

SETTING UP OF MOBILE CRANES



A Training Slideshow.



KEY POINTS

- **Key points to observe with the safe setting up and operation of mobile cranes include;**
 - Personnel Training and Competency.
 - Risk Assessment & Management.
 - Pre-Job Planning and Inspection.
 - Correct Crane and Equipment for Application.
 - Onsite Arrival and Review.
 - Onsite Planning.
 - Correct Setup of Crane
 - Outrigger Operation & Packing
 - Trial Operation
 - Safe Continual Operation.
 - Safe completion of operation.

- **Note:**
 - *Should:- Desired Outcome*
 - *Shall:- Mandatory Outcome*

PERSONNEL TRAINING & COMPETENCY

- **Crane Project Planning Personnel;**
 - Shall be appropriately familiar with the capabilities and limits of the plant & equipment they are planning operations for.
 - Should be appropriately qualified; such as dogging, rigging, crane operation and/or engineering capabilities.
- **Crane Crews;**
 - **Three Stage Process: Training ⇒ Competency ⇒ Familiarization**
 - Should be trained and provided with continual learning, training and refresher in chosen occupation.
 - Shall be appropriately qualified; such as dogging, rigging and crane operation.
 - Should be formally familiarized upon the plant and equipment they are working with and operating.

RISK ASSESSMENT & MANAGEMENT

Risk Assessment is not a mathematical exercise, but rather a subjective application of knowledge and experience to the realities of the worksite (Shapiro, 2000).

- **HAZARD:** Something with the potential to cause harm. This can include substances, plant, work processes and/or other aspects of the work environment.
- **RISK:** Likelihood that death, injury or illness might result because of the hazard.

- **There are Five Basic Steps to the Risk Management Process;**
 - Identify Hazards.
 - Assess Risks.
 - Identify Control Measures.
 - Implement Control Measures.
 - Monitor and Review.

- **When implementing controls, the control hierarchy should be observed;**
 - Elimination
 - Substitution
 - Engineering
 - Administration
 - PPE – *Personal Protective Equipment should always be observed as the final line of defence.*

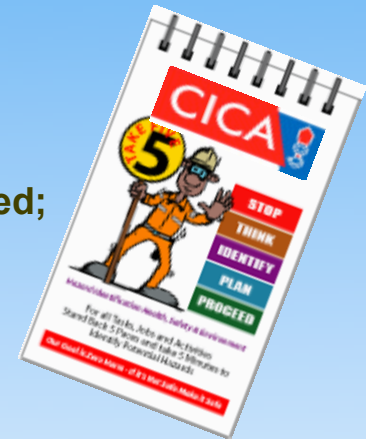
- **Tools for Risk Management may include a Job Safety Analysis and Programs such as the Take 5. Both of these Tools represent a method with which to rate a risk, and to rate the residual risk once a control has been identified.**



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PRE-JOB PLANNING & INSPECTION

- **Responsible Contractors;**
 - Mobile Crane Hire Contractors shall have in place a means of planning (or delegation of) with all operations.
 - This may be in the place of documented procedures of lifting operations, or the absorbing of principal contractor arrangements.
 - A form of auditing, control and review should be in place for documented procedures.
- **Planning Aspects;**
 - Planning should reflect guidelines provided in AS2550 – Cranes Safe Use.
 - Aspects to be considered prior include;
 - Typical Lift Planning characteristics such as radius, load, physical obstructions – incl. overhead & underground.
 - Access in, around and exiting from site for crane and associated transport.
 - Suitable area for rigging of crane, including associated equipment.

CORRECT EQUIPMENT

- **Equipment Allocation;**
 - The correct crane and equipment for the task shall be selected by a competent person in accordance with the planning process.
 - Care shall be taken when interchanging equipment at the 11'th hour.
 - A 'larger' crane may not always be a safer option.
 - Other factors may be introduced when a varying model of crane is interchanged, such as tail swing and outrigger spans.



ARRIVAL ONSITE AND REVIEW

- **Key points to observe prior to establishing to site include;**
 - **Access roads are available and are soundly constructed with suitable entry points to site.**
 - **The workplace is adequately prepared for the incoming mobile crane, including where possible a clear predefined area/crane pad for the crane to position upon.**
 - **Desired setup area should also be level, unless prior consultation has been made with the supplier of the crane.**



ONSITE PLANNING

- **Crew should always inspect site prior to positioning crane in final position;**
- **Elements to observe include;**
 - **Load location and scope of lift.**
 - **Location of any overhead obstructions including; wires, trees, buildings, restricted airspace (ie. Near airport).**
 - **Location of any underground services and/or trenches, including utilities and drainage arrangements that may affect integrity of ground.**
 - **Adequate room for rigging and erection of the mobile crane (ie. Support trucks, fly jibs).**
 - **Adequate tail (counterweight/winch) swing clearance.**
 - **Ability to cordon off area with suitable barricading resources.**

SETTING UP OF CRANE

- **Outrigger Operation;**

- Outriggers should only be extended on the side where the operator is positioned or with suitably located spotter.
- Where space permits, outriggers shall always be fully extended.
- Where space is limited, crane should be configured to maximum capacity – this may require the use of reduced outriggers or on rubber; when permitted by the manufacturer.
- Outriggers shall always be extended to manufacturers procedures and specifications, including the requirement to fit manual pins.
- All outriggers/jacks should be utilised at all times (ie. front jack).
- Generally, Standard Safe Working Load capacity charts are based on all outriggers fully extended and set with the wheels clear of the ground.



SETTING UP OF CRANE

- **Outrigger Packing;**

- Additional packing should always be utilised under outrigger floats (exceptions may include engineered setups where other means of distributing load are adopted).
- Commonly Used (steel fabricated or otherwise) ‘Outrigger Mats’ should carry design information and be subject to periodic inspection.
- When Timber Packing is utilised, it should be in ‘pig-sty’ packing arrangement.
- ‘Rule of Thumb’ formula and calculations should be observed;

$$\text{Area (m}^2\text{)} = 0.65 \times \frac{(C_M + L)}{V}$$

C_M = Total mass of crane (KN)

L = Total mass of load (KN)

V = Maximum permissible bearing pressure of soil. (kPa)

- **Bearing Capacities of ground shall be sourced from Engineering / Site Personnel or alternatively sourced via conducted onsite assessment.**
- **Accurate Outrigger Loadings are desirable for engineered and complicated setups.**

SETTING UP OF CRANE

- **Trial Operation;**
 - Once crane is elevated and level, a trial operation should be completed by the operator; this may include;
 - Luffing Boom to high angle, and slewing 360° with spotter in position – Purpose to review tail swing and outrigger packing suitability.
 - Executing 'dry-run' where load is required to be picked up and placed – Purpose to ensure crane is capable of task and set required limits.



SAFE CONTNUIAL OPERATION

- **Continual Safe Operation can be aided by periodic inspection throughout the project of the following;**
 - **Outrigger Jacks – Leaking Oil / retraction of shaft.**
 - **Outrigger Mats – excessive settlement and/or sinking into ground; ie. Loadings increasing beyond estimated capacity of ground – such as unknown back-filling.**
 - **Outrigger Floats – Cracking or critical damage.**
 - **Evidence of water content in ground – ie. Potential ruptured pipeline.**
- **Should requirements change during operation, then crew shall 'Take 5' and review crane capacity and wider environment to ensure revised work practice is within limits and safe to continue operation.**

SAFE COMPLETION

- Upon completion of project, or specific stage the crane, equipment and site shall be left in secure and safe manner.
- If crane is to be left onsite;
 - Retract Boom, remove keys from the ignition and secure / lock.
 - (Outriggers should be inspected prior to next use).
 - Barricading should remain in place around and crane and any work area deemed necessary.

