Australian Government

MEM14089 Integrate mechanical fundamentals into an engineering task

Release: 1

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Modification History

Release 1. Supersedes and is equivalent to MEM14089A Integrate mechanical fundamentals into an engineering task.

Application

This unit defines the skills and knowledge required to identify, apply and integrate mechanical 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 is suitable for people working as mechanical designers and draftspersons and those pursuing careers and qualifications in mechanical engineering.

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

Pre-requisite Unit

MEM23004 Apply technical mathematics

MEM23109 Apply engineering mechanics principles

Competency Field

Planning

Elements and Performance Criteria

Elements	**Performance Criteria**
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
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 mechanical and related fundamentals to be integrated into engineering task 1.4 Identify stakeholders to be consulted 1.5 Review functions and features of machines, mechanisms and mechanical systems required by the task 1.6 Review software techniques required for task analysis and graphics

Elements	Performance Criteria
Elements describe the essential outcomes.	*Performance criteria describe the performance needed to demonstrate achievement of the element.*
2. Integrate mechanical fundamentals	2.1 Use systems thinking to address contingencies and constraints, problem-solving and decision-making, and continuous improvement to achieve integration task 2.2 Integrate mechanical fundamentals to achieve task objectives 2.3 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 mechanical 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.	
Mechanical and related fundamentals include one or more of the following:	• materials properties • mechanics • chemistry • thermodynamics • fluid mechanics • fluid power • electrical fundamentals • light • sound • electromagnetic effects.
Machines, mechanisms and mechanical systems	• engines: • piston

include one or more of the following:	• rotary displacement
	• turbines:
	  • liquid
	  • gas
	  • steam
	• pumps and pumping systems
	• compressors and pneumatic distribution systems
	• hydraulic systems
	• fans and ducting systems
	• heating, ventilation, air conditioning and refrigeration (HVAC/R) systems
	• mechanical drive systems and transmissions
	• brakes and clutches
	• materials handling plant:
	  • elevators
	  • cranes
	  • conveyors
	• boilers and piping systems.

Appropriate licensed technical and professional assistance include 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 • 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.

Sustainability incudes:	• 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.
Results to be reported and supporting documentation include one or more of the following:	• investigations • evaluation and integration • calculations • diagrams • programs • files.

Unit Mapping Information

Release 1. Supersedes and is equivalent to MEM14089A Integrate mechanical 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