

# PROCEDURE

Title: **Cranes - Safe Use**

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Department: <b>HSEC</b>	Sect./Classification: <b>Safety/Gear &amp; Equipment</b>	Author: <b>D Steel</b>	Approver Role: <b>Manager - Health, Safety &amp; Environment</b>

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### 1.0 PURPOSE

To provide standards for the safe use of fixed and mobile cranes, vehicle-loading cranes and other mobile plant used as a mobile crane on the QAL site to comply with legal and site requirements.

### 2.0 SCOPE

This procedure applies to the use of all fixed and mobile cranes and other mobile plant used as a mobile crane on the QAL site (including the Residue Disposal Area) by QAL employees and Contractors.

The procedure does not apply to the safe use requirements for:

- Elevators – personnel
- EWP and Scissor Lifts (refer P314.311 Work at Height and P314.701 Operation of Mobile Equipment procedures)

### 3.0 RESPONSIBILITIES

#### Crane Base Supervisor

- Complete (and maintain ongoing currency) PG177a Load Lift and Rigging training.
- Maintain a register of all mobile cranes under their control

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- Develop a documented plant risk assessment for all cranes under their control and upload the assessment into QAL SAP Risk Register.
- Ensure all cranes under their control are in safe order with inspection and testing programs undertaken as per P314.422 Cranes – Inspection and Maintenance
- Ensure inspection tagging systems are used correctly

#### **Crane Operator**

- Holds a WHS qualifications (or equivalent) and current CTO for the crane being operated
- Complete and record a pre-start check at the commencement of each shift or the first use of the crane.
- Complete (and maintain ongoing currency) PG177a and PG177b Load Lift and Rigging training prior to commencing lifting activities onsite
- Prepare a Lift Plan or Critical Lift Plan prior to undertaking any lift
- Operate the crane to manufacturer's recommendations
- Will not leave the crane controls while a load is suspended
- Immediately tag defective equipment and take out of service

#### **Equipment Owner**

- Maintain a register of all fixed cranes and power operated lifting devices under their control
- Develop a documented plant risk assessment for all cranes under their control and upload the assessment into QAL SAP Risk Register.
- Ensure all cranes under their control are in safe order with inspection and testing programs undertaken as per P314.422 Cranes – Inspection and Maintenance
- Ensure inspection tagging systems are used correctly

#### **Power Operated Lifting Device Operator**

- Complete and record a pre-start check at the commencement of each shift or at the first use of the lifting device.
- Hold a current CTO for lifting device
- Prepare a Lift Plan prior to undertaking any lift
- Only perform work to the level of qualification obtained (Refer P314.421 Attachment 7.1)
- Immediately tag defective equipment and take out of service

#### **Superintendent**

- Ensure operators of cranes and power operated lifting devices hold current qualifications and CTOs.

#### **Lift Supervisor**

- Hold a relevant Rigger qualification that is recorded against the person's SAP training records
- Signoff on Critical Lift Plan
- Be present throughout the duration of a Critical Lift

## **4.0 REFERENCES**

P312.605	Competent To Operate
P314.301	Barricades and Cordons
P314.311	Work at Height
P314.420	Lifting Equipment – Inspection and Maintenance
P314.421	Lifting Equipment – Safe Use
P314.422	Cranes – Inspection and Maintenance
P314.615	High Voltage Vicinity Procedure
P314.701	Operation of Mobile Equipment
P314.980	Lightning Warning System
Queensland Work Health & Safety Act	
Queensland Work Health & Safety Regulation	
Code of Practice – Plant	
Code of Practice – Working near live parts (Electrical Safety Office)	
Rio Tinto HSE Performance Standard C6 – Cranes and Lifting Equipment	
PG177A	Load Lift and Rigging Training Module
PG105	Slinging & Movements

Mobile Crane Code of Practice  
 Cranes Code of Practice (Draft 2013)  
 AS2550 Cranes, hoists and winches - Safe Use  
**W314.260.21 Lifting Conveyor Counterweights – Isolation and Pinning**

## 5.0 DEFINITIONS

**Competent Operator** – a person who holds an appropriate QAL CTO for the piece of equipment being operated and has successfully completed (and maintains currency in) PG177a, PG177b and holds a WHSQ qualification (or equivalent) appropriate to the complexity of task.

**Crane** - a machine for raising or lowering a load and moving it horizontally, including any supporting structure or foundation. It may include a forklift or excavator with lifting attachments, but does not include conveyors, bauxite unloaders or earthmoving equipment.

- **Gantry Crane** – Overhead crane operating on top of a gantry straddling the work and often running on wheels or rails.
- **Mobile Crane** – a crane capable of travelling over a supporting surface without the need for fixed runways (i.e., railway tracks) and relies only on gravity for its stability.
- **Overhead Crane** – consists of parallel runways or rails with a travelling bridge that spans the gap and carries the hoist. The lifting component of the crane travels along the bridge.
- **Power operated Lifting Device** – device used for lifting or lowering a load by means of a drum or lift wheel with rope, wire rope or chain wraps and can be powered by a variety of sources (eg. Forklifts, Hiab, telehandler, pedestrian operated forklift, etc)

**Crane Equipment Register** – a register that details the description, type / series, inspection, maintenance and disposal records of all cranes. Mobile Cranes may use a paper based system, fixed Cranes use SAP.

**Critical Lifts** - Critical Lifts are:

- Lifts requiring two or more lifting devices - where the combination includes one or more power operated lifting devices
- Where the load is being lifted onto or passed over occupied buildings
- Operation or load passing over or within the electrical wires exclusion zone and / or over electrical equipment (i.e., High Voltage yards / transformers)
- Lifts at maximum rated load capacity of crane
- Lifts involving personnel in workboxes or workbaskets – Additional permit required and special approval is needed for these lifts

**CTO** – Competent to Operate

**Drop Zone** – the area underneath the load where the load would likely fall to or through if it was inadvertently released or dropped (See diagram in section 6.4.4).

**Exclusion Zone** – See diagram in section 6.4.4

**Lift Plans:**

- **Critical Lift Plan** – a document that specifies the crane class and configuration, rigging techniques, load details, hazards and controls required to perform a critical lift. It requires joint development by all parties involved in the lift.
- **Fixed Crane Lift Plan** – Any lift involving the use of fixed plant cranes. It is completed by a qualified and competent operator.

- **Mobile Crane Lift Plan** – Any lift that involves the use of a mobile crane. It requires joint development between the crane operator and the Dogger / Rigger.
- **Lift Plan** – all lifts that do not come under the Critical Lift or Mobile Crane Lift Plan. It is completed by the Dogger / Rigger.

**Lifting Attachment** – an attachment designed to be used in conjunction with lifting devices and similar lifting equipment to raise, lower or haul, arrest and sustain a load.

**Lifting Device** – a device equipped with mechanical means that will raise, lower or haul, arrest and sustain a load in any working position within the full range of hoisting or haulage without adverse effects on any components. Cranes and mobile cranes are inclusive. The lifting device may be manually, engine or power operated (electric, hydraulic, and pneumatic).

**Lifting Equipment** – lifting attachments and rigging equipment that will raise, lower or haul, arrest and sustain a load or object.

**Lift Supervisor** - a competent person who manages a critical lift and at a minimum holds an appropriate Rigger qualification for the lift being performed (refer P314.421 Attachment 7.1)

**Load Control Pole** – a piece of non-conductive equipment that is manageable in length, sturdy to control and light enough to assist in controlling and guiding a load for placement where tag lines are not suitable. An example is a length of wooden pole and / or conduit tube which may have a recessed “V” notch (minimising slippage) or a hook attached.

**Tagline** - a rope attached to an object before a lift takes place and used to control the sway, stability and placement of the object. It will be a minimum of 16 mm fibre rope and of a non-conductive material. The line may not be attached to the rigging equipment or hook.

**Workbox** - a device designed to AS1418.17 to be suspended from a crane to provide a working area for a person.

**Workbasket** - a device designed to be elevated by a forklift or similar having tyne arrangements to provide a working area for a person.

**WHSQ** - Work Health and Safety Queensland

**WWL / SWL** – Working Load Limit / Safe working load limit – equivalent meaning.

## 6.0 ACTIONS

### 6.1 Pre-use Inspections of Crane and Lifting Equipment

#### 6.1.1 Pre-Operational Inspections of Cranes and Power Operated Lifting Devices

All cranes and power operated lifting devices shall be inspected by a competent person prior to use for the shift. Results shall be recorded as follows:

- Mobile crane - in the on-board crane pre-start checklist or vehicle checklist (S-156)
- Fixed cranes - in the Crane Service Record Logbook.

It is critical that all safety devices or overload limits are checked to ensure they are not overridden or cut out.

**Any component found to be defective or non-compliant shall be taken out of service immediately.** An ‘Out of Service’ Tag with the relevant information indicating why the equipment is defective shall be affixed to the equipment and scheduled for repair / replacement.

**6.1.2 Pre-Operational Inspections of Crane lifting equipment**

Lifting system equipment required for the lift task shall be inspected prior to use by a competent person to ensure:

- Lifting device is free of defects;
- Identification tag is attached and SWL is appropriate.
- Current inspection tag is fitted.

**Any lifting system equipment component found to be defective or non-compliant shall be taken out of service immediately.** An 'Out of Service' Tag with the relevant information indicating why the equipment is defective shall be affixed to the equipment and scheduled for repair / replacement.

All lifting hooks (except for grab and chain shortening hooks) shall have a fully operational safety latch.

**6.2 Pre-Task Hazard Assessment for Load Lifts**

A pre-task hazard assessment is required on the overall task being undertaken, not just the lift component in isolation using the Lift Plan or Critical Lift Plan to document the lift component.

The pre-task hazard assessment may vary from a Take5 to a JHA or a Critical Lift Plan depending upon the level of risk and controls in place.

**6.3 Pre-Lift Requirements for Lifts involving the use of a Crane****6.3.1 Hazard Assessment Tools**

- For all crane lifts (except Critical Lifts):

Complete a Lift Plan (Form S164) or Mobile Crane Lift Plan (S166). Signoff of the hazard assessment is done by a competent Crane Operator, Dogger or Rigger depending on complexity of the task.

- For all Critical Lifts using a crane:

For Critical Lifts additional planning, controls and signoff is required.

For all Critical Lifts including those involving a workbasket, complete Part A and B of the Critical Lift Plan (Form S165).

For Critical Lifts involving personnel in a workbox complete Parts A, B and C.

Signoff of the hazard assessment is done by a competent Rigger and the Crane Operator and by one of the following roles:

- Maintenance Services Manager
- Turnaround Superintendent
- Construction Management & Execution Superintendent
- Central Workshop Superintendent
- Maintenance Superintendent.

For Critical Lifts involving a workbasket, the Section Superintendent must also sign the Critical Lift Plan prior to commencement.

Critical lifts must be carried out in accordance with the critical lift plan and be under the control of a Lift Supervisor. The Lift Supervisor must be present throughout the duration of the critical lift. The Lift Supervisor shall position themselves to have a good view of the overall lift, and have the ability to stop the lift at any time.

If the task changes or there is a need to move away from the original lift plan, the lift must stop and the critical lift plan must be up-dated and re-approved.

## **6.4 Operation of Cranes**

All lifting system equipment shall be operated strictly in accordance with the manufacturer's operating handbook.

### **6.4.1 Person in control of the lift**

The crane operator is the person in control of the crane and shall stop the lift if they consider it unsafe.

Except in the event of an emergency, a crane operator shall not leave the crane controls while a load is suspended.

### **6.4.2 Slinging the Load**

Slinging shall only be carried out by persons holding a Rigger or Dogger qualification or under direct supervision of a qualified Rigger or Dogger for the purpose of training (i.e. completion of logbook hours).

Critical lift slinging shall **ONLY** be undertaken under the direct supervision of the Lift Supervisor. Where the entire load can be seen whilst performing the slinging, the Lift Supervisor may also be the person slinging the load.

If the load is outside the vision of the Crane or power lifting device Operator, a Dogger must direct load lift operations.

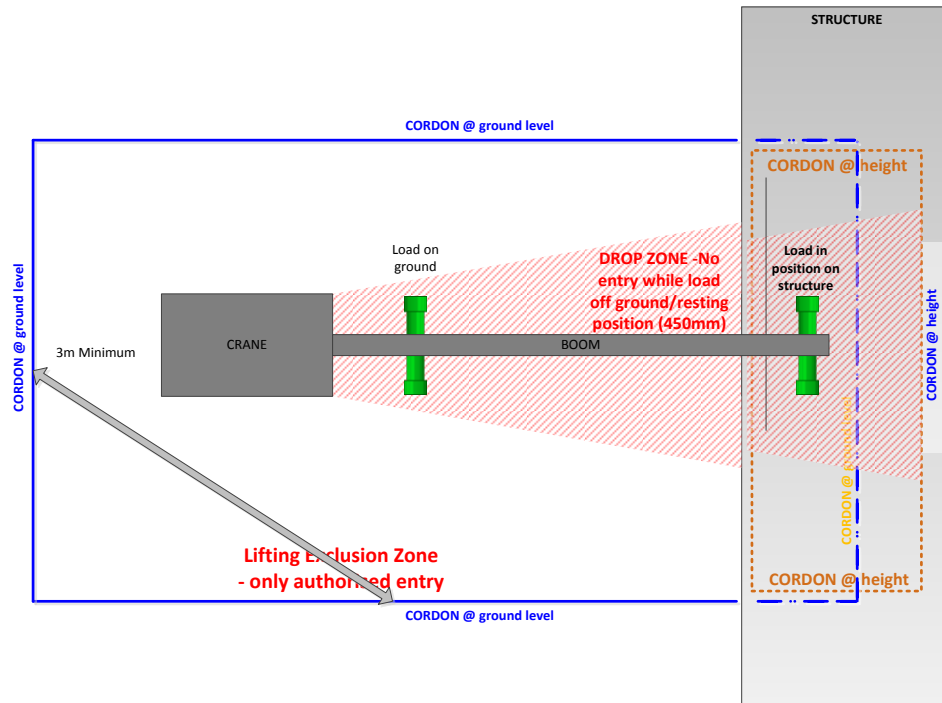
### **6.4.3 Rigging the Load**

Refer P314.421 Lifting Equipment – Safe Use

### **6.4.4 Cordons**

The person in control of lift is responsible for establishing and maintaining the lifting exclusion zone cordon in accordance with QAL procedure P314.311.

The Drop Zone must be identified and all personnel must be kept clear of this zone during the lift.



**6.4.5 Suspended Load Control**

***For the purpose of lifting and pinning a conveyor counterweight refer to W314.260.21 - Lifting Conveyor Counterweights – Isolation and Pinning.***

Prior to the object being lifted an exclusion zone cordon shall be erected around the full lift area to prevent unauthorized entry.

The drop zone must be identified and all personnel must be kept clear of this zone during the lift.

Tag lines shall be used to maneuver all structures / components to their final position.

When landing items, the securing slings must be kept under tension by the crane until the load has been properly secured.

**NO PERSON MUST BE UNDER A SUSPENDED LOAD OR IN A POSITION WHERE THEY CAN BE STRUCK BY A FALLING LOAD.**

**6.4.6 Physical Handling of Loads**

The physical touching of a suspended load is restricted to the load being less than 450 mm from the final attachment, mounting or set-down point.

Where a suspended load requires physical handling outside the restriction zone:

- a detailed documented risk assessment with Section Superintendent approval shall be completed, or
- Where work is performed under a PPM approved by the Section Superintendent, and the PPM specifies physical touching of the load outside of 450 mm from the final resting place or set down point, this shall be considered as the approval to perform this task in the specified manner.

**6.4.7 Taglines**

A tagline or load control pole shall be attached to the load and not the actual lifting equipment and be of an appropriate length where its use does not introduce additional hazards. The use

of taglines or a load control pole shall be used to guide suspended loads into position and to control the sway and stability of the load in transit.

Tag lines should be made of non-conductive material.

#### **6.4.8 Audible Travel Alarms**

Overhead travelling cranes shall be fitted with audible travel alarms or an equivalent warning device and must be checked as operational.

#### **6.4.9 Load Transfer**

Refer P314.421 Lifting Equipment – Safe Use Attachment 7.1 for minimum competency requirements for load transfer activities.

All load transfer methodologies shall have completed a Lift Plan or Critical Lift Plan.

#### **6.4.10 Working Near Live Electrical Lines**

**Insulated lifting links may be required on cranes when working near overhead power lines or when the risk deems direct current as a threat.**

A person must not operate any part of a crane within 3 m of bare electrical conductors (eg. overhead power lines) rated low voltage up to 1,000 volts.

Insulating links will be installed if operating within 3 m.

For all crane lifts within 6 m of electrical conductors greater than 1,000 volts, a High Voltage Vicinity Permit is required as per Procedure P314.615 High Voltage Vicinity.

Part of the risk assessment under P314.615 will determine if an insulated link is required.

#### **6.4.11 Mobile Slewing Crane – Preparing for Travel**

In preparation for travel slew pins must be secured in place where fitted and loose equipment removed from the deck and the hook stowed if travelling off-site.

#### **6.4.12 Integrity test of Outriggers**

Slewing to test the integrity of outriggers must be conducted prior to commencing a lift with controls implemented to manage ground stability if required.

The crane capacity and stability may change when slewing from front to back. The crane should be slewed in complete rotation (where possible) to allow the integrity of the outriggers to be assessed prior to any load being engaged. This operation should include:

- Ensuring the outriggers are fully extended. Where this is not possible the lift plan will document restricted lifting capacity;
- ensuring outriggers are appropriately positioned on the foot plate and support packing with level and even downward pressure; and
- Ensuring the outriggers, footplates and packing demonstrate appropriate stability and weight disbursement and do not indicate inappropriate shift during slew test.

#### **6.4.13 Determining the Weight**

Where the weight of a lift is uncertain and could exceed the SWL of the crane, the crane must be fitted with a load cell with the load displayed and visible to the operator.



**6.4.14 Environmental Conditions**

Persons involved in lifts are to be aware of wind conditions throughout the lift. Wind shall be monitored by the on-board crane wind speed meter (if applicable) or the hand held wind speed meter available from the Crane Base Supervisor.

Crane operators shall follow Procedure P314.980 when a lightning warning is issued.

**6.4.15 Communication**

A method of communication must be established and documented in the Lift Plan or Critical Lift Plan before commencement of work. The chosen method must take into account the operating environment in which the lift will occur. If radio communication is chosen, it must be conducted on a closed channel.

For critical lifts there must be a means of communication between all people involved in the lift.

If a mobile phone has to be used by a person directly involved in the lift, the lift must be stopped.

**6.4.16 Loads transported on Vehicles**

Vehicle mounted loading cranes (eg. Hi-Ab cranes) **shall not** be used to load/unload loads from vehicles. This activity shall be done using a forklift, crane or other suitable power operated lifting device.

When loading objects on vehicles the load shall be fundamentally stable prior to tie down. Appropriate controls shall be put in place when unloading objects off transport vehicles. Loads secured for transport purposes that potentially may move on unloading shall not be unsecured until rigging equipment that will be used to unload the load is in place and the load is supported by a suitable power operated lifting device.

Over Centre Load Binders (otherwise known as Dog, Chain Dog or Bulldog) **shall not** be used by QAL employees, QAL Contractors or QAL contracted transport companies to secure loads transported on site. Ratchet style tensioners may be used as an alternative.

**6.5 Crane Risk Assessment**

All power operated lifting devices shall have a plant risk assessment completed by the Owner prior to initial use. Completed Plant risk assessments can be accessed through the Plant Risk Register and Document Management System, type 'PRD'.

**6.6 Training and Qualifications****6.6.1 Licence Requirements:**

All crane operators must hold a WHS Certificate (or equivalent) relevant to the type of crane being operated. Evidence of qualification is to be attached to the individual's SAP training records.

A High Risk Work Licence issued by Work Health & Safety Queensland is required to operate the following:

- Bridge Crane or Gantry Crane when controlled from a permanent cabin or control station on the crane OR the crane is remotely controlled with more than three powered operations. This includes a single hoist with four powered operations (traversing, travelling, hoisting and rotating) and multiple hoists with four or more powered operations (two non-synchronised hoists would typically have at least five powered operations – traversing by two, hoisting by two and travelling).
- Slewing Mobile Crane
- Non-Slewing Mobile Crane greater than 3 tonne rated capacity
- Multi-purpose Tool Carrier or Telelift when equipped as a non-slewing crane greater than 3 tonne rated capacity

A High Risk Work Licence is not required to operate the following:

- Bauxite Ship Unloader
- Bridge or Gantry Crane that has a maximum of three powered operations (traversing, travelling and hoisting). A QAL CTO is required to demonstrate competency.
- Mobile Crane with rated capacity less than 3 tonne. A QAL CTO is required to demonstrate competency.
- Multi-purpose Tool Carrier or Telelift with rated capacity less than 3 tonne. A QAL CTO is required to demonstrate competency.

#### 6.6.2 Competency to Operate Qualification:

CTOs are required for the following plant prior to use, with qualification records uploaded to the individual's training record in SAP.

- CTO3735 Mobile Crane
- CTO3743 Overhead Gantry Crane & Hoist
- CTO3749 Unloader Crane
- CTO3747 Tool Carrier – Crane Mode

CTO qualifications will expire every 3 years.

It is the accountability of the Superintendent to ensure the training and qualifications are maintained and recorded.

#### 6.6.3 Plant Procedures Training:

Crane Operators are required to complete 'PG177a and PG177b Load Lifts and Rigging' prior to any lift being performed on site.

Refresher Training and demonstration of competency shall be conducted on a three yearly basis.

Evidence of all training will be recorded in SAP against the individual's training profile.

### 6.7 Records

Lift Plans may be discarded upon safe completion of the task.

Crane plant risk assessments shall be filed in the QAL risk register and on the Document Management System under Plant risk (Document type: PRD)

### 7.0 ATTACHMENTS

Nil

### 8.0 REVISION HISTORY

Issue	Revision	Revision date	Change Reason
1	1	21/09/2017	Added reference to 6.4.5 to give guidance on Lifting and Pinning Conveyor Counterweights
1	0	22/12/2016	Complete review and rebuild of system