MSACMT681A Develop a proactive maintenance strategy

Revision Number: 1

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Modification History

Not applicable.

Unit Descriptor

Unit descriptor	This unit covers the knowledge and skills needed to develop and implement a predictive maintenance strategy for a manufacturing enterprise. The unit recognises that there are a number of predictive or proactive maintenance strategies such as TPM, RCM.

Application of the Unit

Application of the unit	In a typical scenario, an organisation engaged in *competitive manufacturing* also adopts proactive maintenance strategies. The initial development and implementation will need to be managed as will subsequent changes to the strategy.
	The unit covers the selection of appropriate strategies, techniques and tools and adopting them to the organisations needs. It also covers the application of the strategies to new areas and the improvement of operation in existing areas. This would typically be done in a team environment and in consultation with all key stakeholders.
	This unit primarily requires the application of skills associated with communication in gathering, analysing and applying information and consulting with stakeholders. Teamwork, problem solving, initiative and enterprise, and planning and organising are required to develop and implement a predictive maintenance strategy. Strategies will incorporate maintenance requirements of relevant technology. This unit also requires aspects of self management and learning to ensure feedback and new learning is integrated into maintenance strategies.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Prerequisite units	

Employability Skills Information

Employability skills	This unit contains employability skills.

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance Criteria describe the performance needed to demonstrate achievement of the Element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the Range Statement. Assessment of performance is to be consistent with the Evidence Guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Determine appropriate analytical techniques	1.1. Liaise with key stakeholders to determine objectives of maintenance strategy
	1.2. Examine current maintenance situation to determine major areas requiring improvement
	1.3. Compare possible ***strategies***, ***techniques*** and ***tools*** against organisation needs
	1.4. Select possible strategies, techniques and tools
	1.5. Confirm selected strategies, techniques and tools with key stakeholders
2. Develop reliability strategies	2.1. Select preferred maintenance strategy
	2.2. Examine and adapt strategy to organisation needs and priorities
	2.3. Examine and adapt techniques and tools required to implement strategy
	2.4. Liaise with key stakeholders to develop an implementation plan
	2.5. Identify key information and performance indicators required
3. Implement strategy	3.1. Identify data collection required
	3.2. Identify hardware and other resources required
	3.3. Identify skill needs required in consultation with key stakeholders
	3.4. Ensure all resources/training are available
	3.5. Implement strategy
4. Monitor implementation of strategy	4.1. Compare information/performance indicators with desired levels
	4.2. Liaise with key stakeholders regarding strategy issues
	4.3. Identify areas requiring adjustment
	4.4. Make required adjustments

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This section describes the skills and knowledge required for this unit.

Required skills

- communication
- teamwork
- analysis
- problem solving
- mathematics
- planning
- reading and interpreting engineering specifications/drawings
- computer use
- prioritising
- recording data

Required knowledge

- characteristics and strengths of different types of strategies, techniques and tools such as TPM, RCM, MTBF, FMEA, condition monitoring, RCA
- holistic costs of different strategies combining cost of maintenance with costs of lost production, sales etc as relevant to the organisation
- business goals sufficient to match the strategy to the business needs
- strategic thinking and its application to proactive maintenance
- principles of process equipment and how to improve its reliability
- resources required and how to obtain them

Evidence Guide

EVIDENCE GUIDE The Evidence Guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, the range statement and the assessment guidelines for this training package.	
Overview of assessment requirements	The person will be able to select appropriate strategies, techniques and tools and adapt them to the organisations needs. They will also be able to apply the strategies to new areas and improve their operation in existing areas.
What are the specific resource requirements for this unit?	Access to an organisation using, or about to use, predictive maintenance strategies.
In what context should assessment occur?	Assessment will need to occur in an organisation using, or about to use, a predictive maintenance strategy or a case study or project.
Are there any other units which could or should be assessed with this unit or which relate directly to this unit?	This unit may be assessed concurrently with other relevant maintenance units and technical units related to the techniques and tools. This unit is related to: • *MSACMT280A Undertake root cause analysis* • *MSACMT281A Contribute to the application of a proactive maintenance strategy*, **and** • *MSACMT481A Undertake proactive maintenance analyses* which cover different aspects/levels of this area.
What method of assessment should apply?	Assessors must be satisfied that the person can consistently perform the unit as a whole, as defined by the Elements, Performance Criteria, skills and knowledge. A holistic approach should be taken to the assessment. Assessors should gather sufficient, fair, valid, reliable, authentic and current evidence from a range of sources. Sources of evidence may include direct observation, reports from supervisors, peers and colleagues, project work, samples, organisation records and questioning. Assessment should not require language, literacy or numeracy skills beyond those required for the unit. The assessee will have access to all techniques,

EVIDENCE GUIDE

	procedures, information, resources and aids which would normally be available in the workplace.
	The method of assessment should be discussed and agreed with the assessee prior to the commencement of the assessment.
What evidence is required for demonstration of consistent performance?	If evidence is provided from the initial introduction of a predictive maintenance strategy or a significant maintenance strategy, then one development and implementation may provide sufficient evidence. Where evidence is from the ongoing improvements of an existing strategy, then it will be needed from a range of activities to provide sufficient evidence.

Range Statement

RANGE STATEMENT	
The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.	
Competitive manufacturing	Competitive manufacturing is used to describe the range of systemic manufacturing practice concepts and approaches. It covers but is not limited to: • lean manufacturing • agile manufacturing • preventative and predictive maintenance approaches • monitoring and data gathering systems such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Manufacturing Resource Planning (MRP), and proprietary systems such as SAP • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull related manufacturing control systems • supply, value, and demand chain monitoring and analysis • other continuous improvement systems. Competitive manufacturing should be interpreted so as to take into account the stage of implementation of competitive manufacturing approaches, the enterprise's size and work organisation, culture, regulatory environment and manufacturing sector.
Strategies and techniques	***Total Preventative Maintenance***/***Total Productive Maintenance*** (***TPM***) is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing Overall Equipment Efficiency (OEE). ***Reliability Centred Maintenance*** (***RCM***) moves maintenance from reactive, or even planned/programmed towards a focus on uptime and OEE ***Root Cause Analysis*** (***RCA***). There are many possible causes of any problem. Eliminating some will have no

RANGE STATEMENT	
	impact, others will ameliorate the problem. However, elimination of the root cause will eliminate the problem. There should only be one root cause for any problem and so the analysis should continue until this one cause is found. Elimination of the root cause permanently eliminates the problem.
	Uptime refers to the overall availability of the plant - it is the inverse of downtime - or the unavailability of the plant. Ideal uptime is 100%.
	Overall Equipment Efficiency (*OEE*) is the combination of the main factors causing loss of productive capacity from equipment/plant and is:
	OEE = availability x performance x quality rate
	where:
	• availability takes into account losses due to breakdown, set up and adjustments
	• performance takes into account losses due to minor stoppages, reduced speed and idling
	• quality rate takes into account losses due to rejects, re-works and start up waste.
	Mean Time Between Failure (*MBTF*) is one key measure of the effectiveness of a maintenance procedure, and is an indicator as to whether root causes are being found and resolved. If MBTF is reducing, then it is an indicator that the maintenance regime is failing.
	Failure Mode and Effects Analysis (*FMEA*) is a systematic approach that identifies potential failure modes in a system, product, or manufacturing/assembly operation caused by either design or manufacturing/assembly process deficiencies. It also identifies critical or significant design or process characteristics that require special controls to prevent or detect failure modes. FMEA is a tool used to prevent problems from occurring.
	Some industry sectors have highly adapted forms of FMEA and may practice traditional FMEA in say their routine maintenance while using another technique (such as HAZOP) for design and modification.
	Hazard and Operability Studies (*HAZOP*) is a form of FMEA which has been practiced by the process industries for over 30 years and examines the implications of changes in process conditions to process

RANGE STATEMENT	
	stability.
	Condition monitoring involves often quite sophisticated monitoring of equipment including such things as vibration monitoring, instrumental analysis of lubricating oil etc to determine the current state of the equipment, monitor the change in this condition and predict when it needs servicing/maintenance to maintain reliability.
Tools	Tools selected will vary with the selected strategy and techniques. Tools should be compatible with the strategy and techniques chosen.
	This unit does not cover the use of selected tools.
	Tools may include root cause analysis, condition monitoring, maintenance/breakdown history, manufacturer's recommendations

Unit Sector(s)

Unit Sector	CM Tools

Co-requisite units

Co-requisite units	

Functional area

Functional Area	