

# Operate a bridge or gantry crane (remote operation only)

Code OHSCER210A

Workplace Health and Safety Queensland is moving to a new learning and assessment system for certificates to work in prescribed occupations. Learning and assessment will now be conducted in the Vocational Education and Training (VET) sector in which units of competency set out the knowledge and skills needed to demonstrate competent performance in a prescribed occupation.

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# Unit of Competency

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**CODE:** OHSCER210A

**TITLE:** Operate a bridge or gantry crane (remote operation only)

**DESCRIPTOR:** This unit of competency covers the functions required to prepare and operate a bridge or gantry crane (remote operation only) to meet minimum training and assessment standards for the purposes of certification. This unit has been developed in accordance with the licensing and assessment requirements of NOHSC:7019 [1992].

This unit involves planning the work for the prevailing working conditions, using the controls and operating systems to manage the operation of the equipment, locating the load and identifying the load characteristics, safely moving the load, monitoring the controls and stopping, shutting down and securing the equipment after the completion of operations.

ELEMENT	PERFORMANCE CRITERIA
<b>1.0 Assess and secure equipment and work area</b>	
<b>1.1 Conduct routine checks</b>	<p>1.1.1 Routine <i>pre-operational</i> equipment checks are carried out in accordance with the checklist provided for the crane.</p> <p>1.1.2 The service log book for the crane is checked to ensure all service requirements have been met and action taken as required.</p> <p>1.1.3 Prior to operation, <i>equipment</i> and site area are visually checked for any evidence of damage, structural weakness or interference, and any faults reported to an authorised person for corrective action.</p>
<b>1.2 Plan work</b>	<p>1.2.1 A workplace operations plan is developed in consultation with the relevant authorised workplace <i>personnel</i>.</p> <p>1.2.2 Site <i>hazards</i> are identified and correct hazard control strategies developed in accordance with the appropriate Australian Standard.</p> <p>1.2.3 Plans for emergency procedures take into account the location of first aid and fire fighting <i>equipment</i>, amenities and access/egress points in the workplace.</p> <p>1.2.4 Precautions are taken to accommodate the effects of weather conditions in accordance with the appropriate Australian Standard. This includes, where necessary, deciding to abort crane operation where weather conditions exceed acceptable limits.</p> <p>1.2.5 The operations plan ensures that the work area is correctly illuminated.</p> <p>1.2.6 The rig's load chart is located and information on permissible loads, radii, weights, boom and jib configurations noted and taken into account in operational plans.</p>

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ELEMENT	PERFORMANCE CRITERIA
<b>1.2 Plan work (cont'd)</b>	<p>1.2.7 The signals and signalling systems to be used are confirmed with associated <i>personnel</i> in accordance with the appropriate Australian Standard.</p> <p>1.2.8 The use of safety tags on electrical switches/isolators (where relevant) is noted and correct <i>hazard</i> control procedures developed in consultation with authorised personnel.</p>
<b>1.3 Check controls and equipment</b>	<p>1.3.1 The crane is started in accordance with <i>equipment</i> procedures and <i>checks</i> made for any abnormal noise or movement. Any abnormal operation is reported to an authorised person for corrective action.</p> <p>1.3.2 The operating and emergency controls and safety devices are located and identified and their correct operation tested in accordance with prescribed procedures.</p> <p>1.3.3 All communication <i>equipment</i>, lighting and alarm systems are checked for correct operation.</p> <p>1.3.4 Defective controls, communication <i>equipment</i>, safety devices, lighting or alarms are reported to authorised personnel for corrective action and the defects entered into the crane's service log book.</p> <p>1.3.5 The operating radii of the crane for planned operations is/are verified and measured taking into account the estimated increase in radius due to boom deflection. The boom is slewed at the planned radii to check that there are no unanticipated complications or obstructions.</p> <p>1.3.6 Slings and lifting gear are checked. Defective slings or lifting gear are identified and segregated and reported to an authorised person for disposal, repair and/or replacement in accordance with the appropriate Australian Standard.</p>

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ELEMENT	PERFORMANCE CRITERIA
<b>1.4 Shut down crane</b>	<p>1.4.1 The crane is <i>shut down</i> using the correct sequence of procedures in accordance with manufacturer's instructions.</p> <p>1.4.2 Routine post-operational <i>equipment</i> checks are carried out in accordance with the checklist provided for the crane.</p> <p>1.4.3 The relevant motion locks and brakes are applied.</p> <p>1.4.4 All lifting <i>equipment</i> is checked in consultation with associated personnel for any signs of wear or damage in accordance with the appropriate Australian Standard.</p> <p>1.4.5 All defective <i>equipment</i> is segregated and reported to an authorised person for corrective action and/or replacement.</p> <p>1.4.6 The crane and <i>equipment</i> are correctly stowed and secured in accordance with manufacturer's instructions and the appropriate Australian Standard.</p>
<b>2.0 Secure and transfer load</b>	
<b>2.1 Secure load</b>	<p>2.1.1 The weight of the load is correctly estimated in consultation with associated personnel.</p> <p>2.1.2 The sling configuration and choice of lifting gear are checked in consultation with associated personnel to ensure:</p> <ul style="list-style-type: none"> <li>- they are appropriate for <i>safe</i> operation</li> <li>- they will not damage the load</li> <li>- they satisfy the requirements of the appropriate Australian Standard.</li> </ul> <p>Corrective action is taken if required.</p> <p>2.1.3 The use of packing or dunnage to protect the load or to facilitate the connection of lifting gear is checked for correct application in consultation with associated personnel. Corrective action is taken if required.</p>
<b>2.2 Conduct trial lift</b>	<p>2.2.1 A trial lift, particularly for near capacity loads or loads of unusual weight distribution or shape, is carried out according to workplace procedures.</p> <p>2.2.2 With the load just suspended off the ground, checks are made in consultation with associated personnel that:</p> <ul style="list-style-type: none"> <li>- the load is correctly slung</li> <li>- all crane <i>equipment</i> is functioning properly</li> <li>- hydraulic or pneumatic systems (where relevant) are at the required operating pressure.</li> </ul>

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ELEMENT	PERFORMANCE CRITERIA
<b>2.2 Conduct trial lift (cont'd)</b>	<p>2.2.3 Where a trial lift reveals an unacceptable operational situation, the load is lowered and appropriate corrective action taken.</p> <p>2.2.4 Where load measuring devices are fitted, the estimated weight is verified and load/radius calculations are revised as required.</p>
<b>2.3 Transfer load</b>	<p>2.3.1 Load is hoisted and lowered into position using all relevant crane movements in accordance with the appropriate Australian Standards.</p> <p>2.3.2 Boom is positioned to ensure load to be lifted is plumbed under hook.</p> <p>2.3.3 Each load is assessed in consultation with associated <i>personnel</i> for the need for a tag handline. Where control of the load is critical, a decision is made to attach a suitable tagline.</p> <p>2.3.4 All required signals are correctly given and interpreted in accordance with the appropriate Australian Standard.</p> <p>2.3.5 Planned <i>hazard</i> control strategies are implemented.</p>

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## RANGE STATEMENT

The range of variables explains the range of contexts within which the performance and knowledge requirements of this standard may be assessed. The assessment must determine that there is sufficient skill and knowledge for the operator to take the licence and operate in a new workplace. The assessment must be adjustable but prescriptive to ensure transferability.

What may be involved in routine *pre-operational* checks of a bridge and gantry crane (remote operation only)?

Pre-operational checks must include, but are not limited to:

- safety devices/alarms
- operating motions
- appropriate lifting gear
- safe working load/working load limit
- log book
- evidence of damage
- visual evidence of structural weaknesses
  - paint separation
  - stressed welds
- approved modifications and/or attachments fitted in accordance with manufacturer's specifications.
- check for adaptations/modifications outside manufacture's specifications.

What range of *attachments* may be used?

Attachments may include but are not limited to:

- drum clamps
- hooks
- electromagnetic hook.

Definition of a bridge or gantry crane addressed by this unit as identified in NOHSC:7019:

Operation of equipment is via remote operation only.

**Bridge** – A crane comprising a bridge beam mounted at each end to an end carriage, capable of travelling along elevated runways and having one or more hoisting mechanisms arranged to traverse across the bridge.

**Gantry** – A crane comprising a bridge beam, supported at each end by legs, mounted on end carriages, capable of travelling along runways at surface or deck level, and which has a crab with one or more hoisting units arranged to travel across the bridge. Gantry cranes may have fixed runways with or without rails.

What enterprise requirements may apply to this standard?

Enterprise requirements may include but are not limited to:

- standard operating procedures
- industry standards
- production schedules
- material safety data sheets
- work notes and plans
- product labels

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- manufacturers specifications
- operators manuals
- enterprise policies and procedures (Including waste disposal, recycling guidelines)
- supervisors oral and written instructions
- current state/territory occupational health and safety legislation
- other relevant legislation to operate a bridge or gantry crane (remote operation only) (eg. to operate a bridge or gantry crane (remote operation only) on a public road requires complying with transport legislation in the state operating).
- standards, codes of practice or advisory standards.

What *hazards* may be encountered in the workplace?

Hazards may include, but are not limited to:

- exposure to chemicals
- dangerous or hazardous substances
- movements of equipment
- goods
- electrical service lines
- materials and vehicular traffic.

Operating environment may include but are not limited:

- overhead service lines
- bridges/walkways
- surrounding buildings
- obstructions
- structures
- facilities
- other equipment
- dangerous materials
- hazardous zones
- personnel/pedestrians
- lifting equipment
- suspended walkways
- work platforms

What occupational health and safety requirements may be relevant to this standard?

Safe systems and procedures for:

- operation and maintenance of a bridge or gantry crane (remote operation only)
- ensuring loads are secure and within working specifications
- identification and avoidance of obstacles during loadshifting operation
- hazard and risk control
- operator position to maintain unobstructed view of load
- handling including lifting and carrying
- manual handling
- the application of emergency/defensive action and techniques for controlling load
- handling, application and storage of hazardous substances
- outdoor work including protection from solar radiation, noise, dust, rubbish
- the protection of people in the workplace
- the appropriate use and maintenance of personal protective equipment
- calculating loads
- using lifting equipment and associated gear to manufacturers' specifications

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- extreme environment temperatures (hot/cold)
- use of high visibility clothing/reflective vests.
- working in confined spaces, for example tool rooms.
- Australian Standard 2550.1 2002 Cranes, hoists and winches – safe use – general requirements

What *permits* may be relevant to this standard?

Any permits required to carry out job activity are obtained from the relevant authorised personnel for example confined spaces, chemical or dangerous goods storage, explosives, road/rail.

What *work area* may be relevant to this standard?

Work areas may include but are not limited to:

- factories
- wharfs
- ships
- warehouses
- manufacturing plants
- quarries and mine sites.

What personal protective *equipment* may be relevant to this standard?

This may include but are not limited to:

- boots
- hat/hard hat
- overalls
- gloves
- protective eyewear
- hearing protection
- respirator or face mask
- sun protection
- task specific personal protective equipment
- high visibility clothing.

What needs to be considered when conducting *post start up* checks?

Post start up checks will be in accordance with manufacturer's specifications and operating instructions/requirements.

Checks may include but are not limited to:

- hazards warning systems, for example lights and horns are functional, audible reversing alarms
- attachments, movements and control functions are smooth and comply with operating requirements
- the operating and emergency controls and safety devices are located, identified and tested in accordance with manufacturers specifications
- communication signals to be confirmed with appropriate personnel
- defects and damage are reported according to site procedures.

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What needs to be considered when setting up the bridge or gantry crane (remote operation only)?

Job requirements are confirmed with relevant site personnel, ensuring:

- determination of appropriate equipment for operating and lifting requirements
- compliance of job with occupational health and safety practices and site instructions.

What needs to be considered for personal/public safety?

Site/non-site *personnel* are safeguarded (protected) by a variety of measures including:

- the erection of barricades
- posting of signs consistent with the principles of the hierarchy of control
- safety zones
- exclusion zones
- direction of barricades.
- Appropriate equipment is selected to ensure personnel safety and protection.

How might the operation of a bridge or gantry crane (remote operation only) be demonstrated in a safe, controlled and correct manner?

- Appropriate selection and use of bridge or gantry crane (remote operation only) equipment controls
- Features
- settings and operational techniques for the specific terrain and weather conditions in the day or night on varying infield terrain without causing damage to machinery
- equipment
- load
- person.

Correct operation includes using appropriate methods to loadshifting enterprise standards so that corrective actions, including defensive techniques are implemented.

To operate a bridge or gantry crane (remote operation only) the person must be competent/qualified in accordance with regulatory requirements.

Who are site/non-site *personnel*?

Non site personnel may include but are not limited to:

- members of the public
- visitors to the site
- delivery driver.

Site personnel may include but are not limited to:

- employees
- contractors
- management
- students.

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What types of *equipment* may be associated with bridge or gantry crane (remote operation only)?

- wire slings
- chain slings
- synthetic slings
- shackles
- tag lines
- buckets/kibbles
- lifting gear

Equipment may include but is not limited to that specified in the current version of Australian Standard 2550.1 2359.1 1995 Powered Industrial Trucks – General Requirements and 1666.1 1995 Wire-Rope Slings – Product Specifications.

What procedures will be included in the *shut-down* of a bridge or gantry crane (remote operation only) and securing of site and will include but not limited to securing the plant.

The bridge or gantry crane (remote operation only) is shut down in accordance with manufacturers' instructions ensuring:

- park in suitable location from danger areas
- motion locks and brakes are applied
- defective equipment is identified and segregated and reported to supervisor
- equipment is correctly stowed
- secure against unauthorised operation
- secure site in accordance with workplace procedures

What *records* may need to be kept or updated?

Record may include but not limited to:

- Log books
- maintenance and repair records
- records of faults and potential faults.

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## Evidence Guide

### What evidence is required to demonstrate competence for this standard as a whole?

The evidence guide identifies the critical aspects, knowledge and skills to be demonstrated to confirm competency for this unit. This is an integral part of the assessment of competency and should be read in conjunction with the performance criteria, the range statement and the assessment guidelines.

Competence in this standard requires evidence of the ability to utilise the components and controls of a bridge or gantry crane (remote operation only) to carry out operations without damage to the bridge or gantry crane (remote operation only), vehicles, loads, property or injury to people. It requires the ability to conduct pre-start and shut-down procedures to ensure mechanical reliability, communicate and cooperate with other personnel such as co-workers, general public, prevent spillage of load, demonstrate emergency operating procedures and maintain operating records.

### What **critical aspects** of evidence are required to demonstrate competency in this unit?

- Location, interpretation and application of relevant information, standards and specifications.
- Compliance with the site safety plan and occupational health and safety legislation/regulations/codes of practice applicable to workplace operations.
- Compliance with organisational policies and procedures including quality requirements.
- Safe and effective operational use of tools, plant and equipment.
- Communication and working effectively and safely with others.

### What **specific knowledge** is needed to achieve the performance criteria?

- Components, controls and features of bridge or gantry crane (remote operation only) and their functions.
- Operating principles and operating methods.
- Legislative requirements with regard to licensing.
- Loadshifting processes and procedures including work platforms.
- Principles of the safe removal of obstacles and hazards from the workplace.
- The hierarchy of hazard control measures with elimination of substitution, isolation and engineering control measures being selected before safe work practices and personal protective equipment.
- Workplace communication procedures.
- Demonstrate safe and environmentally responsible workplace practices.
- Electrical hazards
- Load masses

### What **specific skills** are needed to achieve the performance criteria?

- Readily familiarise self with local conditions.
- Perform routine safety, basic service and maintenance procedures on bridge or gantry crane (remote operation only).
- Demonstrate emergency operating procedures.
- Read and interpret site planning, operators' manuals, manufacturers' specifications, work and maintenance plans and material safety data sheets.
- Communicate faults, malfunctions and workplace hazards, reports and maintain operational records.
- Comprehend and apply task instructions.
- This work may include deciding on a method to move loads and communicating these ideas to supervisor.

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- Working with other plant operators and personnel to move and place loads.
- Calculation of load masses and requirements.
- Load dimensions and centre of gravity
- Load mass contingencies
- Emergency situations
- Determine mass of irregular shaped loads.
- Able to listen and understand job requirement.
- Understand written documents for job processes.
- Understand tables and figures for job procedures.
- Understand interrelationship among workplace processes and procedures in the English language.
- Understand and interpret signals and instructions in the English language.
- Hand/eye co-ordination.

What **methods of** assessment should apply?

- Assessment methods must confirm consistency and accuracy of performance together with application of underpinning knowledge.
- Assessment must include as a minimum the achievement of competence to the standard established in the NOHSC assessment instrument. Additional requirements may need to be achieved to comply with the AQTF including key competencies.
- Assessment methods must confirm the ability to access and correctly interpret and apply the essential underpinning knowledge.
- Assessment must be applied in a real work environment or replicated industrial workplace.

In what **context** should the assessment occur?

- The application of competency is to be assessed in the workplace or replicated industrial workplace.
- Assessment is to occur using standard and authorised work practices including safety equipment and environmental constraints.
- Assessment of essential underpinning knowledge, other than the confirmatory questions, will usually be conducted in an off-site context.
- Assessment is to comply with relevant regulatory requirements including specific Australian Standards.

What are the **specific resource requirements** for this unit?

- Workplace location or replicated work facility in accordance with the OHS instrument relating to the OHS jurisdiction.
- Tools and equipment appropriate to loadshifting
- Specifications and work instructions
- Appropriate bridge or gantry crane (remote operation only)
- Communication equipment (radios) (where applicable)
- Occupational Health and Safety Certification Training and Assessment Delivery Guide
- Occupational health and safety assessment instruments
- Occupational health and safety authority learner guide
- Occupational health and safety authority trainer guide.

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## How should key competencies be applied to this unit of competency?

There are a number of processes that are learnt throughout work and life which are required in all jobs. They are fundamental processes and generally transferable to other work functions. Some of these are covered by the **key competencies**, although others may be added. The questions below highlight how these processes are applied in this competency standard. Following each question a number in brackets indicates the performance level to which they key competency needs to be demonstrated where:

0 = not required

1 = perform the process

2 = perform and administer the process

3 = perform, administer and design the process

1. How can <b>communication of ideas and information</b> be applied?	Information and ideas with regard to bridge or gantry crane (remote operation only) and loadshifting operators and their attachments should be discussed with supervisors and co-workers and other loadshifting operators. <b>Level 1</b>
2. How can <b>information be collected, analysed, and organised</b> ?	Information with regard to performance, faults and maintenance may be observed and monitored for analysis and organised by records, maintenance logs, logbooks and reports. <b>Level 1</b>
3. How can <b>activities be planned and organised</b> ?	Activities involving planning the work and hazard identification may be planned or coordinated around work schedules, or sequenced as required.  Planning required in working with operators and operators of associated equipment. <b>Level 1</b>
4. How can <b>team work</b> be applied?	Team work may be applied in communication methods and procedures to work cooperatively with maintenance officers, vehicle drivers, operators and operators of associated loadshifting equipment. <b>Level 1</b>
5. How can the use of <b>mathematical ideas and techniques</b> be applied?	Mathematics may be applied in the calculation of load masses to ensure a bridge or gantry crane (remote operation only) is operated within safe working load limits. <b>Level 1</b>
6. How can <b>problem solving skills</b> be applied?	Contingencies for changed or difficult operating conditions or to control spillage/damage. <b>Level 1</b>
7. How can the use of <b>technology</b> be applied?	To access, communicate, measure and record information with regard to maintenance, usage and performance of loadshifting job requirements. <b>Level 1</b>

Are there any other competency standards that could be assessed with this one?

This competency standard could be assessed on its own or in combination with the other units of competency relevant to the job function.

There is essential information about assessing this competency standard for the consistent performance and where and how it may be assessed in the Assessment Guideline developed by the National Occupational Health and Safety Commission. All users of this competency standard must have access to this guideline.