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CRANES AND LIFTING

HYER STANDARD

PROCEDURE

CONTENTS

PURPOSE AND SCOPE

The purpose of this procedure is to ensure that safe use of cranes. This procedure applies to all fixed cranes (e.g. tower, vessel-mounted) and mobile cranes (slewing, non-slewing, vehicle loading) cranes used at a Hansen Yuncken site.

RESPONSIBILITIES

HY PROJECT TEAM:

- Ensure Lift Plans are developed for higher risk or complex lifts

- Ensure reports and verifications have been obtained from a geotechnical engineer (or structural engineer if on slab) where required
- Ensure Plant and Equipment has been inspected and verified as safe for use prior to use on site
- Ensure applicable Work Permits are implemented prior to commencing work
- Ensure only trained and competent persons perform work on site
- Ensure worker competencies and qualifications are verified prior to commencing work

HAZARD IDENTIFICATION RISK ASSESSMENT AND CONTROL (HIRAC)

All risks associated with the use of cranes are to be included in the project risk register. This includes risks associated with:

- Structural failure of any crane component, such as the boom, jib, hydraulic rams or wire rope
- Crane overturning due to being overloaded. This may be influenced by:
- Poor ground conditions such as unstable ground
- Backfilled excavations
- Failure to use or fully extend outriggers or stabilisers
- Failure to respond to crane alarms/alerts
- Failure to level the crane
- Over extension of heavy load
- Failure to verify/incorrect weight of load
- Rapid slewing
- High wind conditions
- Contact or collision with other plant and structures such as other cranes, buildings and overhead powerlines
- Falling objects during erecting and dismantling activities, and the way loads are secured during lifting operations
- Crane type and model i.e. radius and capacity suitable for the lifting activities being performed
- Hazards associated with setting up and dismantling the crane

PLANT SAFETY VERIFICATION

Prior to the first use of a crane, it must be approved for use at site as per the Plant and Equipment procedure.

PLANNING

Crane operators must review:

- Boom length or boom angle
- Radius
- Gross capacity
- Net load weight
- Travel path (i.e. proximity to immovable objects, powerlines, workers in the area)

FORMAL LIFT PLAN

Where the lift is determined to be higher risk, such as the weight coming close to the crane's capacity, then a more detailed evaluation must be undertaken and documented as part of a lift plan. A lift plan must always be developed for the following complex lifts:

- Pre-Cast Panel Installation
- Multi Crane Lifts
- Lifting Personnel in a Lift Cage for Work or for Emergency Purposes
- Erection of and lifts with a Tower Crane
- Working near live overhead powerlines
- Lifts which require >85% of the rated Crane Lifting Capacity
- Heavy lifts where load is >20 tonnes

A lift plan must include the following:

- The type of crane or cranes to be used
- The loads to be lifted including the type and mass of lifting equipment e.g. slings and spreader beams
- Verification that the crane standing will support the maximum ground bearing pressure to be imposed by the crane during operations
- The position of the crane, loads to be lifted and where e.g. a diagram showing a plan view of the site

- The load working radius range with confirmation the loads are within the crane's capacity at the maximum radius
- Allowance for the factors that may require de-rating of the crane e.g. for multiple crane lifts, extra radius caused by tilting of tilt-up panels, fly use, short outriggers

FALLING OBJECTS

Controls must be implemented to manage the risk of falling objects, including preventing objects from falling freely or providing a system to arrest the fall of the object. Where reasonably practicable, loads should never be suspended over workers. Loads should not be lifted over public access areas including footpaths, roads, highways, railways, waterways and buildings unless controls are place to safely do so.

If there is a risk of people being hit by falling objects control measures like exclusion zones or suitably designed gantries must be used to prevent people being hit by falling objects during lifting operations. Where possible, site access should be restricted to people who are directly involved with crane activities. Refer to Work at Heights procedure for requirements.

CRANE SETUP

Where to set up the crane must be considered as part of the planning phase. Factors that must be taken into account include:

- Crane standing area (able to withstand the forces likely to imposed on it).
- Location of standing area and factors that may affect stability (e.g. slope, wind conditions etc.)
- Other plant (including other cranes) and structures on site and risk of collision
- Working near overhead powerlines (refer to Underground and Overhead Services procedure)

Where doubt exists as to the integrity of the crane standing area, a geotechnical engineer shall be consulted to assess the capacity of the work areas to support specific items of plant, where necessary additional testing shall be conducted, and a documented geotechnical report obtained.

Plant Setup permit is required for all mobile and vehicle mounted cranes (if outriggers required). Refer to Work Permits procedure.

Where plant is driven or placed onto suspended slabs or other suspended structures, the slab or platform must be design checked by an engineer in accordance with the Temporary Works procedure.

Crane designs may be considered registerable plant in accordance with State legislation and jurisdictional requirements. Registerable plant may require specific maintenance whilst on site.

TOWER CRANES

Large signs must not be placed on crane jibs. Signage wind loading and engineering details must be provided for all signs and fixings used to secure signage to tower crane machine decks and towers.

During tower crane erection and demobilisation:

- Effective work/exclusion zones must be established and communicated to workers/site
- Fall restraint PPE must be used where engineering controls are not present

An independent third-party post erection inspection is required.

If installed, minimum radius weathervane backstays are operational, or:

- removed prior to crane erection or
- Physically secured/restrained

A detailed site layout must be established showing operational and weathervane radius. Anti-collision devices must be fitted where there is a risk of ‘jib clash’ with another tower crane. Controls must also be in place to prevent jib or counterweight clash with other plant e.g. mobile cranes, concrete boom pumps etc. Loads are never to be hoisted outside the site boundary unless authorised by HY and documented (including obtaining over sail rights from neighbours). This includes when loads are being hoisted from approved construction zones on the adjacent road.

Crane tower access should be via compliant enclosed/caged access ladders. Where this is not practicable, fall restraint systems must be used. Protection must be in place at the base of the tower crane, and on all subsequent levels of building structure, to prevent unauthorised access to the crane. Access lighting must be provided to towers and machine deck and have minimum lux level of 40 lux.

Tower cranes must not be operated where lightning strikes are considered as an imminent potential hazard. The crane deck must have controls for preventing fires and fire containment equipment.

Horn must be sounded as warning to allow workers chance to move away.

TOWER CRANE CHECKLISTS

Tower Cranes must be supplied, inspected pre-erection, erected, commissioned, maintained, and dismantled in accordance with:

- AS 1418.4 – 2004: Cranes, hoists and winches Part 4: Tower cranes
- AS 2550.4 – 2004: Cranes, hoists and winches – Safe use Part 4: Tower cranes

Each Tower Crane must be registered as an item of Equipment in HammerTech. The Tower Crane Checklists in HammerTech must be attached to the Equipment item for completion.

Hold points apply and require a permit to be issued by HY before commencing the next phase. The relevant Checklist must be completed (with supporting documentation), submitted and reviewed by HY. The Site Manager and Project Manager must review and sign the checklist and permit the Crane Contractor to erect the Crane. The Crane Contractor Representative must sign the Checklist as acknowledgement.

The hold points are as follows:

- Pre-erection Checklist – completed prior to Tower Cranes being transported to site and erected
- Post Erection & Operation Checklist – completed prior to operation of a Tower Crane

- Demobilisation & Retrieval Checklist – completed prior to dismantling and demobilising a Tower Crane from site

Major Service

Major Servicing is to be conducted at least 10 yearly for registrable mobile and tower cranes or per the manufacturer's requirements. Servicing is to be carried out in accordance with Crane Major Servicing in the Plant and Equipment Procedure (https://www.hyworkzone.com.au/plant-and-equipment-procedure/).

EXCAVATORS

Excavators must not be used for precise lifts.

Excavators may be used for general lifting purposes if:

- Load charts and SWL are displayed
- The machine is fitted with engineered lifting points
- The excavator is fitted with hose burst protection

Excavators must be in accordance with the Plant and Equipment procedure.

TELEHANDLERS

Telehandlers:

- When used as crane, requirements for mobile crane apply e.g. ground certification
- Require engineered jib attachment if used as crane
- When used as crane with jib attached <3t lifting capacity, a Gold Card is required
- When used as crane with jib attached >3t lifting capacity, operator requires Non-Slewing crane (CN) HRWL (or higher).

OPERATING CRANE COMPETENCIES

Personnel involved in crane operations must be trained, hold the appropriate licence (as required) and be deemed competent for work that they are undertaking. Records of operator competency are to be maintained and be readily available.

High risk work licenses (HRWL) for crane operations and associated tasks include:

- Tower cranes
- Self-erecting tower cranes
- Derrick cranes
- Portal boom cranes
- Vehicle loading cranes
- Mobile cranes (slewing and non-slewing)
- Dogging
- Rigging (basic, intermediate and advanced)

Roles involved in crane operations that don't require a HRWL may need to provide evidence of training and competency, including:

- Spotters (e.g. electrical spotter)

A Dogging HRWL is required for the following activities:

- Selecting appropriate slinging methods and lifting gear by:
  - Considering load size and shape
  - Determining load weight (its mass) and centre of gravity
- Inspecting lifting gear like chains, slings, ropes, cables and hooks used to attach loads to plant to ensure it is not defective
- Directing a plant operator in the movement of a load when the load is out of the plant operator's view by communicating with the plant operator using hand signals, whistles or two-way radios

A dogger is not required for slinging loads where judgement is not required and where the load is always in view of the plant operator. Refer to the following table for information on when a dogger is required:

ACTIVITY		A DOGGER IS REQUIRED	DOGGER IS NOT REQUIRED IF ALL THE CONDITIONS BELOW ARE MET.
Slinging a load	Selecting the slinging method	Judgement is required.	No judgement required because the: • selection of the slinging method is pre-determined by a competent person, and • lifting points are pre-determined by a competent person and marked on the load where appropriate.
	Selecting the lifting gear	Judgement is required.	No judgement required because the: • weight of the load—or load within a weight range—is pre-determined by a competent person e.g. may be marked on the load, and • selection of the lifting gear is pre-determined by a competent person.
	Inspecting the lifting gear	Judgement is required.	No judgement required because the condition of the lifting gear is regularly inspected by a competent person.

Safe work lifting procedures incorporating: selecting the slinging method and lifting gear, and inspecting the lifting gear.	Judgement is required because there are no safe work lifting procedures.	No judgement required because the: • safe work lifting procedures have been documented and signed off by a competent person, and • all workers involved have been trained and demonstrated competency in the safe work lifting procedures.
Directing the plant operator – load is in or out of view of the plant operator.	Directing required because the load is out of the plant operator's view during the lift.	No directing required because the load is in view of the plant operator at all times during the lift.
Training – as part of the Dogging Unit of Competency for a HRW licence.	A dogger is required to supervise training.	Not applicable

OPERATING CONDITIONS

A load must not be lifted or suspended unless the load charts are in the crane cabin. They must be available as follows:

- If one main chart, be fixed in the cabin in a clearly visible location
- If numerous, in the operator's manual, a book folder, or envelope in the cabin

A daily pre-start inspection must be completed and entered into the crane's logbook by the operator prior to use.

Communications must be via designated crane channel (i.e. private locked channel not open to the public/site channels) or recognised hand/whistle signals.

Movement of people and mobile plant at the workplace should be minimised while lifting is taking place. Work zones should be established around the crane working area (refer to Work Zones Underpinning Standard).

Note: High-Low/"Christmas Tree" lifts are strictly prohibited on Hansen Yuncken projects.

LIFTING EQUIPMENT

The safety of all lifting gear arriving at site must be verified and must be accompanied by the appropriate documentation, certifying that it has been inspected and maintained in accordance with manufacturers specifications and relevant Australian Standards. This must be done prior to any use of the crane and lifting gear on site.

All lifting / rigging equipment must be:

- Listed within a lifting equipment register by the subcontractor. It must include:
  - a description of the item
  - an identification number
  - serial number details, working load limits
  - where the item is located
- Fit for purpose and inspected prior to use
- Inspected as per relevant Australian Standard and records maintained

Each individual item of lifting equipment must:

- Have an individual inspection record
- Be readily identified against the record. Items to be marked for identification purposes.
- Tagged to confirm mandated inspection

Only hooks with safety latches may be used. Open hooks must not be used.

LIFTING POINTS

Lifting points are to be visually inspected prior to each use to ensure the device is free of any significant damage or wear and markings are legible. Defective devices are to be tagged out and removed from use.

Periodic inspection of lifting points is to be in accordance with the manufacturer's recommendations and performed by a competent person. Worn components are to be measured for degree of wear, which must not exceed that allowed, ensuring the integrity of the lifting point.

Inspection records of lifting points are to be maintained by the owner of the device.

Lifting points for temporary works – steel reinforcing cages, formwork systems, shoring, pits and lids, steel plates, scaffolding, lift boxes, tool boxes and lifting points for items of plant must be designed or checked by a qualified person in accordance with the temporary works procedure.

INSPECTION OF LIFTING EQUIPMENT

All lifting equipment must be inspected before it is used, even new equipment. It must also be inspected in accordance with the relevant Australian Standard or manufacturer's specifications.

Inspections must be done by a competent person (e.g. dogger) experienced in inspecting lifting equipment as follows:

- Synthetic slings – at least 3 monthly (as per AS4497)
- Chain Slings – based on the number of lift cycles per week (as per AS3775.2)
- Wire Rope Slings – 12 monthly or more frequent where conditions are severe (particularly corrosive or abrasive) (as per AS1438.2)
- Winches, Blocks and Hoists – 12 monthly or as directed by the manufacturer

Prior to each use of a sling, the user must check that it does not show any signs of damage that could affect its safe use. Particular attention should be given in circumstances, locations and atmospheres that are likely to result in accelerated damage.

Slings must be withdrawn from service immediately if they sustain any of the following faults or meet the discard criteria:

- A dangerous condition of the sling is suspected
- The label is illegible or missing

- The cover or sewn sleeve has been damaged
- The stitching has been damaged
- A protective coating has been damaged
- An end fitting or a coupling has been damaged

SOFT SLINGS (SYNTHETIC WEBBING SLINGS)

Soft Slings are only to be used where chains, wire ropes, or certified manufactured lifting devices (e.g., suction cups) are not practicable. A task-specific risk assessment using the Soft Slings Risk Assessment template is to be conducted by a licenced rigger/dogman and submitted to the HY Site Manager.

The Site Manager and Project Manager must both review and approve the risk assessment to allow for the slings to be used. The Business Unit HSE Manager is to be provided a copy of the completed risk assessment and kept informed of the project team's decision.

Soft slings must be used, selected, stored, maintained, and inspected as per manufacturers and Australian Standards specifications.

LIFTING BAGS

Material bags can only be used under the following conditions:

- Materials can be delivered in material bags however unloading must be one lift from the truck to ground level and placed on a pallet, in a bin, stillage or similar within a Loading/Unloading Exclusion Zone
- The bag must be contained within a bin, stillage or similar which is lifted to the required location.
- The bag can then be lifted from the bin, stillage to a maximum height of 2m into an exclusion zone of 2m radius from the bin or stillage

CAGES, WORKBOXES AND FIRST AID BOXES

At least once every 12 months, or as required by the manufacturer, a periodic inspection of the cage/workbox must be performed by a qualified inspector in accordance with the instructions provided by the manufacturer.

When using a crane-lifted workbox or a first aid box, the crane must meet the following criteria:

- Have a minimum SWL of 1000 kg at the maximum radius for the task to be performed
- Have a minimum SWL of at least twice the total load of the workbox and its contents, at the maximum radius for the task to be performed
- Be fitted with an upper hoist limit (anti-two block) that stops operation of the hoist, luff and telescope functions of the crane, or be designed so that two-blocking cannot damage any part of the crane or lifting gear
- The crane's levers and foot pedals are to be fitted with a constant pressure system that stops the crane's motions when the operator removes pressure from the controls
- If the crane is fitted with a free fall facility, the free fall function is to be locked out with a keyed lock-out or fixed plate
- Lifting points are to be designed by a competent person

Crane-lifted workboxes and first aid boxes must meet the following criteria:

- Correctly tagged lifting slings are to be supplied with the workbox and first aid box and attached to the lifting points by means of hammerlocks or moused shackles
- The factor of safety for each suspension sling must be at least eight for chains and 10 for wire rope
- The SWL, tare mass and design registration number of the workbox or first aid box must be marked on the workbox or first aid box
- If the workbox is provided with a door, this should be inward opening only, self-closing and provided with a latch to prevent accidental opening. However, first aid boxes may be provided with outward opening doors.
- The sides of the workbox or first aid box must be at least one metre high
- First aid boxes must be clearly identified as first aid boxes

The following must occur to ensure the safety of persons in a crane-lifted workbox:

- All persons in the workbox must wear full body fall-arrest harnesses at all times. Harnesses must be attached to fall-arrest anchorage points in the workbox or to the main sling ring above the workers' heads. Energy absorbers must be provided on the lanyards.
- At least one person in the workbox must hold a dogger's licence class or equivalent to ensure correct directions are communicated to and from the crane operator

EMERGENCY PROCEDURES

Where cranes and lifting is being undertaken at a site, the procedures for the response to an emergency related to cranes and lifting must be included in the Emergency Response Plan. When establishing emergency procedures, the following must be considered:

- The range of unexpected emergencies e.g. dropped loads, overturing of crane, collisions with structures etc.
- Underground and overhead service strikes
- How to rescue workers from a crane (including rescue from height)

DEFINITIONS AND ABBREVIATIONS

HRWL – High Risk Work Licence

SWL – Safe Working Load

WLL – Working Load Limit

REFERENCES

- Work Health & Safety Regulation 2011 (QLD), 2012 (SA/TAS) and 2017 (NSW) – Chapter 5 Plant and structures (relevant sections)
- Occupational Health and Safety Regulations 2017 (Victoria) – Part 3.5 Plant (relevant sections)
- Managing the risks of plant in the workplace (Model Code of Practice)
- General Guide for Cranes (Safe Work Australia) 2016
- High Risk Work Licensing for Dogging Information Sheet (Safe Work Australia) December 2015
- Federal Safety Commission (FSC) Audit Criteria – H14 Tilt-Up / Precast Concrete
- Federal Safety Commission (FSC) Audit Criteria – H16 Mobile Plant

ASSOCIATED DOCUMENTS

- HYer Standard – Cranes and Lifting

- Quick Guide – Loading and Unloading Vehicles (https://www.hyworkzone.com.au/loading-and-unloading-vehicles-quick-guide/)
- Quick Guide – Work Zones (https://www.hyworkzone.com.au/work-zones-quick-guide/)
- Temporary Works procedure (https://www.hyworkzone.com.au/temporary-works-procedure/)
- Underground and Overhead Services procedure (https://www.hyworkzone.com.au/underground-and-overhead-services-procedure/)
- Work at Heights procedure (https://www.hyworkzone.com.au/work-at-height-procedure/)
- Work Permits procedure (https://www.hyworkzone.com.au/work-permits-procedure/)
- Soft Slings Risk Assessment template

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ANIMATION

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