



**Australian Government**

# **MSS405053A Manage application of six sigma for process control and improvement**

**Release 2**

# MSS405053A Manage application of six sigma for process control and improvement

## Modification History

Release 2 - Prerequisite unit code corrected - MSS404052A

Release 1 - New unit, superseding MSACMT653A Apply six sigma to process control and improvement\* - Equivalent

\* New prerequisite *MSS404052A Apply statistics to operational processes* superseding MSACMT452A Apply statistics to processes in manufacturing

## Unit Descriptor

This unit of competency covers the skills and knowledge required to manage six sigma in the workplace for the purposes of process control and process improvement.

## Application of the Unit

This unit covers the skills and knowledge needed by a technical expert in managing the application of six sigma in an organisation in order to minimise defects and make improvements to processes and/or products. Depending on the need the expert will apply six sigma processes themselves or work with, and advise, other employees in applying six sigma processes.

This unit requires the application of skills associated with problem solving, initiative, enterprise, planning and organising in order to apply six sigma in the workplace. This unit requires skill in gathering, analysing and applying information and data.

Depending on the situation of the enterprise and the complexity of their operations process the following units may also be required in implementing six sigma at an enterprise:

- *MSS403010A Facilitate change in an organisation implementing competitive systems and practices*
- *MSS403051A Mistake proof a production process*
- *MSS404081A Undertake proactive maintenance analyses*
- *MSS405002A Analyse and map a value stream*
- *MSS405011A Manage people relationships*
- *MSS405050A Determine and improve process capability*
- *MSS405052A Design an experiment*
- *MSAPMSUP390A Use structured problem solving tools.*
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## Licensing/Regulatory Information

Not applicable.

## Pre-Requisites

MSS404052A Apply statistics to operational processes

## 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	Review process data	1.1	Confirm area of responsibility/study with executive leaders and other stakeholders
		1.2	Review statistical process control (SPC), process capability and other relevant data for area of responsibility/study
		1.3	Identify shifts in process performance and processes requiring improvement
		1.4	Quantify the shifts in performance which have occurred or which are desired
		1.5	Determine cost of shift in performance and cost of intervention
		1.6	Identify improvement priorities and degree of intervention
2	Apply define, measure, analyse, improve, and control and	2.1	Define improvement project
		2.2	Determine if a six sigma project team is to be established or project undertaken individually

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| standardise<br>(DMAIC) process<br>to priority areas | 2.3                                    | Determine metrics and acquire initial data  |  |
|   | 2.4                                    | Analyse data and determine possible causes of performance shifts/process improvements |  |
|   | 2.5                                    | Develop and trial improvement solutions   |  |
|   | 2.6                                    | Control and standardise the improvement   |  |
| 3   | Establish/review<br>control strategies | 3.1   | Determine sampling schedule  |
|   |  | 3.2   | Analyse data to determine process capability   |
|   |  | 3.3   | Develop process control strategy   |
|   |  | 3.4   | Confirm strategy with all stakeholders   |
|   |  | 3.5   | Identify skills required to implement and monitor process control strategy                                   |
|   |  | 3.6   | Arrange training, where required, for employees in skills and techniques needed for process control strategy |
| 4   | Review and<br>confirm<br>improvement   | 4.1   | Calculate and document benefits  |
|   |  | 4.2   | Ensure procedures and other relevant documentation is updated for improved procedure                         |
|   |  | 4.3   | Review process data after an appropriate period and confirm the improvement                                  |

## Required Skills and Knowledge

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

### Required skills

Required skills include:

- identifying and defining six sigma projects
- developing procedures for collection and analysis of data
- reporting and presenting data and quantitative information
- analysing priorities and improvement projects and determining where individual or team effort is required
- determining and completing appropriate charts for a project
- communicating and explaining DMAIC methods to others
- leading a six sigma project team
- documenting and reporting six sigma project benefits in both statistical (defect reduction) and benefit/cost terms

### Required knowledge

Required knowledge includes:

- charting, including:
  - Pareto charts
  - fishbone diagrams
  - PICK charts
  - run charts
  - scatter diagrams
- statistical principles and analysis, including:
  - confidence limits
  - analysis of variance
  - presentation data:
    - frequency distribution tables
    - histograms
  - measures of central tendency:
    - arithmetic mean
    - median
    - mode
  - measures of dispersion:

- standard deviation
- range
- interquartile range
- correlation and dependence
- acceptance criteria/confidence levels
- DMAIC methods
- failure mode and effects analysis (FMEA)
- process mapping
- suppliers, inputs, process, outputs, customers (SIPOC) mapping
- types of data (e.g. discrete/continuous/attributes) and their use in six sigma

## 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.

<p><b>Critical aspects for assessment and evidence required to demonstrate competency in this unit</b></p>	<p>A person who demonstrates competency in this unit must be able to provide evidence of the ability to:</p> <ul style="list-style-type: none"> <li>• analyse statistical data and identify significant variations and other indicators for potential six sigma projects</li> <li>• apply DMAIC process individually</li> <li>• lead others in DMAIC process</li> <li>• review control strategies</li> <li>• confirm improvements.</li> </ul>
<p><b>Context of and specific resources for assessment</b></p>	<p>Assessment of performance must be undertaken in a workplace using or implementing one or more competitive systems and practices.</p> <p>Access may be required to:</p> <ul style="list-style-type: none"> <li>• workplace procedures and plans relevant to work area</li> <li>• specifications and documentation relating to planned, currently being implemented, or implemented changes to work processes and procedures relevant to the assessee</li> <li>• documentation and information in relation to production, waste, overheads and hazard control/management</li> <li>• reports from supervisors/managers</li> <li>• case studies and scenarios to assess responses to contingencies.</li> </ul>

<p><b>Method of assessment</b></p>	<p>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:</p> <ul style="list-style-type: none"> <li>• demonstration in the workplace</li> <li>• workplace projects</li> <li>• suitable simulation</li> <li>• case studies/scenarios (particularly for assessment of contingencies, improvement scenarios, and so on)</li> <li>• targeted questioning</li> <li>• reports from supervisors, peers and colleagues (third-party reports)</li> <li>• portfolio of evidence.</li> </ul> <p>In all cases it is expected that practical assessment will be combined with targeted questioning to assess underpinning knowledge.</p> <p>Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.</p>
<p><b>Guidance information for assessment</b></p>	<p>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.</p>

## 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.

<p><b>Competitive systems and practices</b></p>	<p>Competitive systems and practices may include, but are not limited to:</p> <ul style="list-style-type: none"> <li>• lean operations</li> <li>• agile operations</li> <li>• preventative and predictive maintenance approaches</li> <li>• monitoring and data gathering systems, such as Systems Control and Data Acquisition (SCADA) software, Enterprise Resource Planning (ERP)</li> </ul>
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	<p>systems, Materials Resource Planning (MRP) and proprietary systems</p> <ul style="list-style-type: none"> <li>• statistical process control systems, including six sigma and three sigma</li> <li>• Just in Time (JIT), kanban and other pull-related operations control systems</li> <li>• supply, value, and demand chain monitoring and analysis</li> <li>• 5S</li> <li>• continuous improvement (kaizen)</li> <li>• breakthrough improvement (kaizen blitz)</li> <li>• cause/effect diagrams</li> <li>• overall equipment effectiveness (OEE)</li> <li>• takt time</li> <li>• process mapping</li> <li>• problem solving</li> <li>• run charts</li> <li>• standard procedures</li> <li>• current reality tree</li> </ul> <p>Competitive systems and practices should be interpreted so as to take into account:</p> <ul style="list-style-type: none"> <li>• the stage of implementation of competitive systems and practices</li> <li>• the size of the enterprise</li> <li>• the work organisation, culture, regulatory environment and the industry sector</li> </ul>
<p><b>DMAIC</b></p>	<p>DMAIC is a structured improvement methodology for existing business processes involving the following stages:</p> <ul style="list-style-type: none"> <li>• define</li> <li>• measure</li> <li>• analyse</li> <li>• improve</li> <li>• control and standardise</li> </ul>
<p><b>Define</b></p>	<p>Definition of the project to include:</p> <ul style="list-style-type: none"> <li>• completed, verified and validated as in process map</li> <li>• SIPOC diagram</li> <li>• discrepancies to current 'as is' process map</li> <li>• formation and briefing of project team</li> <li>• defining business case for project</li> <li>• problem statement</li> </ul>



	<ul style="list-style-type: none"> <li>• goal statement</li> <li>• project scope</li> </ul>
<b>Metrics</b>	<p>Metrics may include:</p> <ul style="list-style-type: none"> <li>• key measures/attributes</li> <li>• sampling schedule for project</li> <li>• defect rate</li> </ul>
<b>Analyse</b>	<p>Analyse may include:</p> <ul style="list-style-type: none"> <li>• statistical analysis of data</li> <li>• root cause analysis</li> <li>• FMEA</li> <li>• use of various other problem solving/analysis tools</li> </ul>
<b>Improve</b>	<p>Improve may include:</p> <ul style="list-style-type: none"> <li>• generating and testing of improvements</li> <li>• selecting appropriate improvements</li> </ul>
<b>Control and standardise</b>	<p>Control and standardise may include:</p> <ul style="list-style-type: none"> <li>• documenting outcomes and procedures for standardisation</li> <li>• transferring ownership of improved process</li> </ul>
<b>Sampling schedule</b>	<p>Sampling schedule may include:</p> <ul style="list-style-type: none"> <li>• sampling frequency</li> <li>• type of sample/sample method</li> <li>• sample location/type</li> <li>• type of test/data to be collected</li> </ul>
<b>Process control strategy</b>	<p>Process control strategy may include:</p> <ul style="list-style-type: none"> <li>• degree of intervention/rules for resets</li> <li>• SPC tools to be used</li> </ul>

## Unit Sector(s)

Unit sector

Competitive systems and practices

## **Custom Content Section**

Not applicable.