

NZTA LIFTING PROCEDURES



Lifting Operations and Cranes

**THIS IS A DRAFT EXAMPLE PUBLICATION FOR LARGE ORGANISATIONS**

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## Context

This process details the minimum requirements in New Zealand for managing hazards related to lifting operations where cranes, hoists or earthmoving machinery are used to lift freely suspended loads.

*This procedure does not apply to powered industrial lift-truck or forklift lifting operations.*

The aim of this process is to ensure lifting operations are planned and coordinated to minimise risk of cranes and lifting equipment overturning or collapsing, or persons being struck by loads.

This instruction specifically addresses the following areas:

* General lift and load requirements
* Categorisation of lifts
* Procurement of a crane for lifting operations
* Planning and executing the lift
* Controls required for complex lifts
* Inspection and maintenance requirements for cranes and lifting equipment.

Reference Documents: ACOP Cranes, Crane Safety Manual and Standards referenced within, Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999

This process applies throughout NZTA, in all its operations, for all personnel and contractors, and on all projects. This process is to be maintained as a minimum requirement.

## Accountabilities

The following table shows what position is accountable for the components of the lifting procedure.

|  |  |  |
| --- | --- | --- |
| **Section** | **Procedure** | **Accountable Position** |
| 3 | Process | Contractors Managing Director/Manager |
| 3.1.1 | Appoint Lifting Coordinator/Lifting Supervisor | Contractor Director/Manager |
| 3.1.3 | Develop JSEA & SH | Lifting Coordinator; Crane Operator; Rigger; Dogger |
| 3.1.1.3 | Identify Hazards and Assess Risks | Contractor Director / Manager |
| 3.1.3.2 | Determine Permit Controls | Contractor Director / Manager |
| 3.1.4 | Develop a Lift Plan | Lifting Coordinator, Lifting Supervisor (where appointed |
| 3.1.4.1 | Obtain Lift Plan Approval Sign-off for complex lifts | Lifting Coordinator; Lifting Supervisor (where appointed) |
| 3.2.1 | Select and Procure Mobile Crane | Contractor Director / Manager |
| 3.2.2 | Verify Competency of Personnel involved in Lifting Operations | Plant Coordinator / Lifting Coordinator |
| 3.2.3 | Conduct Daily Task Pre-start Briefing | Lifting Supervisor, Crane Operator; Rigger; Dogman |
| 3.2.4 | Set up Crane | Lift Coordinator; Crane Operator |
| 3.2.4.1 | Geotechnical Analysis | Lifting Coordinator; Geotechnical Engineer |
| 3.2.4.2 | Pre-Operational Area Check | Crane Operator / Rigger / Dogman |
| 3.2.4.3 | Establish Exclusion Zones to Prevent Lifting Overhead | Lifting Coordinator; Lifting Supervisor |
| 3.2.4.4 | Access Crane | Crane Operator; Rigger; Dogger |
| 3.2.4.5 | Set up Crane Outriggers | Crane Operator |
| 3.2.4.6 | Consider Atmospheric Impacts on Crane Set-up | Lift Coordinator / Crane Operator |
| 3.2.4.7 | Working In the Vicinity of Overhead Power Lines | Lifting Coordinator; Lifting Supervisor |
| 3.2.4.8 | Dual and Multiple Crane Lifts | Lifting Coordinator; Lifting Supervisor |
| 3.2.5 | Undertake Lifting Operations | Lifting Supervisor; Crane Operator; Rigger; Dogman |
| 3.2.5.1 | Conduct Pre-start Inspection | Lifting Supervisor, Crane Operator, Rigger/Dogman |
| 3.2.5.2 | Verify Crane Load Indicator Device | Crane Operator |
| 3.2.5.3 | Establish Communication System | Crane Operator; Rigger; Dogman |
| 3.2.6 | Execute Lift | Lifting Coordinator; Lifting Supervisor; Crane Operator; Rigger / Dogman |
| 3.2.6.1 | Manage Deviation from Lift Plan | Lifting Coordinator/Lifting Supervisor |
| 3.2.6.2 | Pick and Carrying of Loads | Crane Operator; Rigger / Dogman |
| 3.2.7 | Using Excavators as Crane | Crane Operator; Rigger; Dogman |
| 3.3 | Inspect Cranes, Equipment and Accessories | Contractors Project Director / Manager; Authorised Supervisor or Engineer; Owner of Crane |
| 3.3.1 | Inspection Maintenance and Certification of Lifting Equipment | Lifting Coordinator |
| 3.3.2 | Conduct Inspection | Lifting Coordinator; Owner of Crane; Rigger / Dogman |
| 3.4 | Plan Emergency Preparedness and Response | *Authorised Supervisor or Engineer* |
| 3.5 | Plan Emergency Preparedness and Response | Authorised Supervisor or Engineer |
| 3.6 | Training and Competency Requirements | Authorised Supervisor or Engineer, Project Safety & Health Team |

## Process

Accountability: Contractors Managing Director / Manager

The Contractors Project Director or Manager assumes overall responsibility for ensuring full compliance with this process on any project or facility.



### Develop Control Measures

#### Appoint Lifting Coordinator / Lifting Supervisor

Accountability: Contractor Director / Manager

All Personnel involved in the planning, set up, operation and maintenance of cranes and lifting operations shall have clearly defined roles and responsibilities to ensure lifting operations and crane activities are conducted in a controlled and safe manner.

* The Contractors Director/Manager shall determine the roles on the contract that will be responsible for ensuring the requirements of this process are implemented.
* The Contractor Director/Manager shall appoint a Lifting Coordinator who will be authorised to oversee all lifting operations and will be responsible for reviewing and approving lift plans on the contract.
  + Depending on the volume and complexity of lifting anticipated for the project, this may or may not be a full time role.

##### Identify other key personnel

* Other key roles required for lifting operations may include crane operator, rigger and dogman. Verify competency and training records

#### Determine Lift Category

Accountability: Lifting Coordinator; Lifting Supervisor; Crane Operator; Rigger; Dogman

All lifts regardless of size, weight or complexity need to be planned, risks assessed and have controls implemented before they are executed. To enable appropriate preparation, the first requirement is to determine the lift category:

Routine or Standard Lift

A lift that may have a generic risk assessment and lift plan

A routine/standard lift includes:

* Within normal operating parameters of the crane
* Lifting over non-sensitive areas
* Has suitable environmental conditions
* A load that has a known weight, shape and centre of gravity
* Standard rigging arrangements

Complex Lift

An complex lift is defined as a non-routine lift requiring detailed planning and additional or unusual precautions.

Complex lifts include:

* Lifts made when the load weight is 75% or more of the rated capacity of the crane; lifts that require the load to be lifted, swung or placed out of the operators view; of lifts made with more than one crane;
* Lifts using more than one hoist; lifts involving non-routine or technically difficult rigging arrangements; hoisting personnel with a crane or derrick;
* Lifts involving hazardous materials (e.g., explosives, highly volatile substances); lifts involving submerged loads; lifts without the use of outriggers
* Using on-rubber load charts; lifts where the centre of gravity could change; or any lift that the crane operator believes should be classified as complex.
* All lifting inserts on tilt-up and pre-cast concrete construction must comply with the requirements of ACOP Safe Handling, Transportation & erection of Pre-cast Concrete.

##### Multiple Crane Lifts - De-rating

For multiple crane lifts, the minimum capacity requirements for each crane is to be applied in accordance with ACOP Cranes and the Crane association Safety Manual. The Crane Association provides a Lift Planning Document for Multi-crane Lifts.

#### Develop JSEA or SH&EWMS

Accountability: Lifting Coordinator; Crane Operator; Rigger; Dogger

* Develop a Job Safety and Environment Analysis (JSEA or SH&EWMS) for each task involving a lifting operations and the use of crane(s).
* Ensure to follow the Hierarchy of Control as per the Health & Safety Act 1992
* Lifting operations associated with the use of cranes will vary depending on the type of crane selected, work area preparation and operational procedures. JSEA or SH&EWMS should address as a minimum:
  + Location and details of ground conditions including:
    - Ground services - electrical, water, gas etc
    - Uncompacted ground
    - Locations of embankments and soft surfaces
  + Load and other restrictions, including:
    - Overhead structures (jump form, concrete pumps, other cranes, buildings etc)
    - Necessary load / working requirements (mass / nature of loads, frequency, positioning)
    - Foreseeable operating limitations
    - Load limits on local roads
    - Width of local roads when operating adjacent to them
    - Issues relating to delivery requirements (operating times, noise restrictions, community restrictions etc)
  + Hazardous activities (tasks that present increased risk); and
  + Operational issues (general operational risks).
* Before commencing work, communicate the requirements of the JSEA to all personnel involved in lifting operations and the use of cranes.
* Review and update the JSEA following any changes to the activity or working environment.

##### Identify Hazards and Assess Risks

Accountability: Contractor Director / Manager

* Review the Work Method Statement (Work Breakdown Structure) to identify the tasks associated with lifting operations and the use of cranes and the hazards that arise from them.
  + Key hazardous events may include but not limited to:
    - Overturn/Collapse of Lifting
    - Person(s) struck by falling objects - loss of loads
    - Contact with overhead powerlines
    - Persons being struck/crushed by moving plant
* Record the risks arising from those hazards and develop JSEA (Risk Treatment Plans).
* JSEA shall consider the Hierarchy Of Control, working from the most effective controls to the least effective starting with elimination, taking all practical steps to.

For example:

* + Eliminate:
    - use hoists and lift cages
    - use construction methodologies that eliminate requirements for some lifts
  + Substitute:
    - avoid multiple lifts by use of a higher Safe Working Load (SWL) capacity crane where possible
    - use hydraulic hoists
  + Isolate:
    - create exclusion zones using physical barriers
    - enforce operator protection zones on vehicle loading cranes
    - deploy physical barriers to protect crane outriggers from impact
  + Engineering:
    - restrict overload movements with limiters (as per design)
    - engineered lifting lugs on equipment
    - geotechnical assessment of ground conditions where required
  + Administrative:
    - A Permit to Work for the use of use of Crane Lifted Platforms (Workboxes)
    - All routine lifts with Pre-lift assessments – Crane Association lift plan or Company specific lift plan
    - Define complex lifts in accordance with Crane Association criteria
    - Complex lifts to be managed by Advanced Lift Plans
    - Job Safety Environment Analysis or equivalent to be completed
    - test lift with known weight
    - inspection and maintenance regime in accordance with the ACOP
    - testing and certification of cranes and lifting equipment in accordance with the ACOP
    - Training and Verification of Competency for Crane Operator, Rigger, Dogman, Lifting Coordinator, Lifting Supervisor etc
  + PPE:
    - In accordance with site requirements
* Conduct regular risk reviews to ensure the risks are controlled in accordance with the defined JSEA.
  + Periodic review intervals shall be determined by the current risk ratings.
* Reactive reviews are required whenever there is a change in task, are significant safety events or situations that may impact the lifting activity.

##### Determine Permit Controls

Accountability: Permit Issuer – This maybe the service provider, company or contractor required to ensue controls are in place to high risk works.

* A Permit To Work may be required for work associated with lifting operations, for example
  + use of a Crane Lifted Platforms (workbox) for lifting people, consider the checks that need to be completed prior to personal being transported in a Crane Lifted Platform (workbox).
  + Working in the vicinity of powerlines, this maybe a permit by the service owner
  + The controls and management processes identified in all applicable Permits to Work must be strictly adhered to.

#### Develop a Lift Plan

Accountability: Lifting Coordinator, Lifting Supervisor (where appointed)

* Standard and advanced lift plans may include the following:
* All lifts that fall under the complex category require preparation of a Lift Plan.
* The detail required in the Lift Plan shall be determined by the level of risk and complexity. It will clearly address, but not be limited to:
  + crane details
  + rigging arrangement drawing
  + calculation of crane load
  + crane configuration diagrams in plan and oblique view, or if recalled from a library of crane lift studies, photographs of previous crane set-up
  + crane lift methodology.
* Unless the Lift Plan is being completed immediately before the crane lift is to occur, the Pre-lift Conditions and Final Checks and Sign Off sections do not require completion at this stage.
* It is recommended that each site establishes a library of completed crane lift plans that can be reviewed and used for similar lifts in future.

Reference Documents: Standard Lifts as per Crane Association forms. Advanced Lifts Plans are normally developed using software or cad programs by a competent person.

##### Obtain Lift Plan Approval Sign-off for Complex Lifts

Accountability: Lifting Coordinator; Lifting Supervisor (where appointed)

* The calculations or drawings associated with all complex lifts and included in the Advanced Lift Plan, may require approval from a a qualified structural or mechanical Engineer.
* Submit and Obtain sign-off of the Advanced Lift Plan from the Lifting Coordinator (and Lifting Supervisor or competent person where appointed).
* Any issues raised shall be raised and addressed; any minor alterations drawn or written on the plan shall be clearly signed.

### Apply Control Measures

#### Select and Procure Mobile Crane

Accountability: Contractor Director / Manager

* Before selecting a crane for a particular application, all relevant information must be obtained and all relevant operational and risk criteria must be determined.
* Select and procure fit for purpose crane
* All cranes and mobile plant used for lifting must comply with the ACOP Cranes & PECPR Regulations.
* The specifications of the crane must be matched to the anticipated lifts, taking into consideration such things as:
  + Safe Working Load (SWL) - must have the capacity to lift the heaviest load at the maximum required radius within the SWL.
  + traffic movement controls
  + height and reach requirements
  + the position from where the load is to be lifted
  + the position where the load is to be placed
  + combined weight of crane, load and any other equipment (dead weight)
  + ground conditions
  + workplace restrictions and working environment
  + access to and egress from the work location
  + set-up area required
  + crane limitations, for example, movement limitations
  + multiple crane lifting
  + the nature of the rigging or slinging to be used
* Contractor Director / Manager
* Verify that the crane complies with the ACOP, Certificate of Inspection and manufacturers specifications prior to commencing work on site.
  + Earthmoving machinery that does not comply with the ACOP must be prevented from undertaking lifting operations.
  + Where earthmoving machinery has the potential to be used for lifting (and other items of plant where appropriate) but does not meet the minimum safety features specified it is recommended that during the plant inspection/acceptance process a "DANGER - Not suitable for Lifting Operations" sticker or similar is fitted. Alternatively lifting attachments may be removed or blocked to prevent use subject to supplier approval.
* Plant Risk Assessment to confirm there have been no changes affecting the controls determined.
* Conduct a Daily Task Pre-start Inspection for any crane that has been procured and has not been provided with an OEM-specific pre-start checklist.
* Safe Working Load (SWL) shall be clearly identified and marked on all relevant lifting equipment.
* Load charts, operation manuals specific to the crane being used shall be available and kept in the machine (hard copy or electronic).

#### Verify Competency of Personnel involved in Lifting Operations

Accountability: Plant Coordinator / Lifting Coordinator

* Develop operator competency assessment instruments for a crane that has not been supplied with suitable verification of competency documentation, or where personnel not associated with the supplier will operate the crane.
* Confirm that the correct Unit standards are held by the persons involved in the lifting operation (Crane Operator, Rigger, Dogman etc.). (Refer to Part 4 of the ACOP for Cranes).
* Conduct a standard (routine) pre-lift assessment using Tool: Routine Pre-lift Assessment or other approved method prior to any lift or series of lifts commencing.
  + Select the appropriate assessment tool for the type of crane to be used e.g. non-slewing or slewing
  + The assessment must determine whether suitable controls are in place to safely manage the activity.
    - Suitable controls must be in place prior to the lift proceeding

#### Conduct Daily Task Pre-start Briefing

Accountability: Lifting Supervisor, Crane Operator; Rigger; Dogman

* For each day of the lifting operation, organise a Daily Task Pre-start Briefing and require attendance by all persons involved in the lift (Crane Operator, Rigger, Dogman etc.).
* At this briefing, review and communicate the:
  + JSEA or SH&EWMS
  + Standard Pre-lift Assessment or other approved method
  + Lift Plan (where required)
  + and any Permit to Work (where required).
* Obtain required sign off from all personnel involved in the lifting operation to confirm everyone understands and agrees with the methods and control measures to be used.

#### Set up Crane

Accountability: Lift Coordinator; Crane Operator

Prior to the siting of the crane, ensure control measures are in place to mitigate the following hazards, where relevant:

* overhead powerlines and other services
* other cranes, nearby structures or other obstructions in the working radius, including those on adjacent workplaces
* mobile plant and equipment moving within the crane working area
* excavations, trenches and underground structures (for example basements) including buried services
* wind and weather conditions - Beware of washout under crane pads if heavy rain has occurred
* the condition of the ground:
  + for vehicle loading or slewing cranes − that the crane will be set up on
  + for non-slewing cranes − the carry route the crane will traverse
  + side slopes that reduce the lifting capacity of the crane
  + the unloaded weight of the crane itself, including any counterweights
  + any dynamic load resulting from lifting, lowering, and moving the load
* For pick and carry crane operations (i.e. using frannas, telehandlers, roughies, crawlers) inspect the path of travel for potholes or gradients to ensure the ground is within the manufacturers requirements for safe operations limits prior to use.

For details of correct crane set up, refer to ACOP Cranes and Crane Specifications.

##### Geotechnical Analysis

Accountability: Lifting Coordinator; Geotechnical Engineer

* To confirm ground bearing capacity for all complex lifts greater than 75% and all other complex lifts where specified in the lift plan), or where the Contractor Director/Manager deems it necessary that a Geotechnical Engineer may be required to provide a report certifying the ground bearing capacity of the sites selected for placement of crane outriggers.

##### Pre-Operational Area Check

Accountability: Crane Operator / Rigger / Dogman

* Conduct a pre-operational area check of the immediate surroundings of the crane and its slew area. The checks should include:
  + Check of the ground condition and if applicable, the outriggers and their support pads.
  + Proximity to overhead power lines.
    - For minimum approach distances, refer to service provider
  + Clearance to and potential for the lift to pass over:
    - buildings and other structures
    - pedestrian, vehicular, rail or water corridors.

##### Establish Exclusion Zones to Prevent Lifting Overhead

Accountability: Lifting Coordinator; Lifting Supervisor

* All practicable steps must be taken to ensure that loads are positively secured and not suspended over persons in unprotected areas. This includes delineating and barricading areas under the load to prevent access, and the use of approved stillages wherever possible.
* Plan lifting operations and crane setup wherever possible to avoid loads being lifted over head of personnel, traffic or assets.
  + Persons at risk include those in buildings or other structures as well as those in the open air.
  + To avoid the need to lift over personnel, consider controls such as a 270 degree slew angle rather than a 90 degree slew angle.
* Suitable exclusion zones must be established and enforced underneath loads and within the footprint of the crane's operating radius (including slewing zones and area under counterweights of mobile cranes).
* As well as being prevented from entering the exclusion zone, people in the area of the lift must be made aware of the impending lift.
  + To secure the exclusion zones, in addition to barriers, it may be necessary to barricade access stairways or walkways into areas over which a crane lift is likely to occur.
* Appropriate signage should be used to indicate the purpose of all barriers.
* As an alternative to barriers, spotters can be used for shorter durations and pick and carry operations.

Reference Documents: Crane Safety Manual

##### Access Crane

Accountability: Crane Operator; Rigger; Dogger

* Personnel may only access the crane whilst it is stationary and not engaged in a lift.
* Only access the crane deck, turret head (if applicable) and cabin through purpose-built steps and ladders.
  + The crane wheels, outriggers etc. are not acceptable means of access and egress.

##### Set up Crane Outriggers

Accountability: Crane Operator

The following controls must be applied for mobile crane outriggers:

* With the exception of pick and carry operations, where the lift device is fitted with outriggers, no lifting is to be done without those outriggers being fully extended / positioned / packed / supported in accordance with OEM or Engineer specifications.
* Partial extension of outriggers is only permitted for cranes that have the manufacturer's approval to lift in such a configuration.
  + If a lift is to be undertaken with partially extended outriggers, the correct outrigger configuration, according to the load chart, must be used.
* Ensure outriggers are not placed over:
  + underground assets
  + ground that cannot support the load they will impose.
* Where there is a risk of extended outriggers being struck by mobile plant, they shall be protected by suitable controls.
* Irrespective of ground conditions, footpads or other means of distributing the load must always be placed under outriggers in line with the OEM or Engineer specifications.

##### Consider Atmospheric Impacts on Crane Set-up

Accountability: Lift Coordinator / Crane Operator

* Before and during the proposed lift, the following atmospheric conditions should be considered and noted in either the Pre-lift Assessment, Lift Plan, JSEA or SH&EWMS:
  + Strong winds that may affect the load and its movement.
    - Wind impact will be influenced by the size, shape, mass and openness of the load.
  + Heavy rain that limits ability to see the load, and correctly position it, due to slippery surfaces and tag lines.
  + Has heavy rain undermined the crane pads, does it require another sign off from the Geotech Engineer?
  + Lightning, which can strike a raised crane boom, or load, and cause:
    - damage to the crane
    - injury to persons working on or near the crane or load.

##### Working In the Vicinity of Overhead Power Lines

Accountability: Lifting Coordinator; Lifting Supervisor

Where services could be impacted by construction activities they must be protected/isolated (as appropriate) identification signage such as type of service, line marking and/or area demarcation.

Travel ways under overhead powerlines that may be impacted by mobile/fixed plant, including delivery vehicles, must have high visibility warning signage to make the power line proximity clearly visible. Wherever possible the use of physical warning devices, e.g. height barriers, should be considered.

There must be compliance with:

* the requirements of the electricity supply asset owner.
* conditions imposed by any permits issued in relation to the work

##### Dual and Multiple Crane Lifts

Accountability: Lifting Coordinator; Lifting Supervisor

A multiple crane lift is considered complex lift requiring a Lift Plan. The Crane Association has Multi-crane Lift Plans that can be used to plan these types of lifts.

* Consider multiple crane lifting only where the physical dimensions, characteristics, mass, access limitations or required movement of the load prevent the operation from being carried out by a single crane.
* Set up multiple cranes in such a manner that no hazards are presented by their individual and combined use.

Reference Documents: ACOP Cranes and Crane Safety Manual.

The Crane Association publishes a document for planning multi-crane lifts.

#### Undertake Lifting Operations

Accountability: Lifting Supervisor; Crane Operator; Rigger; Dogman

* Immediately before the lifting operation:
  + Implement all required controls as detailed on the Lift Plan, JSEA and any associated Permits.
  + Review and complete the Pre-lift Conditions section of the plan and implement any required controls determined from this assessment.
  + Complete the Final Checks and Sign Off section of the Lift Plan.
  + Provide details for the Crane Operator, Rigger(s) and Dogman, and obtain sign-off.
  + Ensure all personnel involved in the lifting operation are briefed in the requirements of the Lift Plan, JSEA, SH&EWMS and any associated permits/documents.

##### Conduct Pre-start Inspection

Accountability: Lifting Supervisor, Crane Operator, Rigger/Dogman

For all lifts:

* Conduct a pre-start inspection of the crane, and document the findings
* Tag the crane as 'Out of service' if any faults are identified that would prevent the safe use of the crane.
* Document any identified faults that will not compromise the safe use of the crane but do require attention.
  + Make arrangements for their earliest possible repair.
* Inspect all lifting equipment to ensure it is in satisfactory condition and has been tested and the appropriate certification is available. Refer to section 4.4.

##### Verify Crane Load Indicator Device

Accountability: Crane Operator

* If the load indicator is found to be inaccurate, tag the crane as 'Out of service'.

##### Establish Communication System

Accountability: Crane Operator; Rigger; Dogman

* Decide on the communication system that will be used during the lifting operation.
  + Commonly used systems as per the ACOP are two way radio, standard set of hand signals or other agreed systems.

Reference Documents: ACOP Cranes and Crane Safety Manual

* + All personnel involved in controlling the lifting operation must understand and commit to use the agreed common communication system.
  + Ensure an agreed emergency stop signal is communicated to all personnel involved in the lifting operation at pre-lift briefings.
    - Note: Hand signals used for communication between Dogman and Crane Operator must be those prescribed.
    - Commonly used is the constant talk method
  + Where, between the Dogman and Crane Operator, there is no or limited line of sight or sound communication (for example on a noisy site or in windy conditions), a more robust method of communication (for example radio) must be used.
* If radio communication is selected ensure that the following requirements are met:
  + A dedicated crane radio frequency shall be used in order to prevent interference with the communication.
  + The Crane Operator must be able to perform their tasks while using the radio.
  + Crane Operator, Rigger and Dogman are trained in and thoroughly familiar with the use of the radio equipment.

#### Execute Lift

Accountability: Lifting Coordinator; Lifting Supervisor; Crane Operator; Rigger / Dogman

Designated people involved in a lifting operation are responsible for complying with the following:

* All lifts must have a 'Person in Charge’ assigned.
* The Person in Charge must ensure that lifting operations are conducted in accordance with the approved Lift Plan and other control documents (JSEA, SH&EWMS, Pre-lift Assessment, Permits etc).
* The load must not exceed the dynamic and / or static capacities of the lifting equipment as per the lift plan and SWL. Remember to leave yourself some tolerance, calculations could be wrong or an error in set up has occurred loading the crane up with more weight than what was anticipated.
* Crane booms must not be side loaded.
* The wind speed capacity of the crane and attachments cannot be exceeded.
* The load must be rigged by a qualified and competent person/s per the ACOP Cranes to ensure that it remains stable and cannot unintentionally tip, slip, swing or fall.
  + Stability must be confirmed before lifting, if necessary by trial lift.
* The number of personnel involved in handling the load must be kept to a minimum.
* All loads must be safely secured using additional wrapping and / or lifting stillages as required.
* Tag lines must be used and must be attached to an appropriate position to control the load.
* Tag lines must be of sufficient length to allow the person handling the load to work at a safe distance.
* For personnel working with Tag lines, they:
  + must be held in such a manner that they can be quickly and fully released.
  + must not be looped around the wrist or body or attached to clothing or harness.
* The load must remain within a Dogman's vision at all times.
* The Crane Operator must not leave the operating controls while a load is suspended.
  + If a safety concern arises, the load must be made safe and secure before operations are halted.
* Under no circumstances must anyone be positioned under a suspended load or between a suspended / lifted load and fixed objects or structures.
* Where lifting operations are carried out in low light conditions, adequate illumination must be provided:

Reference Documents: ACOP for Cranes

##### Manage Deviation from Lift Plan

*Accountability: Lifting Coordinator/Lifting Supervisor*

If a need arises for a deviation from the Lift Plan during the lift:

* Halt all lifting activities.
* Make the load safe and secure.
* Revise and have the Lift Plan re-approved before recommencing with the lift.

##### Pick and Carrying of Loads

Accountability: Crane Operator; Rigger / Dogman

The carrying of a load by a crane is subject to the following controls:

* In accordance with the manufacturers specifications
* ground stability, slopes and general condition must be risk assessed before the the crane moves.
* the load must be kept as low to the ground as is practical
* the load must be secured back to the crane or a tag line(s) used to control the load
* the Dogman must remain in contact with the Crane Operator at all times
* Safety Observers (Spotters) may be required in addition to the Dogman.

Reference Documents: ACOP for Cranes

#### Using Excavators as Crane

Accountability: Crane Operator; Rigger; Dogman

* Excavators used for lifting works shall comply with ACOP Cranes
* Excavator cannot be used for general crane work such as assembling structures. In general most excavators cannot meet the specific design and safety requirements required of mobile cranes.
* When selecting Excavator for a lift, do not exceed the design and SWL specified by the manufacturer. Reference shall be made to the Manufacturers Manual and the ACOP Cranes for the correct operation.
* Lifting equipment must be attached to specific lifting points or lifting attachment.
* Implement the following controls, when attaching lifting equipment to an excavator for lifting operations:
  + The lifting equipment attachment must comply with ACOP Cranes & [relevant standards.](http://www.saiglobal.com/online/Script/Details.asp?DocN=AS0733789471AT)
  + The hydraulic rams of the Excavator shall be fitted with check valves to prevent the rapid fall of arms or booms in the event of a hydraulic line failure.
  + The lifting equipment attachment point shall be one that is certified by a Certified Engineer
  + The bucket must be removed and a certified lifting point located above the bucket attachment point.
  + The Maximum Rated Capacity (SWL) of the lifting attachment shall be clearly marked on it.
  + The rated capacity of each lifting point shall be prominently marked on each lifting point. Loads being lifted shall not exceed the rated capacity under any configuration
  + Any hook shall have a positive locking safety catch.
  + It is not permissible to wrap chains or slings around a bucket, any adaptors or attach them to bucket teeth in order to use the bucket for lifting operations.
  + Lift point shall be arranged such that accidental unhooking of the load cannot occur.
* Where Excavator is used in crane mode ensure operational speed is reduced to a 'slow speed' setting
* Where an excavator requires the use of stabilizers in order to achieve stability, the equipment shall be supported by such stabilizers when necessary.
* No person shall be permitted under the boom of a suspended load.
* No person shall be lifted by an excavator being used as a crane.
* Where a quick hitch is used, loads shall only be suspended from a lift point on the quick hitch that complies with ACOP Cranes & relevant standards, with the buckets and other attachments removed.
* Quick hitches shall be maintained in proper working order at all times.
* Ensure the operator of the excavator and the person slinging the load are competent. Refer to ACOP Cranes Part 4.

### Inspect Cranes, Equipment and Accessories

Accountability: Contractors Project Director / Manager; Authorised Supervisor or Engineer; Owner of Crane

Cranes, equipment and accessories must be:

* fit for purpose (designed, certified and having the capacity to lift and place loads at the required radius).
  + designed and certified in accordance with the ACOP Cranes, PECPR Regulations and applicable relevant Standards.
* The SWL shall be clearly identified and marked by an identification number or tag.
* For each device that is hired, contracted or owned, each project shall have access to a Lifting Equipment Register.
  + - Refer to ACOP Crane.
* All cranes must be equipped with anti-two blocking systems for each of the main hoist and auxiliary hoist circuits.
  + Vehicle Loader Cranes (VLC) must comply with the requirements of ACOP Cranes
* Attachments used with cranes must not exceed the capacity rating or scope recommended by the crane manufacturer.

#### Inspection Maintenance and Certification of Lifting Equipment

Accountability: Lifting Coordinator

Maintenance must be performed on lifting equipment, devices and accessories as per the following minimum requirements.

* Ensure that all lifting equipment is correctly stored to prevent damage or early deterioration.
* Establish a site, section and/or crane Lifting Equipment Register to ensure that all lifting equipment undergoes regular inspections prior to use
* All lifting equipment shall be inspected and documented in accordance with ACOP Cranes
* Update the Lifting Equipment Register with details of inspections and tests conducted.
* Rigging and slinging equipment must be visually inspected before use, and any equipment displaying signs of excessive wear or damage or otherwise found to be sub-standard must be tagged, 'Out of Service', and kept in a dedicated storage area pending repair, replacement or cutting up and disposal to prevent re-use.
* Note: For small items of equipment and high wear lifting equipment, it may be economical to regularly dispose of equipment, and purchase certified lifting equipment rather than subject individual items to annual testing.

#### Conduct Inspection

Accountability: Lifting Coordinator; Owner of Crane; Rigger / Dogman

* Local arrangements must include appointing competent person to be responsible for the storage, inspection and maintenance of cranes and equipment.
* In addition:
  + all registered lifting equipment and accessories must be inspected, tested and certified by a competent person in accordance with the ACOP Crane
  + the owner or supplier must maintain a schedule to ensure these requirements are carried out at the nominated times
* Daily pre-start equipment inspections and function tests must be conducted for all cranes in accordance with the manufacturer's instructions, recommendations and statutory requirements.
* Each crane shall also be subject to a documented inspection for condition at weekly intervals as a minimum over its duration on site. Inspection results must be recorded, signed and dated by the competent person who conducted the inspection.
* Lifting equipment that has been involved in any of the following events must be taken out of service until it can be thoroughly examined by a competent person:
  + lifting or overload incident including lifting points/inserts that fail
  + electrical or mechanical fault
  + modification or major repair
  + changes in recommended condition of use, including periods out of service.
* Cranes must undergo:
  + annual inspection to conform to the ACOP Cranes & PECPR Regulations

#### Undertake Repair and Modification

Accountability: Contractor Project Director / Manager; Owner of Crane

Repairs to lifting equipment, other than the replacement of parts during servicing, must only be carried out according to Manufacturers specifications and under the guidance of the controller.

Modifications to plant and equipment must:

* be documented and the documentation made available with the plant
* undergo a specific plant risk assessment

Modifications that override the safe use of lifting equipment must not be made to safety devices.

Following modification, a test certificate stating the SWL and the Proof Load must be obtained and retained by the owner of the lifting equipment.

Reference Documents : ACOP Cranes, PECPR Regulations & AS/NZS 1554.1:2011 Structural steel welding - Welding of steel structures

### Plan Emergency Preparedness and Response

Accountability: Authorised Supervisor or Engineer

* Prepare rescue plan.
* Identify appropriate equipment and arrange its provision for all lifts where people are suspended from the crane in a Crane Lifted Platform (workbox).
* Incorporate requirements into the relevant JSEA or Safety Health and Environment Work Method Statement (SHEWMS).

Refer to Process: Emergency Preparedness and Response

### Monitor and Review Work

Accountability: Authorised Supervisor or Engineer, Project Safety & Health Team

* Monitor work involving lifting operations and cranes using task observations and workplace inspections to ensure personnel are working in accordance with the requirements of the Safety Health and Environment Work Method Statement (SHEWMS) (and Permit to Work if applicable) and all risk control measures are implemented and current.

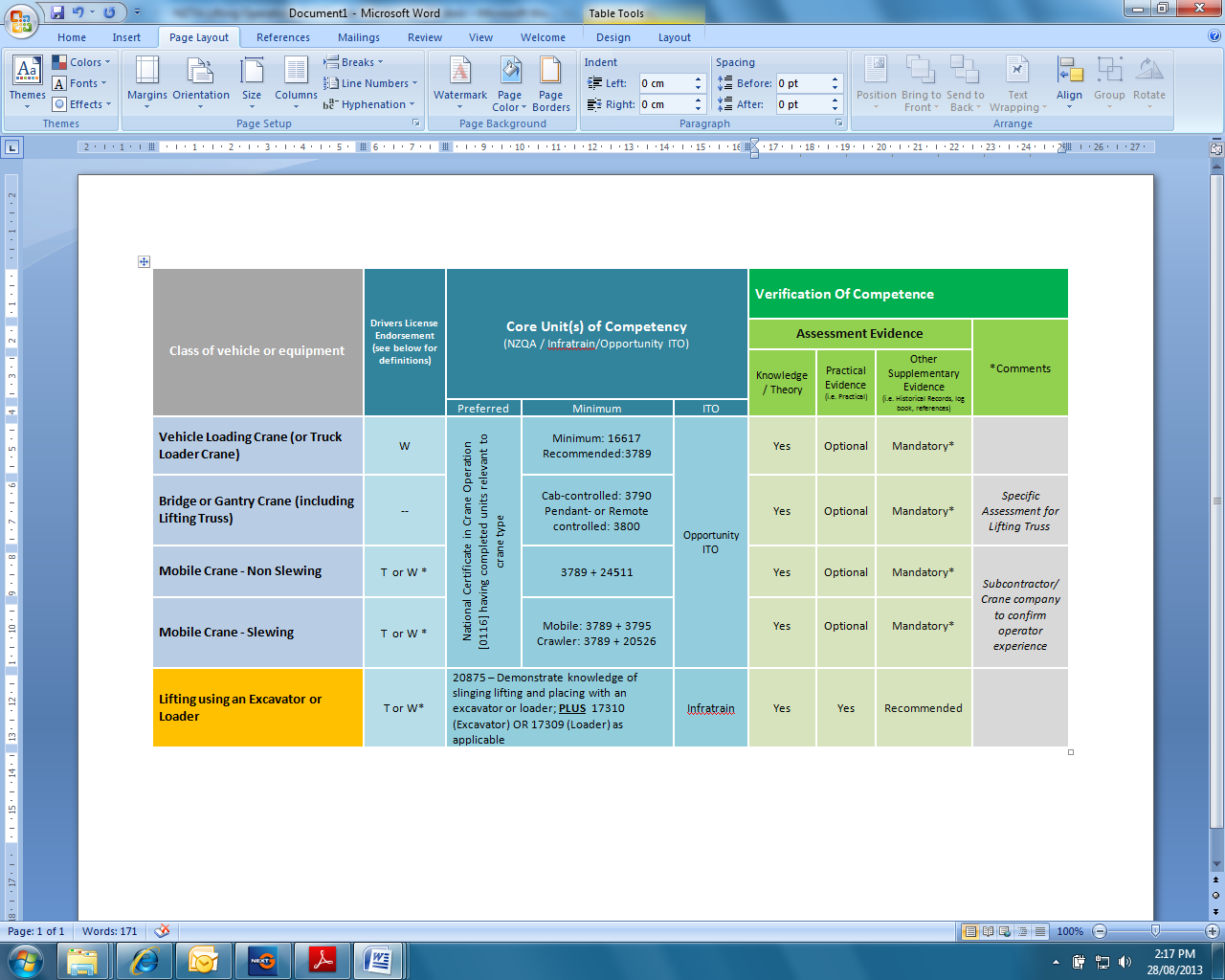
Refer to Process: Task Observation and Process: Workplace SHE Inspections.

### Training and Competency Requirements

Accountability: Authorised Supervisor or Engineer, Project Safety & Health Team

* All persons operating cranes, excavators, slinging or directing the load shall have appropriate license and/or Unit Standards,
* In addition to the above, ensure all personnel who are required to carry out work involving lifting operations and cranes are assessed as competent; in particular:
  + Crane operations, dogman and rigger functions
  + Operators of lifting equipment must be able to demonstrate appropriate training and competency in that particular item of equipment; and
  + Skill competency assessments may be conducted for all operators of lifting equipment and for those involved in rigging or dogging activities.

Crane Operator competency requirements



Clarification required on unit standard requirements

Extract from ACOP Cranes 2009

**PART 4: REQUIREMENTS FOR PERSONS OPERATING OR**

**WORKING WITH CRANES**

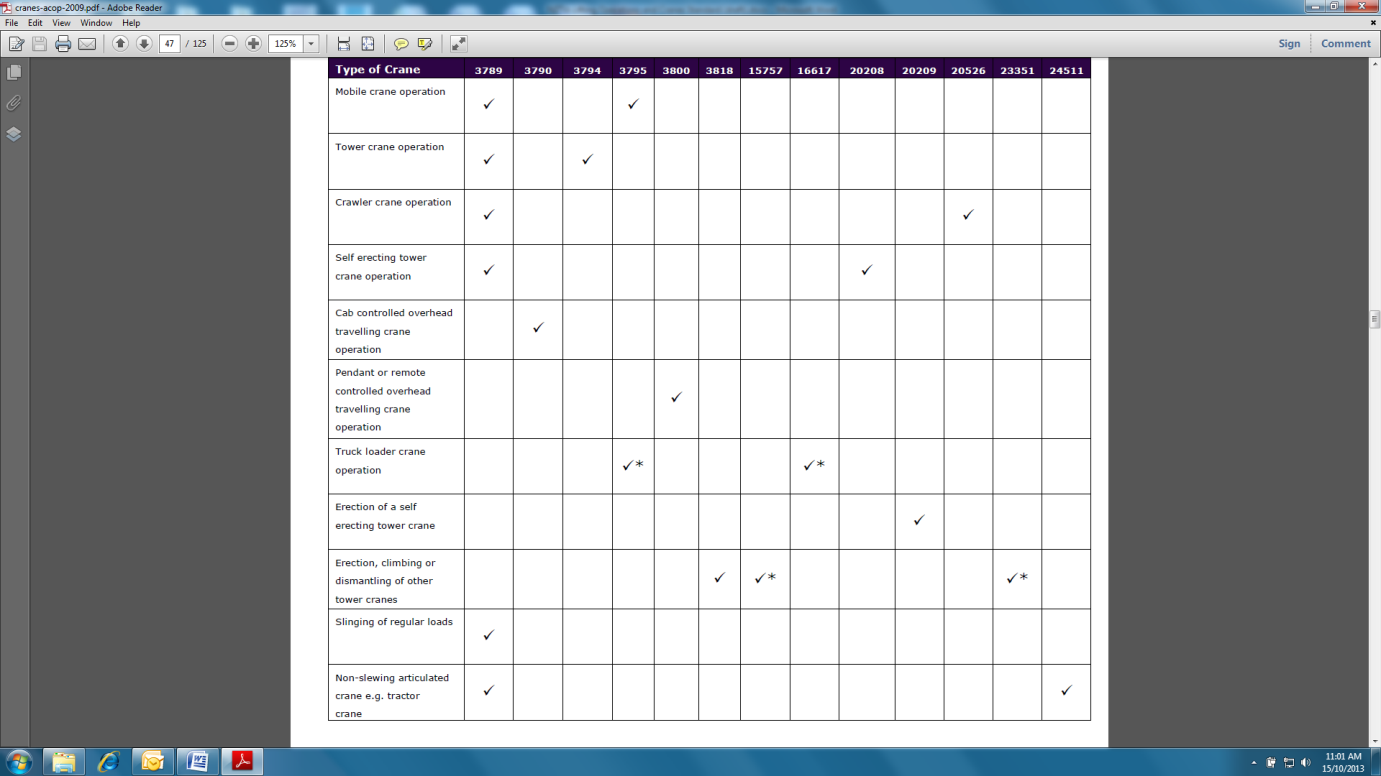
All persons operating or working with a crane must hold the following applicable Unit

Standards as a minimum qualification and preferably hold the relevant National

Certificate in Crane Operation.

***Table 4.1: Minimum Unit Standard Requirements***

\* One or more of these unit standards must be held



## Definitions

|  |  |
| --- | --- |
| Term | Definition |
| Complex Lift | A lift defined as requiring a higher level of verification and approval as determined by the Crane Operator, site or company guidelines |
| Crane Lifted Work Platform (Work Box) | A device designed to be suspended from a crane to carry personnel |
| Dead Weight | Total weight of crane plus load |
| Designed Lift | An extraordinary and temporary lifting operation requiring an assessment of the design of the crane, which may require a temporary re-classification or re-rating or a change in the intended use of the crane.  Note: The following are examples of designed lifts:   * Some multiple crane lifts * Lifts where the centre of gravity changes or is difficult to determine * Lifts for hazardous materials * Lifts where the load lifted exceeds the published rated capacity of the crane |
| Dogging | The application of slinging techniques including:   * selection and inspection of lifting gear * directing a crane / hoist operator in the movement of a load when the load is out of the operator’s view. |
| Dogman | The certified Dogman is responsible for the safe execution of all slinging and lifting activities to which they are assigned. |
| JSEA | Job Safety Environment Analyses |
| PPE | Personal Protective Equipment |
| Proof Load | Known test weight |
| Rigging | Work involving the use of mechanical load shifting equipment and associated gear to move, place or secure a load including plant, equipment or members of a building or structure and to ensure the stability of those members and for the setting up and dismantling of cranes and hoists. The definition is not intended to include work performed by operators or drivers of mechanical load shifting equipment, unless the work is part of the process of setting up or dismantling cranes and hoists. |
| Rigger | The Rigger is responsible for the safe execution of all lifting and rigging activities on which they are assigned. The Rigger is also responsible for the proper and safe use of lifting and rigging gear in accordance with the manufacturer’s recommendations and industry best practice. |
| SHEWMS (also known as SWMS) | Safety, Health and Environmental Work Method Statement |
| Standard Lift | Routine lift that is performed multiple times with identical or highly similar characteristics |
| SWL | Safe Working Load  The maximum load, determined by an approved design engineer, which an item of lifting equipment or gear may safely raise, lower or suspend a load in a particular service condition. |
| VLC | Vehicle Loading Crane |
|  |  |

## Attachments

* Lifting Equipment Register
* Lifting Equipment Inspection Checklist
* Crane Operator Dogger Rigger Competency Checklist
* Crane Operator Shift Handover
* Lift Plan template
* Routine Pre-Lift Assessment template
* Lifting Operations and Cranes - Roles and Responsibilities
* Lifting Operations and Cranes - Training and Competencies

## Reference Documents

* Health and Safety in Employment (Pressure Equipment, Cranes, and Passenger Ropeways) Regulations 1999
* ACOP Cranes and the referenced Standards within Cranes Association including Crane Safety Manual
* ACOP Safe Handling, Transportation & erection of Pre-cast Concrete
* For further reference and standard documents refer to Appendix C in the ACOP Cranes 2009.