ID and plant warranties • standard repair schemes • modification data and configuration • procedural documents including: • monitoring and preventative maintenance schedules • safe work method statements • safety data sheets (SDS) • work permits • monitor reports and system measurements • maintenance actions and costs • spares inventory control.
Sustainability includes:	• meeting all regulatory requirements • conforming to all industry covenants, protocols and best practice guides • minimising ecological and environmental footprint of process, plant and product • maximising economic benefit of process plant and product to the organisation and the community

	• minimising the negative WHS impact on employees, community and customer.
<i>Results to be reported and supporting documentation include one or more of the following:</i>	• investigations • evaluation and integration • calculations • diagrams • programs • files.

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Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM14092A Integrate maintenance fundamentals into an engineering task.

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 MEM14092 Integrate maintenance fundamentals into an engineering task

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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:

- following work instructions, standard operating procedures (SOPs) and safe work practices
- communicating, cooperating and negotiating with stakeholders to achieve integration task
- determining task parameters, context and chain of responsibility
- identifying work health and safety (WHS), regulatory and risk management requirements and organisational procedures
- evaluating task requirements, principles, techniques, typical applications and software
- selecting and using software and graphics for required analysis and graphics
- planning the task
- integrating maintenance fundamentals to achieve task objectives on at least two occasions
- reviewing sustainability implications, functions and features for the engineering task
- reporting and documenting results on at least two occasions.

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:

- safe work practices and procedures
- maintenance and related fundamentals including:
 - materials properties
 - maintenance methods and processes
 - mechanics
 - chemistry
 - thermodynamics
 - fluid mechanics
 - fluid power
 - electrical and electronic fundamentals

- fundamentals of controller programming, interfacing and signal conditioning
- computing
- graphics, including computer-aided design (CAD)
- workshop and maintenance equipment
- functions and maintainable features of plant, facilities and services
- sources of maintenance systems data
- maintenance methods and procedures including:
 - breakdown maintenance
 - preventive maintenance
 - predictive maintenance (on-condition)
 - precision maintenance
 - proactive maintenance
 - reliability centred maintenance and modification
 - total productive maintenance
 - repair and replace methods and processes
- role and application of maintenance-related risk management procedures and analysis
- systems thinking, problem-solving and decision-making, and continuous improvement methods
- WHS and regulatory requirements, codes of practice, standards, risk management and registration requirements
- sources of professional and technical assistance
- constraints on the integration of maintenance fundamentals into an engineering task
- sustainability considerations
- current options and trends in maintenance software
- typical software applications for engineering maintenance fundamentals.
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Assessment Conditions

- Assessors must:
 - have vocational competency in integrating maintenance fundamentals into an engineering task 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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