



Australian Government

Department of Education, Employment and Workplace Relations

MSS405024A Apply the theory of constraints

Release: 1

MSS405024A Apply the theory of constraints

Modification History

New unit

Unit Descriptor

This unit of competency covers the skills and knowledge required to apply the theory of constraints to organisational change.

Application of the Unit

This unit applies to individuals who as part of their work role need to apply the theory of constraints to assist their organisation to maximise output from a capacity constrained process or system. The unit will normally be applied as part of an organisation's improvement strategy and in conjunction with other competitive systems and practices units.

The person will typically be a technician, manager or other person who works with others in the bringing of change to an organisation as part of a formal team or otherwise. The unit includes liaison and communication with others, as required.

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	Identify the system constraint and throughput	1.1	Identify goals and objectives of the organisation
		1.2	Identify systems, processes and products to be examined
		1.3	Determine throughput of steps within the system
		1.4	Identify the capacity constrained process
		1.5	Determine optimum throughput of capacity constrained process (drum)
		1.6	Determine maximum system throughput based on the capacity constrained process
2	Optimise constraint throughput	2.1	Determine optimum accumulation (buffer) before capacity constrained process
		2.2	Determine appropriate supply schedule and trigger (rope) for buffer
		2.3	Implement buffer and rope to match drum
		2.4	Monitor capacity constrained process and system to ensure optimum throughput
		2.5	Take required actions to minimise non-productive rate at capacity constrained process

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| 3 | Prioritise processes and resources to maximising output at the constraint | 3.1 | Ensure operations and individuals in non-constrained locations protect buffers and prevent build-up of work in process except at buffer locations |
| | | 3.2 | Identify operations that conflict with maximising constraint performance and replace with measures that help maximise throughput |
| 4 | Determine strategy to reduce capacity constraint | 4.1 | Examine causes of the constrained capacity |
| | | 4.2 | Develop possible ways of increasing system capacity |
| | | 4.3 | Analyse and rank possible alternatives for increasing capacity |
| | | 4.4 | Draft a strategy for increasing capacity of system |
| | | 4.5 | Obtain required approval for response strategy |
| 5 | Implement a process of on-going improvement as appropriate | 5.1 | Develop an implementation plan appropriate to the organisation |
| | | 5.2 | Implement plan, as appropriate |
| | | 5.3 | Monitor implementation |
| | | 5.4 | Modify implementation plan, as appropriate |
| | | 5.5 | Identify next capacity constrained process and take appropriate action |

Required Skills and Knowledge

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

Required skills

Required skills include:

- identifying steps and processes in current operations system
- identifying current performance against key performance indicators (KPIs)
- determining where performance especially sub-optimal performance relates to unique factors or is a manifestation of other symptoms/circumstances
- manipulating data
- communicating with relevant people and asking leading questions
- developing strategic plans for change including identification of:
 - what to change
 - goal of change
 - how to make the change
 - how to measure the change
 - resources required for change
 - timeline

Required knowledge

Required knowledge includes:

- theory of constraints, including:
 - the five focusing steps
 - types of constraints, including capacity, policy, human resources (HR), market or supplier constraints
 - drum-buffer-rope or 'choke-release' methodology of reducing lead time through the organisation
 - the goals and objectives of the organisation
 - internal and external constraints
 - throughput, inventory and operating expenses
 - identifying KPI's which create conflict and affect constraint performance
 - exploiting a constraint, which includes working through breaks on split shift systems, or the strategic use of overtime
 - subordinating which includes giving a constraint preference during breakdowns and supply
 - concepts of weakest link (drum), including difference between cost approach and

- throughput approach
- duration (in production applications this is often known as material release buffer or inventory to protect the weakest link/constraint)
 - release timing of buffer (rope)
 - organisation processes, products and internal and external customers

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>Critical aspects for assessment and evidence required to demonstrate competency in this unit</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"> • identify capacity constrained process implement drum-buffer-rope strategy • analyse causes of constrained capacity and develop a response strategy.
<p>Context of and specific resources for assessment</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"> • 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 • minutes of meetings and other records relevant to determining and dealing with the core conflict.
<p>Method of assessment</p>	<p>A holistic approach should be taken to the assessment.</p> <p>Competence in this unit may be assessed by using a combination of the following to generate evidence:</p> <ul style="list-style-type: none"> • demonstration in the workplace • workplace projects

	<ul style="list-style-type: none"> • 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. <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>Guidance information for assessment</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>Competitive systems and practices</p>	<p>Competitive systems and practices may include, but are not limited to:</p> <ul style="list-style-type: none"> • 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
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	<ul style="list-style-type: none"> • 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 <p>Competitive systems and practices should be interpreted so as to take into account:</p> <ul style="list-style-type: none"> • the stage of implementation of competitive systems and practices • the size of the enterprise • the work organisation, culture, regulatory environment and the industry sector
Constraint	<p>A constraint is anything in the organisation that prevents or makes it harder for the organisation to achieve improved performance. Constraints may be:</p> <ul style="list-style-type: none"> • internal or external to the organisation • physical (equipment or material-based) • process-based (inefficient or wrong processes/policies/logistics) • people-based (poor training, communication) • market based (lack of demand)
Capacity constrained process	<p>A key assumption in this unit and in the theory of constraints is that improved performance is limited by one (or at most a few) capacity constrained process</p>
Internal constraint	<p>Internal constraints exist where customers demand more than the organisation can deliver (e.g. product, performance and/or quality)</p>
External constraint	<p>External constraints exist where the organisation is producing more (product or services) than are wanted by customers</p>
Drum-buffer-rope	<p>Drum-buffer-rope (choke/release) is a system to avoid flooding the system with inventory. Raw materials are</p>

	released at a rate to which the constraint can cope (i.e. to a rhythm set by the drum). A buffer is placed in front of the constraint and strictly managed to protect capacity loss
Non-productive time	Non-productive time may include: <ul style="list-style-type: none">• quality losses• downtime• other availability losses

Unit Sector(s)

Unit sector

Competitive systems and practices

Custom Content Section

Not applicable.