



**Australian Government**

**Department of Education, Employment and Workplace Relations**

# **CPCBC4043A Operate a self-erecting tower crane**

**Release: 1**

## **CPCBC4043A Operate a self-erecting tower crane**

### **Modification History**

Not Applicable

### **Unit Descriptor**

#### **Unit descriptor**

This unit of competency specifies the outcomes required to operate a self-erecting tower crane, including planning and preparing for work, conducting operational checks, safely and effectively operating the self-erecting tower crane for a range of tasks including lifting and moving loads, monitoring and shutting down in accordance with designated Australian standards.

### **Application of the Unit**

#### **Application of the unit**

This unit may have application in a range of industries, including automotive, defence, forests, maritime, metals and engineering, mining, transport and distribution, in addition to general construction.

### **Licensing/Regulatory Information**

Not Applicable

## Pre-Requisites

**Prerequisite units** Nil

## Employability Skills Information

**Employability skills** This unit contains employability skills.

## Elements and Performance Criteria Pre-Content

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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

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare for operation.	<p>1.1. Applicable <i>safety (OHS), licensing, legislative</i> and <i>organisational requirements</i> relevant to operating a self-erecting tower crane are verified and complied with.</p> <p>1.2. <i>Work order</i> is reviewed, confirmed and clarified with <i>appropriate personnel</i>.</p> <p>1.3. Type of operations to be conducted with a <i>self-erecting tower crane</i> are assessed and prepared.</p> <p>1.4. <i>Equipment</i> is selected appropriate to work requirements and checked for operational effectiveness in accordance with manufacturer recommendations.</p> <p>1.5. Self-erecting tower crane operations are planned in accordance with site procedures.</p> <p>1.6. <i>Environmental protection measures</i> are adhered to in accordance with environmental plans and regulations.</p> <p>1.7. Communication with others is established and maintained in accordance with OHS requirements.</p>
2. Inspect and test self-erecting tower crane.	<p>2.1. Self-erecting tower crane is visually inspected prior to operation for any evidence of damage, structural weakness or interference according to pre-operational safety check procedures and service logbook inspection.</p> <p>2.2. <i>Pre start-up checks</i> are carried out on equipment in accordance with manufacturer recommendations and specifications.</p> <p>2.3. Self-erecting tower crane controls and functions, including manoeuvrability, emergency functions, gear and accessories are checked for serviceability and any faults are rectified or reported.</p> <p>2.4. Tower functions are checked after start-up and are monitored throughout operation.</p> <p>2.5. Site <i>hazards</i> associated with self-erecting tower crane operations are detected and documented, risks assessed and safe operating techniques used to eliminate or control risks.</p>
3. Prepare for erection.	<p>3.1. Self-erecting tower crane is positioned in accordance with work instructions, manufacturer specifications and statutory regulations.</p> <p>3.2. Ground or base is assessed to ensure it will</p>

**ELEMENT****PERFORMANCE CRITERIA**

<b>ELEMENT</b>	<b>PERFORMANCE CRITERIA</b>
4. Operate self-erecting tower crane.	<p>withstand crane operation without subsidence, in accordance with engineer specifications.</p> <p>3.3. <b>Barriers and signage</b> are used to isolate the work area in accordance with safe work practices, load shifting requirements and the work plan.</p> <p>3.4. Self-erecting tower crane is positioned to ensure a level operating platform in accordance with manufacturer instructions and statutory regulations.</p> <p>3.5. Activities are coordinated with <b>riggers, doggers</b> and other crane operators.</p> <p>3.6. Self-erection system is activated to achieve the required height of operation in accordance with manufacturer specifications.</p> <p>3.7. Rig is handed over to riggers to complete erection and <b>stability</b> procedures.</p> <p>4.1. Self-erecting tower crane is operated with <b>ground controls</b> to work instructions and in accordance with company operating procedures and manufacturer specifications.</p> <p>4.2. Communication practices associated with lifting and moving loads are conducted in accordance with work site procedures and are confirmed between parties.</p> <p>4.3. Start-up and shutdown procedures are performed in accordance with manufacturer specifications and site requirements.</p> <p>4.4. <b>Weight of load</b> is confirmed as complying with crane lifting capacity, operating radius and crane load chart.</p> <p>4.5. <b>Lifting gear</b> is selected, inspected, attached and used in accordance with working load limits and OHS legislation.</p> <p>4.6. Crane movements are checked for safe operation and load is prepared for lifting in accordance with crane, dogging and rigging requirements.</p> <p>4.7. Load is manoeuvred to position using the control systems to manufacturer specifications and continually monitored throughout its travel, and <b>tasks</b> are completed effectively.</p> <p>4.8. Load is lifted and moved in accordance with the agreed crane schedule and conventional hand and audible signals that meet OHS legislation and work site procedures.</p> <p>4.9. Load is constantly monitored to ensure safety to</p>

ELEMENT	PERFORMANCE CRITERIA
5. Shut down and stow self-erecting tower crane.	<p>personnel, load and structural stability, with monitoring systems and alarms immediately acted upon in accordance with site requirements.</p> <p>5.1. Self-erecting tower crane is shut down and stowed using the correct sequence of procedures in accordance with manufacturer recommendations and specifications.</p> <p>5.2. Routine post-operational checks are carried out in accordance with manufacturer specifications.</p> <p>5.3. Self-erection system is lowered by activating the recoil procedure or ram in accordance with manufacturer specifications.</p> <p>5.4. Self-erecting tower crane operations and faults are <i>recorded and reported</i> to appropriate personnel.</p>

## Required Skills and Knowledge

### REQUIRED SKILLS AND KNOWLEDGE

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

#### Required skills

Required skills for this unit are:

- communication skills to:
  - enable clear and direct communication, using questioning to identify and confirm requirements, share information, listen and understand
  - clarify and confirm work order with appropriate personnel
  - follow instructions
  - participate in on-site meetings
  - report faults and respond appropriately
  - read and interpret:
    - instructions
    - work orders
    - other relevant documentation
  - use a range of communication technologies and equipment
  - use and interpret non-verbal communication
  - use language and concepts appropriate to cultural differences
  - written skills to:

## REQUIRED SKILLS AND KNOWLEDGE

- document hazards
- record and report faults relating to self-erecting tower crane operations
- comply with legislation, regulations, standards, codes of practice and established safe practices and procedures for conducting self-erecting tower crane operations
- efficiently and safely conduct self-erecting tower crane operations
- inspect work plans (job safety analyses and safe work method statements) in accordance with legislation
- numeracy skills to calculate rated capacity, working load limits and load charts
- use and maintain relevant tools, machinery and equipment
- verify problems and equipment faults and demonstrate appropriate response procedures.

### Required knowledge

Required knowledge for this unit is:

- environmental protection requirements relating to the disposal of waste material
- established communication channels and protocols in the workplace
- federal, state and territory OHS legislation, regulations, standards and codes of practice relevant to the full range of processes for conducting self-erecting tower crane operations
- job safety analysis (JSA) and safe work method statements
- material safety data sheets (MSDS) and material handling methods
- organisational and site standards, requirements, policies and procedures for conducting self-erecting tower crane operations
- procedures for recording, reporting and maintaining workplace records and information
- remote control operations and indicators
- risk assessment and management
- routine problems encountered with equipment use or adjustment and required corrective actions
- self-erecting tower crane capabilities and gear
- self-erecting tower crane operations and operating techniques
- techniques for calculating rated capacity, working load limits and load charts
- types of tools and equipment, and procedures for their use, operation and maintenance.

## Evidence Guide

### EVIDENCE GUIDE

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The evidence guide provides advice on assessment and must be read in conjunction

## EVIDENCE GUIDE

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with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

### Overview of assessment

This unit of competency could be assessed by providing evidence that the candidate can safely and efficiently conduct self-erecting tower crane operations according to organisational and regulatory requirements.

This unit of competency can be assessed in the workplace or a close simulation of the workplace environment, provided that simulated or project-based assessment techniques fully replicate construction workplace conditions, materials, activities, responsibilities and procedures.

### 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:

- comply with organisational and site policies and procedures, including quality requirements and state or territory legislation applicable to workplace operations.
- comply with OHS and environmental regulations, policies and procedures
- communicate effectively and work safely with others in the work area
- conduct effective risk assessment and management procedures
- complete the raising and lowering of the coil structure or ram
- operate a self-erecting tower crane, including all functions to their maximum extension and travel in the lifting and moving of at least three differing load types (including different sizes, shapes, weights and materials) to different locations on the site
- conduct pre and post-operational checks of the self-erecting tower crane.

### Context of and specific resources for assessment

This competency is to be assessed using standard and authorised work practices, safety requirements and environmental constraints.

Assessment of essential underpinning knowledge



## EVIDENCE GUIDE

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will usually be conducted in an off-site context.

Assessment is to comply with relevant regulatory or Australian standards' requirements.

Resource implications for assessment include:

- workplace location or simulated workplace
- materials and equipment relevant to self-erecting tower crane operations
- specifications and work instructions.

Reasonable adjustments for people with disabilities must be made to assessment processes where required. This could include access to modified equipment and other physical resources, and the provision of appropriate assessment support.

### Method of assessment

Assessment methods must:

- satisfy the endorsed Assessment Guidelines of the Construction, Plumbing and Services Training Package
- include direct observation of tasks in real or simulated work conditions, with questioning to confirm the ability to consistently identify and correctly interpret the essential underpinning knowledge required for practical application
- reinforce the integration of employability skills with workplace tasks and job roles
- confirm that competency is verified and able to be transferred to other circumstances and environments.

Validity and sufficiency of evidence requires that:

- competency will need to be demonstrated over a period of time reflecting the scope of the role and the practical requirements of the workplace
- where the assessment is part of a structured learning experience the evidence collected must relate to a number of performances assessed at different points in time and separated by further learning and practice, with a decision on competency only taken at the point when the assessor has complete confidence in the person's demonstrated ability

## EVIDENCE GUIDE

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and applied knowledge

- all assessment that is part of a structured learning experience must include a combination of direct, indirect and supplementary evidence.

Assessment processes and techniques should as far as is practical take into account the language, literacy and numeracy capacity of the candidate in relation to the competency being assessed.

Supplementary evidence of competency may be obtained from relevant authenticated documentation from third parties, such as existing supervisors, team leaders or specialist training staff.

## Range Statement

### RANGE STATEMENT

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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.

***Safety (OHS)*** is to be in accordance with state and territory legislation and regulations and project safety plan and may include:

- emergency procedures, including extinguishing fires, organisational first aid requirements and evacuation
- handling activities that may require the assistance of others or the use of manual or mechanical lifting devices where size, weight or other issues, such as disability are a factor
- hazard control
- hazardous materials and substances
- housekeeping
- organisational first aid
- personal protective equipment (PPE) prescribed under legislation, regulations and workplace policies and practices
- safe operating procedures, including the conduct of operational risk assessment and

## RANGE STATEMENT

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treatments associated with:

- air monitoring equipment
- falling objects
- man-made structures
- obstructions
- recently filled trenches
- restricted access barriers
- safe parking
- security from unauthorised access or movement
- traffic control
- uneven or unstable surfaces or terrain
- underground or overhead services
- work site visitors and the public
- working at heights
- working in proximity to others
- use of firefighting equipment
- use of tools and equipment
- workplace environmental requirements and safety.

***Licensing requirements*** include: • relevant recognition, permit, licence or permission to operate within any state or territory issued by the government regulatory authority of that jurisdiction.

***Legislative requirements*** include: • award and organisation agreements and relevant industrial arrangements

- confidentiality and privacy requirements
- environmental issues
- equal opportunity
- industrial relations and anti-discrimination
- OHS issues
- relevant industry codes of practice
- relevant legislation from all levels of government that affect business operation.

***Organisational requirements*** include legal, organisational and site policy, guidelines and procedures relating to:

- access and equity principles and practices
- consultative processes
- emergency and evacuation procedures
- equipment maintenance and storage procedures
- ethical standards
- OHS policies

## RANGE STATEMENT

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- Work order** includes:
- own role and responsibility
  - procedures and programs
  - quality and continuous improvement processes and standards
  - quality assurance or procedures manuals
  - recording and reporting procedures.
  - organisational work specifications and instructions issued by authorised personnel for the operation of a self-erecting tower crane and its respective tasks.
- Appropriate personnel** includes:
- client
  - colleague
  - manager
  - supervisor
  - supplier.
- Self-erecting tower crane** includes:
- cranes with bales mounted in a triangular or nested configuration for transport
  - driven by electric or hydraulic mechanical systems
  - cranes of the telescopic ram type
  - involvement of riggers to:
    - stabilise the self-erecting tower crane with the use of plates and packing under the footplates to adequately distribute the load, ensuring the bearing capacity of the crane standing is not exceeded
    - conduct other erection activities, including the boom and counterweights
  - self-erecting systems with:
    - automatic locking mechanisms
    - braking systems
    - operator cabins designed to ascend and descend the erected tower
    - outriggers
    - ramps
    - remote control
    - self-levelling systems
    - stabilisers.
- Equipment** includes:
- self-erecting tower cranes, lifting gear, workboxes and relevant maintenance equipment and may include remote control

## RANGE STATEMENT

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	<ul style="list-style-type: none"> <li>• devices (pendant control and radio control)</li> <li>• procedures for equipment lock-out protecting operators and co-workers from accidental injury by isolating the equipment</li> <li>• emergency shutdown and stopping, extinguishing fires, organisational first aid requirements and evacuation.</li> </ul>
<p><b><i>Environmental protection measures</i></b> include organisational and project requirements, including:</p>	<ul style="list-style-type: none"> <li>• clean-up management</li> <li>• dust and noise</li> <li>• vibration</li> <li>• waste management.</li> </ul>
<p><b><i>Pre start-up checks</i></b> are conducted to ensure:</p>	<ul style="list-style-type: none"> <li>• equipment has been set up correctly</li> <li>• gear is fitted accurately</li> <li>• plant is operating to optimum performance and to manufacturer specifications.</li> </ul>
<p><b><i>Hazards</i></b> include:</p>	<ul style="list-style-type: none"> <li>• buildings</li> <li>• chemicals</li> <li>• fires</li> <li>• hazardous materials</li> <li>• movement of equipment, goods or material</li> <li>• structures</li> <li>• traffic</li> <li>• underground or overhead services</li> <li>• uneven or unstable surface or terrain.</li> </ul>
<p><b><i>Barriers and signage</i></b> include:</p>	<ul style="list-style-type: none"> <li>• barrier tape or netting</li> <li>• fencing</li> <li>• specified safety signage</li> <li>• temporary boundaries.</li> </ul>
<p><b><i>Riggers' role</i></b> is to include:</p>	<ul style="list-style-type: none"> <li>• process of fitting and removing booms, cables, spars and counterweights to ensure structural stability and load capacity of self-erecting tower cranes.</li> </ul>
<p><b><i>Doggers' role</i></b> is to include:</p>	<ul style="list-style-type: none"> <li>• provision of directional signals to the crane operator on the position and security of the load.</li> </ul>
<p><b><i>Stability</i></b> is to ensure:</p>	<ul style="list-style-type: none"> <li>• self-erecting tower crane is positioned and secured so as not to topple over during operations.</li> </ul>
<p><b><i>Ground controls</i></b> include:</p>	<ul style="list-style-type: none"> <li>• pendant controls</li> <li>• remote control devices.</li> </ul>

## RANGE STATEMENT

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***Weight of load*** includes:

- that prescribed by manufacturer as not exceeding the allowable capacity of the self-erecting tower crane.

***Lifting gear*** includes:

- chains
- flexible steel wire rope slings
- grabs
- spreader beams
- other slinging equipment.

***Tasks*** include:

- operations, including:
  - boom up and boom down and operation of attachments
  - luff movements
  - outriggers
  - slew left and right
  - telescope in and out
  - trolley in and trolley out
  - winch up and down in combination
- service operations that provide for lighting, telecommunications and raised platforms for applications, including:
  - airports
  - entertainment
  - firefighting
  - harbours
  - law enforcement
  - mining
  - oil and gas exploration
  - road construction
  - search and rescue
  - sports.

***Records and reports*** include:

- conclusions
- costs
- dangerous occurrences or equipment malfunctions
- difficulties or issues faced
- environmental issues
- hazards
- incidents or injuries
- maintenance of equipment

## RANGE STATEMENT

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- maintenance records
- pro formas
- production reports
- recommendations, including for future work
- results
- self-erecting tower crane operations
- using logbooks.

## Unit Sector(s)

Unit sector                      Construction

## Co-requisite units

Co-requisite units              Nil

## Functional area

Functional area