



Australian Government

MEM23118A Apply production and service control techniques

Release 1

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Modification History

Release 1 - New unit. Replaces MEM23083A, but not equivalent.

Unit Descriptor

This unit of competency covers the application of techniques for production and service control to maintain efficient and effective supply of product or service delivery to customers and to provide data for improvements to enhance competitiveness. This unit includes monitoring and measurement of quality, costs, quantities and reliability of processes in the value chain, including maintenance activities to ensure customer requirements. It requires the use of statistical process control (SPC), and control charts and the graphical representation of results.

Application of the Unit

This unit applies to individuals who are required to control production and/or service delivery processes to ensure quality and for product manufacture or the provision of services to defined quality and operational requirements. It is suitable for people working as service providers, supervisors or technicians and those pursuing manufacturing, engineering or related technical qualifications and careers.

Licensing/Regulatory Information

Not applicable.

Pre-Requisites

MEM30012A Apply mathematical techniques in a manufacturing, engineering or related environment

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.

Elements and Performance Criteria

1	Establish scope of required production or service control	1.1	Identify products or services required by customers, including quality and delivery requirements
		1.2	Identify current production or service control tasks, key performance indicators (KPIs), and context within organisation strategic objectives and markets
		1.3	Identify software techniques required for production or service control, communications and reporting
		1.4	Identify stakeholders to be consulted on the production or service control tasks
		1.5	Confirm work health and safety (WHS) and regulatory requirements, codes of practice, standards and risk assessment requirements
2	Review current data collection and production or service provision	2.1	Determine measurable parameters of production process or service delivery
		2.2	Determine parameters of product or service that are open to control and establish tolerances or acceptable variation
		2.3	Review process control functions
		2.4	Review production control performance indicators/indices
		2.5	Review the role of probability in sampling and SPC
		2.6	Review process capability and SPC evaluation, control

- charts and sampling
- 2.7 Review features and functions of graphical methods for display of data
- 3 Analyse data and apply production control principles to improve product manufacture or service provision
- 3.1 Obtain or record production or service data or appropriate data samples using a range of manual and automated devices
- 3.2 Use software and control chart techniques to generate histograms, Pareto diagrams, flowcharts, tallycharts, scatter plots and/or run charts in accordance with procedures
- 3.3 Analyse data for trends and correlations and apply to process improvement, quality control and other support functions according to procedures
- 3.4 Determine process capability indices for an appropriate sample of a product or service delivery
- 3.5 Establish required performance indicators for production or service operations
- 3.6 Take corrective action in accordance with procedures
- 3.7 Monitor production or service delivery using control charts to determine compliance of the product or service with specified performance limits
- 3.8 Take further corrective action, as required
- 4 Report results
- 4.1 Provide required reports
- 4.2 Provide documentation, such as data, graphics, capability assessments, control and continuous improvement processes

Required Skills and Knowledge

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

Required skills

Required skills include:

- identifying production control task parameters and context within organisation strategic objectives and markets
- confirming stakeholder and support functional group interdependencies and communications, reporting and information flow
- determining controllable parameters of product or service and acceptable variation
- using manual and automatic methods for measurement, data gathering and analysis
- production of different charts used in production and service control, including:
 - histograms
 - Pareto diagrams
 - flowcharts
 - tallycharts
 - scatter plots
 - run charts
- applying a range of sampling plans to products or measurable aspects of services and justifying the choice of sampling plan
- analysing data for trends and correlations
- setting of KPIs capable of measurement and ongoing monitoring
- determining appropriate corrective actions based on analysis of measurable production or service performance parameters

Required knowledge

Required knowledge includes:

- process capability, including:
 - capable processes definition
 - upper, lower and target specification limits
 - in-control
 - out-of-control, assignable causes and trends
 - corrective action plans, such as Western Electric, Wheeler or Nelson rules
 - capability indices
 - sample estimators
 - confidence intervals for indices and Chi square distribution

- role of production or process control in supporting lean processes, for example:
 - value stream management
 - standardised work
 - demand pull
 - just-in-time (JIT)
 - process levelling
 - cycle time
 - quick changeover
 - preventative maintenance
 - waste minimisation
 - efficient process layout
- role of production control in quality maintenance:
 - mistake proofing process
 - defect detection, production halt and correction procedures
 - total quality management (TQM), quality assurance (QA) procedures and quality control (QC), and SPC processes
 - role of SPC and process capability
- production control performance indicators/indices
- applications where role of probability in sampling and SPC is important
- SPC, including:
 - data types and frequency distributions
 - population mean and standard deviation
 - sample mean and standard deviation
 - upper and lower specification limits and target
 - upper and lower process control limits and centre line
 - data mean and process control centre line offset
 - 3 sigma σ and 6 sigma σ
 - sigma shift to account for long-term drift of data
- types and functions of control charts
- attributes and variables of sampling plans
- features and functions of graphical methods for display of data:
 - Ishikawa 'Fishbone' diagrams
 - histograms
 - Pareto analysis diagrams
 - flowcharts
 - tallycharts
 - scatter plots
 - run charts, including control charts
- types of manual and automated data collection and information flow

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>Overview of assessment</p>	<p>A person who demonstrates competency in this unit must be able to measure and analyse production or service performance data and apply techniques for process control to maintain efficient and effective production or supply or service to customers and to provide data for improvements to enhance competitiveness. This includes working individually and as part of a team in accordance with organisational procedures</p>
<p>Critical aspects for assessment and evidence required to demonstrate competency in this unit</p>	<p>Assessors must be satisfied that the candidate can competently and consistently:</p> <ul style="list-style-type: none"> • determine measurable and controllable parameters of product or service, • determine acceptable variation of production or service parameters • use manual and automatic methods for measurement, data gathering and analysis • apply software and control chart techniques for SPC, performance analysis and graphical representations, including generating histograms, Pareto diagrams, flowcharts, tally charts, scatter plots and/or run charts from production or measurable service data • review production and service functions in order to recommend or make process improvements that are based on statistical analyses • identify WHS and regulatory requirements, risk management and related organisational procedures • report and document results.
<p>Context of and specific resources for assessment</p>	<ul style="list-style-type: none"> • This unit may be assessed on the job, off the job or a combination of both on and off the job. Where assessment occurs off the job, then a simulated working environment must be used where the range of conditions reflects realistic workplace situations. • The competencies covered by this unit would be demonstrated by an individual working alone or as part of a team. • Where applicable, reasonable adjustment must be made to work environments and training situations to accommodate ethnicity, age, gender, demographics and disability.

	<ul style="list-style-type: none"> • Access must be provided to appropriate learning and/or assessment support when required. Where applicable, physical resources should include equipment modified for people with disabilities.
Method of assessment	<ul style="list-style-type: none"> • Assessment must satisfy the endorsed Assessment Guidelines of the MEM05 Metal and Engineering Training Package. • Assessment methods must confirm consistency and accuracy of performance (over time and in a range of workplace relevant contexts) together with application of underpinning knowledge. • Assessment methods must be by direct observation of tasks and include questioning on underpinning knowledge to ensure correct interpretation and application. • Assessment may be applied under project-related conditions (real or simulated) and require evidence of process. • Assessment must confirm a reasonable inference that competency is not only able to be satisfied under the particular circumstance, but is able to be transferred to other circumstances. • Assessment may be in conjunction with assessment of other units of competency where required.
Guidance information for assessment	Assessment processes and techniques must be culturally appropriate and appropriate to the 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.

Production control related tasks	<p>Production control related tasks covered by this unit may include:</p> <ul style="list-style-type: none"> • measuring and recording data either manually or using automated data collection • determining process capability indices for a large sample of a product with a particular dimension normally distributed within upper and lower specification limits • applying a range of sampling plans to products or measurable aspects of services and justify the choice of sampling plan based
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	<p>on the properties required of the plan</p> <ul style="list-style-type: none"> • applying control charts to a sample from a product or service to determine acceptability of the product or service within set limits (e.g. 3σ and 6σ limits) • analysing data for trends and taking corrective action in accordance with procedures • selecting and employing appropriate control charts from c-chart, p-chart and X-bar and R or np control charts • employing a Pareto analysis to determine priority issues for solutions related to a specific problem
Process control	Process control includes the qualitative and quantitative analysis of the process and production data necessary to ensure customer requirement
Required performance indicators for production or service operations	<p>Required performance indicators for production or service operations will vary according to the nature of the product or service and may include:</p> <ul style="list-style-type: none"> • design features, such as dimensional and weight specifications and tolerances • production schedules • organisation or customer specified target error rates and waste, including those set under lean systems, such as 6σ • equipment availability indices • mass balancing targets • WHS related indicators (e.g. lost time injury) • takt time compliance
WHS, regulatory requirements and enterprise procedures	<p>WHS, regulatory requirements and enterprise procedures may include:</p> <ul style="list-style-type: none"> • WHS Acts and regulations • relevant standards • codes of practice from Australian and overseas engineering and technical associations and societies • risk assessments • registration requirements • safe work practices • state and territory regulatory requirements
Lean principles	Lean principles and techniques use cost, capacity and responsiveness, quality, reliability and waste minimisation as drivers of the process and measures for process improvement.

Unit Sector(s)

Competency field

Unit sector Engineering science

Custom Content Section

Not applicable.