



Australian Government

Department of Education, Employment and Workplace Relations

MSS404081A Undertake proactive maintenance analyses

Release: 1

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Modification History

New unit, superseding MSACMT481A Undertake proactive maintenance analyses - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to undertake the most common forms of analyses associated with predictive/preventative/reliability centred maintenance strategies.

Application of the Unit

This unit applies to a technical expert (usually an engineer, technician or tradesperson) who is required to undertake analyses for the purpose of predictive/preventative/reliability centred maintenance as part of a competitive systems and practices strategy.

This unit primarily requires the application of skills associated with communication, teamwork, problem solving, initiative and enterprise, and planning and organising in order to undertake maintenance analyses. This is normally done in the context of using computer technology, and requires aspects of learning and self-management to ensure team involvement and facilitation of learning.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

Not applicable.

Employability Skills Information

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

1	Liaise with operator	1.1	Establish a relationship with the operator of equipment/plant
		1.2	Ensure the operator has the required skills and resources to keep the equipment/plant clean
		1.3	Ensure the operator is able to effectively monitor the operation of the equipment/plant
		1.4	Regularly communicate with operator about the overall equipment effectiveness (OEE) of their equipment/plant
		1.5	Involve operator, team leader and other key personnel in identification of skill needs and means of skill acquisition to fill any identified gaps
2	Analyse history	2.1	Analyse mean time between failures (MTBF) from maintenance records
		2.2	Analyse performance data of the equipment/plant
		2.3	Identify causes of changes to historic trends/status
		2.4	Determine methods of ensuring causes of improvements and resolution of deterioration are locked in

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| 3 | Undertake failure mode effects analysis (FMEA) or similar failure effects analysis | 3.1 | Undertake analysis |
| | | 3.2 | Record results of analysis |
| | | 3.3 | Investigate methods of eliminating possibility of failure and/or minimising the impact of the failure |
| | | 3.4 | Liaise with operator, team leader and other key personnel regarding possible solutions |
| | | 3.5 | Select most appropriate solution |
| | | 3.6 | Implement selected solutions |
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| 4 | Undertake condition monitoring analysis | 4.1 | Obtain data for condition monitoring analysis |
| | | 4.2 | Interpret condition monitoring data |
| | | 4.3 | Predict required maintenance type and timing from condition monitoring data |
| | | 4.4 | Liaise with operator, team leader and other key personnel regarding implications of condition monitoring report |
| | | 4.5 | Involve team members in development of changes to maintenance strategy to ensure awareness, learning and commitment |

Required Skills and Knowledge

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

Required skills

Required skills include:

- communicating with operators and team leaders in a variety of situations and with different media
- adapting personal communication strategy to different levels of operator and team leader literacy and numeracy
- working in formal and ad-hoc teams to undertake proactive maintenance related analyses
- analyse data to determine trends, variations, equipment history and to prioritise methods of eliminating or minimising equipment failure
- solving problems to root cause
- applying basic arithmetic and statistical methods
- planning for effective data collection
- reading and interpreting engineering specifications/drawings
- reading and interpreting charts and diagrams
- using information system terminals and computer
- recording data in hard or soft formats

Required knowledge

Required knowledge includes:

- cleaning needs, techniques and principles of equipment in area of responsibility
- methods of assessing operator and maintenance skill gaps and filling them
- techniques for determining MTBF or similar
- techniques for undertaking FMEA or similar
- underpinning principles of competitive systems and practices strategies being implemented and how to adapt them to maintenance
- root cause analysis
- techniques to analyse condition monitoring data

Evidence Guide

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment

Guidelines for the Training Package.

Critical aspects for assessment and evidence required to demonstrate competency in this unit	A person who demonstrates competency in this unit must be able to provide evidence of the ability to: • identify and analyse data and other information on the historical performance of equipment • involve operators, maintenance and other stakeholders in decisions on proactive maintenance strategies • identify root cause of failure and deterioration in equipment performance • select and implement failure elimination or minimisation solutions.
Context of and specific resources for assessment	Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices. Access may be required to: • workplace procedures and plans relevant to work area • specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee • documentation and information in relation to production, waste, overheads and hazard control/management • reports from supervisors/managers • case studies and scenarios to assess responses to contingencies.
Method of assessment	A holistic approach should be taken to the assessment. Competence in this unit may be assessed by using a combination of the following to generate evidence: • demonstration in the workplace • workplace projects • suitable simulation • case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on) • targeted questioning • reports from supervisors, peers and colleagues (third-party reports) • portfolio of evidence. In all cases it is expected that practical assessment will be combined with targeted questioning to assess

	underpinning knowledge. Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the oracy, language and literacy capacity of the candidate and the work being performed.

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 systems and practices	Competitive systems and practices may include, but are not limited to: • lean operations • agile operations • preventative and predictive maintenance approaches • monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP) systems, Materials Resource Planning (MRP) and proprietary systems • statistical process control systems, including six sigma and three sigma • Just in Time (JIT), kanban and other pull-related operations control systems • supply, value, and demand chain monitoring and analysis • 5S • continuous improvement (kaizen) • breakthrough improvement (kaizen blitz) • cause/effect diagrams • OEE • takt time • process mapping
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	• problem solving • run charts • standard procedures • current reality tree Competitive systems and practices should be interpreted so as to take into account: • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
OEE	OEE is the combination of the main factors causing loss of productive capacity from equipment/plant and is: $OEE = \text{availability} \times \text{performance} \times \text{quality rate}$ 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, reworks and start-up waste
MTBF	MTBF 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 MTBF is reducing, then it is an indicator that the maintenance regime is failing. There are many possible causes of any problem. Eliminating some will have no 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. Depending on the equipment, operations and procedures of the organisation, alternative statistical records of maintenance and maintenance related events may be substituted for MTBF providing they relate strategies for improving OEE.
FMEA	FMEA is a systematic approach that identifies potential failure modes in a system, product, or operations/assembly operation caused by either design or operations/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 Hazard and Operability Studies (HAZOP) for design and modification. 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 stability.
Condition monitoring	In this unit condition monitoring is used to describe the process of analysing the implications of condition monitoring data for proactive maintenance, whether it be obtained from non-destructive testing (NDT) reports, visual assessment by experts, diagnostic reports obtained from SCADA or other enterprise or equipment software and product or process quality analyses. It does not require the actual undertaking of the NDT or condition monitoring assessment or test. If this is required appropriate units from other Training Packages will be required.

Unit Sector(s)

Unit sector

Competitive systems and practices

Custom Content Section

Not applicable.