



Australian Government

Department of Education, Employment and Workplace Relations

CPCCR13016A Perform advanced tower crane erection

Release: 1

CPCCR13016A Perform advanced tower crane erection

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit of competency specifies the outcomes required to conduct advanced tower crane erection coordinating the slinging, stability, lifting, moving and placement of tower cranes and tower crane sections in conjunction with the crane operator.

It includes equipment selection, load distribution and calculation.

Application of the Unit

Application of the unit

This unit supports the attainment of skills and knowledge to erect a tower crane, including coordination of all aspects of lifting, moving and placing sections, which includes working with others and as a member of a team.

Licensing/Regulatory Information

Not Applicable

Pre-Requisites

Prerequisite units

CPCCOHS2001A	Apply OHS requirements, policies and procedures in the construction industry
CPCCR13013A	Perform intermediate rigging

Employability Skills Information

Employability skills 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

ELEMENT	PERFORMANCE CRITERIA
1. Plan and prepare.	1.1. Work instructions, including plans, specifications, quality requirements and operational details are obtained from relevant information, confirmed and applied for the scope of work required. 1.2. Safety (OHS) requirements are followed in accordance with safety plans and policies. 1.3. Signage and barricade requirements are identified and implemented. 1.4. Plant, tools and equipment selected to carry out tasks are consistent with the requirements of the job, checked for serviceability and any faults are rectified or reported prior to commencement. 1.5. Material quantity requirements are calculated in accordance with plans, specifications and quality requirements. 1.6. Materials appropriate to the work application are identified, obtained, prepared, safely handled and located ready for use. 1.7. Environmental requirements are identified for the project in accordance with environmental plans and statutory and legislative authority obligations and applied.
2. Plan crane erection.	2.1. Crane erection, rigging and dismantling plan are identified and checked for conformity with manufacturer and engineer's specifications. 2.2. Hazard control measures are planned and implemented. 2.3. Foundation to support crane base is checked for conformity and structural suitability in accordance with engineer's specifications.
3. Select equipment.	3.1. Resources, materials and equipment are selected in accordance with load charts and inspected for compliance with job specifications. 3.2. Lifting equipment is inspected according to regulatory requirements and manufacturer specifications. 3.3. Lifting and load shifting equipment identified as inconsistent with manufacturer specifications is labelled, rejected and disposed of to prevent its use in any circumstance. 3.4. Elevated work platforms and other means of

ELEMENT	PERFORMANCE CRITERIA
4. Assemble and erect tower crane.	mechanical access systems are determined and selected where specified. 3.5. Fall arrest equipment is installed. 3.6. Personnel cartage systems are identified and selected. 4.1. Base of crane is located and positioned in accordance with manufacturer and engineer's specifications. 4.2. Bottom tower and climbing frame/transition piece are erected and installed level and plumb to manufacturer and engineer's specifications. 4.3. Tower braces or guys are installed and secured to support tower crane. 4.4. Mast, turntable, machine deck and power pack of crane are assembled, erected and installed in accordance with manufacturer specifications. 4.5. Main jib and counter jib are assembled and erected in accordance with manufacturer specifications. 4.6. Counter weights are lifted into cradles and secured in accordance with manufacturer specifications. 4.7. Wire ropes and hook and block reeving are installed to manufacturer specifications.
5. Climb (raise/lower) tower crane.	5.1. Drop ladder is removed and monorail is placed and secured. 5.2. Crane is secured and placed at balance point ready for climbing. 5.3. Tower bolts to transition piece are removed, drifts fitted and rollers checked. 5.4. Tower section is moved into place in accordance with manufacturer specifications. 5.5. Crane is reconnected with bolts and a visual check of all components and connectors is conducted.
6. Dismantle crane.	6.1. Electrical and hydraulic lines are safely disconnected. 6.2. Power pack, counterweights, climbing frame and crane deck are dismantled and safely lowered to the ground.
7. Clean up.	7.1. Work area is cleared and materials disposed of, reused or recycled in accordance with legislation, regulations, codes of practice and job specification. 7.2. Plant, tools and equipment are cleaned, checked,

ELEMENT	PERFORMANCE CRITERIA
	maintained and stored in accordance with manufacturer recommendations and standard work practices.
	7.3. Work completion procedures are applied and relevant personnel notified that work is finished.

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:
 - determine requirements
 - follow instructions
 - notify completion of work
 - read and interpret:
 - documentation from a variety of sources
 - drawings and specifications
 - report faults
 - use language and concepts appropriate to cultural differences
 - use and interpret non-verbal communication, such as hand signals
 - written skills to complete work completion procedures
- identifying and accurately reporting to appropriate personnel any faults in tools, equipment or materials
- numeracy skills to apply calculations
- organisational skills, including the ability to plan and set out work
- teamwork skills to work with others to action tasks and relate to people from a range of cultural and ethnic backgrounds and with varying physical and mental abilities
- technological skills to:
 - use a range of mobile technology, such as two-way radio and mobile phones
 - voice and hand signals to access and understand site-specific instructions.

Required knowledge

Required knowledge for this unit is:

REQUIRED SKILLS AND KNOWLEDGE

- crane erection, climbing and dismantling techniques
- crane types, capabilities, operations and limitations
- designs and functions of lifting equipment
- documentation requirements
- general construction terminology
- job safety analysis (JSA) and safe work method statements
- material safety data sheets (MSDS)
- materials storage and environmentally friendly waste management
- plans, drawings and specifications
- plant, tools and equipment types, characteristics, uses and limitations
- processes for the calculation of material requirements
- quality requirements
- relevant Acts, regulations and codes of practice
- rigging equipment and techniques
- signalling methods and communications
- workplace and equipment safety requirements.

Evidence Guide

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.

Overview of assessment

This unit of competency could 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:

- locate, interpret and apply of relevant information, standards and specifications
- comply with site safety plan and OHS legislation, regulations and codes of practice applicable to workplace operations
- comply with organisational policies and procedures, including quality requirements
- safely and effectively use tools, plant and equipment
- communicate and work effectively and safely with others
- fully erect and rig one hammerhead tower crane and one luffing boom tower crane (including a jib for each) to manufacturer and engineer's specifications
- complete the raising of one hammerhead tower crane and one luffing boom tower crane by installing at least two extra sections for each.

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 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:

EVIDENCE GUIDE

- an induction procedure and requirement
- realistic tasks or simulated tasks covering the mandatory task requirements
- relevant specifications and work instructions
- tools and equipment appropriate to applying safe work practices
- support materials appropriate to activity
- workplace instructions relating to safe work practices and addressing hazards and emergencies
- material safety data sheets
- research resources, including industry related systems information.

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

EVIDENCE GUIDE

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 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

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.

Information includes:

- diagrams or sketches
- instructions issued by authorised organisational or external personnel
- manufacturer specifications and instructions, where specified
- MSDS
- memos
- regulatory and legislative requirements pertaining to performing advanced tower crane erection
- relevant Australian standards
- safe work procedures relating to performing

RANGE STATEMENT

Scope of work:

advanced tower crane erection

- signage
- verbal, written and graphical instructions
- work bulletins
- work schedules, plans and specifications.
- planning and preparation includes work site inspection, equipment defect identification, assessment of conditions and hazards and determination of work requirements
- calculations include load charts, fleet angles, diverter sheaves, lead loads, head loads, load angle factors, multiple fall, load share, load share distribution, pre-cast compliance charts and safe working loads
- sling types include chain, flexible steel wire rope, and natural or synthetic fibre
- load slinging methods include straight sling, adjustable sling, reeved sling and inclined sling
- personal cartage systems include personnel boxes and elevated work platforms
- types of cranes to be used in erection include fixed cranes, tower cranes, hydraulic mobile cranes, lattice boom mobile cranes, slewing cranes
- types of cranes to be erected include hammerhead tower cranes, luffing boom tower cranes and self erecting tower cranes
- crane components to be erected include crane bases, bottom towers, tower sections, climbing frame/transition pieces, tower braces, guys, masts, turntables, machine decks, power packs, main jibs, counter jibs, counter weights, wire ropes, hook and block reeving and connecting bolts.
- 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 a disability are a factor
- hazard control
- hazardous materials and substances, including

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

RANGE STATEMENT

cement and curing agents

- organisational first aid
- PPE prescribed under legislation, regulations and workplace policies and practices
- safe operating procedures, including the conduct of operational risk assessment and treatments associated with:
 - earth leakage boxes
 - lighting
 - power cables, including overhead service trays, cables and conduits
 - restricted access barriers
 - surrounding structures
 - traffic control
 - trip hazards
 - working at heights
 - work site visitors and the public
 - working in confined spaces
 - working in proximity to others
- use of firefighting equipment
- use of tools and equipment
- workplace environmental requirements and safety.

Tools and equipment:

- include:
 - air winches
 - chain blocks
 - chain winches
 - come alongs
 - drifts
 - eye bolts
 - hammers
 - hand operated creeper winches
 - jacks
 - plumbing/levelling equipment
 - pneumatic wrenches
 - podgers spanners
 - pulley blocks
 - shackles
 - shifting spanners

RANGE STATEMENT

- sledge hammers
- spirit levels and automatic levels
- tape measures
- torque multipliers
- trolleys
- turn buckles
- wedges
- wrenches
- may include:
 - angle grinders
 - elevated work platforms
 - explosive power tools
 - hydraulic jacks
 - laser levels
 - lifting clutches and snatch blocks
 - lifting lugs
 - oxy-acetylene equipment
 - pneumatic tools
 - rigging screws
 - skates
 - skids
 - water levelling equipment
 - winches and rails.

Quality requirements include relevant regulations, including:

- Australian standards
- internal company quality policy and standards
- manufacturer specifications
- workplace operations and procedures.

Environmental requirements include:

- clean-up management
- dust and noise
- vibration
- waste management.

Statutory and regulatory authorities include:

- federal, state and local authorities administering the applicable Acts, regulations and codes of practice.

Unit Sector(s)

Unit sector

Construction

Functional area

Functional area