



Australian Government

Department of Education, Employment and Workplace Relations

MSS405032A Analyse cost implications of maintenance strategy

Release: 1

MSS405032A Analyse cost implications of maintenance strategy

Modification History

New unit, superseding MSACMT632A Analyse cost implications of maintenance strategy - Equivalent

Unit Descriptor

This unit of competency covers the skills and knowledge required to analyse the cost implications of different maintenance strategies and to adjust or adopt a strategy to minimise or eliminate unnecessary costs.

Application of the Unit

This unit applies to an individual in an organisation who is selecting or reviewing its proactive maintenance strategy. While technical factors are significant in the choice of maintenance strategy and tools, cost factors will also impact on the selection of a maintenance strategy. This unit covers the cost analysis of maintenance strategies and complements the technical analysis covered in MSS405081A Develop a proactive maintenance strategy. The technical analysis may be performed by the same or a different person to the person undertaking the cost analysis.

This unit primarily requires the application of skills associated with communication in gathering, analysing and applying costing information and consulting with maintenance personnel. Problem solving, initiative and enterprise, and planning and organising are required to analyse and estimate the cost of maintenance strategies.

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	Analyse cost components of maintenance	1.1	Determine cost of failure of plant/equipment
		1.2	Determine cost of a planned maintenance shutdown activity, including costs of re-start
		1.3	Determine cost of maintenance for a planned activity
		1.4	Determine cost of maintenance for an unplanned activity
		1.5	Determine costs of condition monitoring
		1.6	Identify cost implications of different maintenance strategies
2	Estimate life cycle costs of plant/equipment	2.1	Determine initial capital cost
		2.2	Estimate servicing, maintenance and repair costs
		2.3	Estimate production and other costs associated with service, maintenance and repair
		2.4	Determine depreciation and other applicable allowances
		2.5	Estimate ancillary costs, such as training, commissioning and productivity loss
		2.6	Estimate technological life and costs of changing to current technology/costs of retaining obsolete equipment

- 2.7 Estimate annualised costs in present value terms
 - 2.8 Identify life cycle cost implications for strategy
- 3 Liaise with proactive maintenance strategy developer
 - 3.1 Identify cost implications for different strategies
 - 3.2 Negotiate a strategy which minimises total costs
 - 3.3 Monitor the implementation of the strategy to ensure the costs are minimised
 - 3.4 Make required adjustments to strategy

Required Skills and Knowledge

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

Required skills

Required skills include:

- undertaking financial modelling and calculations relevant to different maintenance scenarios
- reading and interpreting charts and diagrams
- communicating with stakeholders, including technical and production staff to identify implications of maintenance strategies
- identifying sources of information on depreciation, allowances and ancillary costs
- analysing data and qualitative information on impact of different maintenance strategies on meeting customer needs
- solving problems to root cause
- preparing strategies and recommendations for stakeholders

Required knowledge

Required knowledge includes:

- techniques, calculations and data used in different maintenance strategies
- cost components of maintenance strategies
- interrelationship of cost components and maintenance activities

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 current and potential maintenance strategies • communicate effectively with operators, maintenance personnel, engineers and other stakeholders on implications of maintenance strategies • make recommendations on optimal maintenance
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	strategies from a cost perspective.
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 • overall equipment effectiveness (OEE) • takt time • process mapping • 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
Maintenance strategies and	Maintenance strategies and techniques may include:

techniques	• total productive maintenance (TPM) • reliability centred maintenance (RCM) • root cause analysis (RCA) • mean time between failures (MTBF) • failure mode and effects analysis (FMEA) • condition monitoring
Cost components of maintenance	For costing purposes, maintenance strategies should include: • direct costs, such as labour and materials, and also include comparison with cost of equipment replacement, re-engineering, and breakdown repair strategies, as well as cost of lost production under different maintenance strategies
TPM	TPM is an application of total quality management to maintenance with the intention of increasing reliability, getting it right first time and increasing OEE
RCM	RCM moves maintenance from reactive, or even planned/programmed towards a focus on uptime and OEE
RCA	RCA is a formal problem solving technique. In RCA there are many possible causes of any problem. Eliminating some will have no impact, while eliminating others will ameliorate the problem. However, elimination of the root cause will eliminate the problem completely. 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
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
Uptime	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%
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 process 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

Unit Sector(s)

Unit sector Competitive systems and practices

Custom Content Section

Not applicable.