



Lifting Operations

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1 Purpose

This Safe Work Procedure defines responsibilities and workflow for lifting operations carried out during the execution of construction and commissioning activities on sites under COMPANY's responsibility.

It specifies the requirements for cranes, rigging and lifting equipment, including the classification of lifts as well as, the design/engineering and approval of transportation, rigging/lifting of equipment, modules and material carried out during the execution of the project

The purpose of this Safe Work Procedure is to set safety requirements for the lifting operations to ensure they are safely planned and executed to prevent any incidents.

2 Scope and Validity

This Safe Work Procedure applies to any activities carried out during construction, pre-/commissioning and start-Up phases as well as for repair work and small-scale modifications.

In addition, this Safe Work Procedure also applies to all pre-fabrication and sub construction areas (e.g. Package Units) within COMPANY's area of responsibility.

3 Definitions and Abbreviations

Assembly / Disassembly	Process which changes the capacity, configuration and/or operational characteristics of a crane.
Competent Person	A person who has demonstrated that they have the knowledge, training, and experience required to perform specific tasks and is capable of identifying existing and predictable hazards in the surroundings or working conditions which may be hazardous or dangerous and who has authority to take prompt control measures to eliminate them.
Cribbing	The use of materials to spread the load exerted by a mobile crane onto the ground to prevent movement that could cause instability. Materials used include metal sheets or wooden blocks/planks.
Lifting	Any vertical movement (raising or lowering) of load including a mechanical lifting device, lifting gear, a load and a lifting operator.
Lifting Accessories (Lifting gears)	Load carrying accessories used in combination with a lifting appliance, however, that are not necessarily part of the permanent arrangement of the lifting appliance, such as: <ul style="list-style-type: none">- attachment rings, shackles, swivels, balls, pins- sheaves, hook-blocks, hooks, load cells- loose gear
Equipment Load chart	Schematic graph showing lift capacities for a range of lift heights and radii.
Exclusion Zone	An Area people are not allowed to enter without specific permissions due to dangerous / hazardous conditions
Ground Bearing Capacity	The capacity of soil to support the loads applied to the ground
Ground Bearing Pressure (GBP)	The maximum allowable pressure that may be imposed on the supporting surface.
Lifting Equipment	General expression including mechanical lifting devices (lifting appliances), lifting gears, loose gears and other lifting attachments.

Lifting Operation	A lifting operation is an operation concerned with the lifting and lowering of a load. It may be performed manually or using lifting equipment.
Lifting/crane/equipment Operator	Person who operates a mechanical lifting device to lift, move, position or reposition loads.
Lift Plan /or Study	A detailed study of the factors affecting the safety of a proposed lift (such as lifting sequences, weights and equipment involved, etc.) and the controls necessary to manage it.
Lifting Supervisor	Person who is responsible for planning and supervising lifting activities in accordance with local legislation and LE requirements. He/she is a direct supervisor of person executing lifting operations (can be LE employee or contractor).
Load	Total weight to be lifted including applicable crane components, rigging gear, etc.
Loose Gears	<p>Equipment used to attach the load to the hook, but which do not form a part of the load, which is normally not permanently attached to the hook, and which may be stored separately from the crane.</p> <p>These include slings, nets, baskets, chains, links, rings, shackles, lifting beams and frames, spreaders, grabs, loading pallets, skids, etc.</p>
Mechanical Lifting Devices (Lifting appliances)	<p>Machine used for lifting goods and materials and in special cases, personnel. These include:</p> <ul style="list-style-type: none">- all types of cranes (e.g. tower cranes, mobile cranes, gantry crane, portal frame cranes, jib cranes and vehicle mounted cranes)- other certified lifting devices (e.g. excavators, hoists, winches)
Rigger	Qualified and competent person who select suitable lifting equipment and ensure that the load is attached safely (this can also be performed by the lifting operator).
Rigging plan	Document which define the equipment being used during the lifting to have control and establish safety precautions before the process is completed.
Signalman	Qualified and competent person who provide maneuvering signals to assist the lifting operator (this can be performed by the lifting operator or the rigger only as long as safety can be maintained).

4 References

Document	Title
&AA W-PQ 9601.001 (EN)	HSE Program (CONTRACTOR HSE Requirements)

5 Planning of Lifting Operations

5.1 Risk Management

5.1.1 Lift Classes

The lift class to be assigned to a lifting operation must be determined prior work start as an aid to define suitable controls to be implemented at project site. The lift classes are related to the complexity of the lifting and hoisting operations.

The types of control measures and the level of supervision required to manage the risks inherent to the lift classes increase with their complexity of the lifting and hoisting operations. These are described in the below sub-sections.

Lift Classes	Type of Lifting Appliances	Operation Types	Minimum Required Control Measures
Routine	Crane, Excavator, etc.	Lifts using <ul style="list-style-type: none"> - one piece of lifting equipment, AND - $5T \leq \text{Loads}$, AND - Loads < 50% of the crane rated capacity 	<ul style="list-style-type: none"> - Equipment load chart - Job Safety Analysis / Risk Assessment - General Permit to Work - Lift plan (optional, upon COMPANY's decision)
Minor	Crane, excavator, etc	Lifts using <ul style="list-style-type: none"> - one piece of lifting equipment, AND - $5T \leq \text{Loads} < 15T$, AND - $50\% < \text{Loads} < 85\%$ of the crane rated capacity 	<ul style="list-style-type: none"> - Equipment load chart - Job Safety Analysis / Risk Assessment - General Permit to Work - Lift plan (optional, upon COMPANY's decision)
Major	Mobile or Tower Crane	Lifts using <ul style="list-style-type: none"> - one piece of lifting equipment, AND - $15T \leq \text{Loads} < 50T$, AND - Loads < 85% of the crane rated capacity 	<ul style="list-style-type: none"> - Equipment load chart - Job Safety Analysis / Risk Assessment - Special Permit to Work - Lift Plan (incl. rigging plan)/ Lifting Study - COMPANY Lifting supervisor present during lifting
Critical	Mobile or Tower Crane	Lifts using <ul style="list-style-type: none"> - more than one piece of lifting equipment, OR - Loads > 50T, OR - Loads > 85% of the crane rated capacity, OR Lifts requiring <ul style="list-style-type: none"> - any part of the equipment or load to cross above or below an energized process line, equipment, or occupied building, - Hoisting Personnel 	<ul style="list-style-type: none"> - Job Safety Analysis / Risk Assessment - Special / Lifting Permit to Work - Lift Plan / Lifting Study - Pre-Lifting Meeting - Critical Lifting Operation Safety Checklist - COMPANY Lifting supervisor present during lifting

5.1.2 Risk Assessment and Job Safety Analysis

- When planning lifting operations, CONTRACTOR must prepare a or risk assessment to evaluate the hazards and identified control measures associated with the specific lifting activity being performed.
- As a minimum, following hazards must be evaluated and addressed:
 - Falling over of lifting equipment
 - Damage to lifting equipment due to overload
 - Falling or dropped loads
 - Falling material not being part of, not being secured to loads
 - Contact with other lifting devices, equipment, structures etc.
 - Contact with personnel
 - Risks during rigging (attaching, detaching), at grade and also at height
 - Electrical hazards e.g. malfunction, power outage, overhead power lines, temporary power, etc
 - Ground bearing capacity and effects loads may have on ground stability underneath tracks, outriggers and matting

CONTRACTOR Job Safety Analysis (JSA) or risk assessment are also required when preparing a lift plan / lifting study to support the hazards identification and risk evaluation.

For further details of JSA and Risk Assessment refer to HSE Program Site (&A?-W-PQ 9601)

5.1.3 Equipment load charts

CONTRACTOR must verify a copy of the equipment load chart used for the lift is available in the lifting equipment operator's cabin.

5.1.4 Lift Plan / Lifting Study

- A lift plan / lifting study must be prepared prior some lifting operations depending their classification. The level of detail required is related to the risk and complexity of the lift. Lifting study / lift plan may be separate documents or can be part of other documents.
- Lift plan / lifting study must clearly address, but not be limited to, the following:
 - Drawings
 - **WITH ELEVATION VIEW INCLUDING:**
 - a description of the configuration of the cranes indicating model number, boom length, boom type, auxiliary counterweights, parts of load line, jib, length, type, offset, etc.
 - radius
 - crane capacity for the configuration used
 - tabulation of weights of all accessories and components that constitute load on the crane boom
 - lifted equipment information including weight, height, diameter, point of support, centre of gravity and degree of dress out
 - tabulation of load on tailing crane, configuration, and capacity
 - identify any obstruction
 - layout of support (matting) under all cranes
 - ground Bearing Capacity and pressure
 - ratio of lifted load to crane chart capacity
 - dead blocking requirements
 - lifting and tailing hook-ups, including shackle, sling, and spreader bar sizes, lengths, and capacities.
 - a scale elevation view that shows the relationship and clearances between the lifting equipment, lifted items, and potential obstructions.
 - **WITH PLAN VIEW INCLUDING:**
 - lift (and tailing) crane location
 - equipment, foundation
 - structures, etc. that need to be left out until the lift has been made
 - initial horizontal position of item to be lifted
 - The type and number of personnel required, their specific roles and competences, and how they will be briefed
 - The nature and weight of the load and lifting points
 - Pick up and set down points and constraints such as space and stacking
 - Equipment required and certification checks
 - Step-by-step instructions
 - Communication methods to be used
 - Emergency and rescue plans
 - Restrictions on the lift such as weather, light, sea state, etc.
 - Access and egress for slinging and un-slinging the load
 - Simultaneous, conflicting, or nearby operations or work
 - Whether Permit to Work procedures are applicable
 - Load integrity check
 - Load charts for generic lift plans and for heavy or complex lifts
 - An assessment of whether tag lines should be used, their hazards and limitations

5.1.4.1 For Routine Lifts

- CONTRACTOR lift plan is optional for routine lift. However, if COMPANY Site Manager or site representative find a lift plan is necessary due to complexity of lift, site conditions, equipment being lifted, etc. CONTRACTOR will develop a lift plan and follow minimum required control measures as defined for Minor Lift. (see "Lift Classes")
- COMPANY reserves the right to review and approve the lifting plan if considered necessary.

5.1.4.2 For Minor Lifts

- In the case of multiple Minor lifts with the same crane, same radius, same configuration, and same crane location, CONTRACTOR may utilize one lift plan which reflects the “worst case scenario”, e.g. max radius, and greatest capacity within the “Minor” lift criteria.
- COMPANY reserves the right to review and approve the lifting plan if considered necessary.

5.1.4.3 For Major Lifts

- CONTRACTOR must provide a detailed lifting and rigging plan developed by a Competent Person.
- Completed lifting and rigging plan must be submitted to COMPANY Site Representative for review no less than 24 hours before the lift.

5.1.4.4 For Critical Lifts

- CONTRACTOR must provide a lifting and rigging plan prepared and approved by a CONTRACTOR qualified person.
- All Lifting study / lift plan should be submitted to COMPANY's Site Manager for review and approval at least **10 calendar days** prior to making the lift.
- COMPANY lifting supervisor must verify all lift documentation is in order at lift location prior to lift being made.
- Any changes to a critical lift plan must be approved by COMPANY's Site Manager. (see section “changes in lifting operational conditions”)
- COMPANY lifting supervisor must be present at lifting site

5.1.5 Pre-Lift Meeting

A pre-lift meeting is required for every “critical lift”, at least to ensure that the lift can be executed in a safe and efficient manner. The pre-lift meeting can cover several lifts on the same day/shift.

At least the following personnel must participate in the pre-lift meeting to be familiarized with the requirements and documents:

- COMPANY's Construction Manager or delegate (i. e. appropriate Discipline Superintendent) or Commissioning Manager
- CONTRACTOR's responsible supervisor
- CONTRACTOR's lifting coordinator (e. g. for tandem lifts)
- CONTRACTOR's crane operators
- CONTRACTOR's riggers
- CONTRACTOR's signalmen

5.1.6 Permit to Work

- A COMPANY General Work Permit must be issued for routine and minor lifting operations.
- A COMPANY special (Lifting) Permit must be issued for major and critical lifting operations.

Refer to Permit to Work System procedure &A?-W-SC 9601.

5.1.7 BeSafe Daily and Toolbox Talk

- CONTRACTOR must conduct BeSafe Daily (see HSE Program Site - &A?-W-PQ 9601) or toolbox talk prior each lifting to discuss the lift with each person of the lift team and to confirm their understanding of the lift plan and hazards involved.

- CONTRACTOR involved in the lifting must have the opportunity to review the findings of the Job Safety Analysis (JSA) or risk assessment, the control measures as defined in the Permit to Work and the details of the lift plan (if required) to ensure they clearly understand and agree with the operation procedure.
- When reviewing the finding of the Job Safety Analysis (JSA) or risk assessment, CONTRACTOR must discuss about hazards specific of planning lifting operations including at least:
 - Falling over of lifting equipment
 - Damage to lifting equipment due to overload
 - Falling or dropped loads
 - Falling material not being part of, not being secured to loads
 - Contact with other lifting devices, equipment, structures etc.
 - Contact with personnel
 - Risks during rigging (attaching, detaching), at grade and also at height
 - Electrical hazards e.g. malfunction, power outage, overhead power lines, temporary power, etc
 - Ground bearing capacity and effects loads may have on ground stability underneath tracks, outriggers and matting
- Responsibilities of CONTRACTOR personnel involved in the lifting operation must be clearly defined and assigned at the time of the pre-job meeting.
- When relevant, a review of site incidents for the previous months or similar project sites must be discussed by means of Lessons from Incident.

5.1.8 Critical Lifting Operation Safety Checklist

For critical lifts, CONTRACTOR must complete a lifting operation safety checklist (Attachment 2) to ensure that all control measures are readily in place prior operation starts.

5.1.9 Changes in Lifting Operational Conditions

As Risk Assessment (RA), Job Safety Analyses (JSA) and Permits to Work (PTW) and Lift Plans are developed based on a pre-determined set of parameters and considerations, any significant changes must result in a temporary stoppage of the lifting operation and a review of the Risk assessment, Job Safety Analysis and Permit to Work.

The following scenarios must result in a review of the RA, JSA and PTW.

- Changes to the type and capacity of lifting device as defined in lifting studies, Job Safety Analysis (JSA), Risk Assessments and Permits to Work (PTW)
- Changes to the sequence of operations
- Changes requiring reconfiguration of the crane (boom/ jib length, outrigger beam length reduction, parts of hoist line, etc)
- Changes in the rigging details which could result in a reduction in rigging strength or significant increase in rigging weight
- Changes in surrounding environment such as the presence of a temporary structure obstructing the operation
- Changes in the weather and environmental conditions which have an adverse impact to the lifting operation
- Changes to safety-critical personnel

Any changes to a critical lift plan must be approved by COMPANY's Site Manager.

5.2 Integrity Management

All lifting equipment must be used/serviced, maintained, stored, and inspected in accordance with the manufacturer's instructions and the relevant local applicable and project specific requirements as defined below.

Lifting equipment must not be modified for purposes other than those stated without the consent of the manufacturer and/or applicable authorities.

5.2.1 Register

Lifting equipment must be recorded in a lifting equipment register or logbook that contains certification and inspection details.

5.2.2 Identification and marking

Lifting devices must be marked with:

- a unique identifier that can be used to track the testing and inspection history of the item
- identifier within correct inspection date
- working load limit (WLL) / load capacity or capacity chart. Alternatively, a manual calculation sheet must be easily accessible at the working location to ensure that all personnel have access to the correct information on lifting gears

5.2.3 Certification

Lifting equipment must be certified for the intended use by the OEM.

Lifting equipment must meet all applicable legislative and project specific requirements.

5.2.4 Inspection and Testing

- CONTRACTOR must ensure that lifting equipment used on the project site are inspected and tested by a competent person or third-party according to the applicable regulatory and following requirements:
 - Initial inspection (e.g. for lifting device assemble directly at site, for cranes after installation)
 - Cranes having their configuration changed or having been dismantled and then re-erected must be re-inspected before being used
 - Periodic Inspection (at least once a year)

Additional inspections are required when lifting equipment has been involved in an incident or structurally modified or repaired.

Personnel carrying out inspection and testing of lifting equipment must be qualified and competent (as may be required by statutory laws and regulations).

- CONTRACTOR must maintain records of lifting equipment testing and inspections including results, date of completion and next planned occurrence. The documentation must be submitted to COMPANY upon request.

5.2.5 Site Entry Process for Mobile Cranes

Before access to site is granted to CONTRACTOR's mobile cranes, following requirements must be fulfilled:

- CONTRACTOR must provide COMPANY with all equipment and operator(s) related documentation before mobilization of crane at site. Cranes and operators can only be mobilized once documentation has been approved by COMPANY.
- Upon crane's arrival at the site, CONTRACTOR must conduct a visual and functional inspection of the crane installed in an area specifically designated by COMPANY. CONTRACTOR must use and fill COMPANY "Crane pre-entry inspection form" (see attachment 1). Filled forms must remain on site for the duration of the cranes mobilization.

- After successful completion of the site entry process for mobile crane, COMPANY will mark the relevant crane(s) accordingly (e.g. with stickers). Only marked cranes are allowed to be operated on site.

5.2.6 Maintenance, Servicing and Repair

- Lifting equipment must be maintained, serviced, and repaired according to manufacturer's recommendation and local legislation requirements.
- Modifications of lifting equipment must only be carried out by a competent person or third-party.
- CONTRACTOR must document all maintenance, service and repair of lifting equipment including, as a minimum
 - all maintenance activities
 - change out of critical items
 - test certificates
 - load tests and results
 - any approved modifications and any deviations supported by a management of change process with the necessary approvals
- No part of a crane which is subject to lifting loads must be altered welded or changed in any way without reference to the crane manufacturer's procedures.

5.2.7 Storage

- CONTRACTOR must always store lifting equipment in a dedicated storage area (preferably off the ground) and protected from damage.
- CONTRACTOR must inspect loose lifting equipment for the correct marking, possible overload, wear, and damage, before and after use. Defect and damaged loose lifting equipment must be marked and set aside at a designated place clearly identified for this purpose.
- CONTRACTOR is responsible for returning lifting equipment to the storage area after use.

5.2.8 Removal from Service

CONTRACTOR must remove lifting equipment from service if it is:

- damaged
- incorrectly tagged or coded
- outside the defined inspection date

5.3 Mechanical Lifting Devices (Lifting Appliances)

5.3.1 Cranes

- All cranes must have a clearly and visibly posted plaques with:
 - a load capacity chart for safe working load capacities at the appropriate radius and recommended operating conditions
 - a lift range indicating the length(s) of the boom which may be fitted
- Such instruction plaques must be permanently affixed to the cab of the crane in a location readily visible to the operator while he/she is seated in his/her control station.
- The crane manufacturer's operation manual, maintenance requirements and load specification charts must be adhered to at all times.
- Fly jibs on telescopic cranes must be only erected or dismantled by a competent person.

- For overhead cranes, CONTRACTOR operators must conduct and record pre-use inspection before each shift.
- For overhead cranes, CONTRACTOR must maintain records of inspections carried out before crane arrived at site.
- CONTRACTOR must ensure proper testing has been performed according to the equipment design, manufacturer recommendation and local or in country requirements

5.3.1.1 Load Moment Limiter (Load Limit Switches)

Load moment limiters (load limit switches) are safety components for the hoisting units (hoist cranes, traveling cranes) and are meant for interrupting automatically the driving of the hoisting gears when the prescribed values are exceeded. They are intended for fitting out the cranes with a view to protecting them against stability losing or overloading.

- A load moment limiter must be installed on all cranes. In some exceptional cases (e.g. unavailability of appropriate cranes on the local market) an exemption might be possible (approved by COMPANY's Site Manager), if it can be demonstrated that overloading of the crane is avoided, considering a safety factor of 3 or more. The demonstration must be documented by means of lifting studies and/or method statements for every lift (or group of similar lifting operations).

5.3.1.2 Anti-Two-blocks (A2B)

Anti-two-block warning systems are used on cranes to halt or caution operators of unsafe upward movement of the hook. Without anti-two block protection, operators can pull the hook and load through the crane body, damaging the crane or causing safety risks.



Anti-Two-blocks must be fitted and functional to prevent the head and sheave blocks hitting.

5.3.2 Pick'n Carry Cranes

Pick'n Carry Cranes are used for loading, lifting and shifting.

In some cases, the front and rear wheels are connected by a pivot/flexible link. While moving with load and during turns, the gravity centre of the crane may move unexpectedly to the outside of the projected area centre between front- and rear wheels. Some types of pick'n carry cranes then get unstable, especially during turns on uneven surfaces or on slopes. When climbing or descending a slope, the centre of gravity of the suspended load also moves towards the tipping point, thereby reducing the crane's forward stability.

- Based on past unsatisfying experience with the "Escort Model FX 150", this model and similar ones are banned from and prohibited on all COMPANY sites.
- In case of uncertainty about acceptable "Pick'n Carry cranes", COMPANY's Lead Construction HSE Manager must be contacted.

Prohibited (Escorts Model FX 150 and similar)	Allowed
	

5.3.3 Work/Man Baskets / Man Lift use on a Crane

CONTRACTOR must use a work/man basket on crane only when access and means of access to work place or area are otherwise inaccessible or unsafe because of structural design or worksite conditions.

Refer to procedure &A?-W-SC 9606 "Working at Height" for safety requirements and responsibilities in terms of use.

5.3.4 Excavators

Excavators must

- only be used for lifting loads when they are designed for this purpose
- be operated in accordance with the manufacturers (OEM) instructions
- feature properly designed and installed lifting points and a safe load indicator or display of safe working load

5.4 Personnel for Lifting Operations

5.4.1 Tasks and Duties

5.4.1.1 Lifting / Crane / Equipment Operator

The duties of the lifting operator include the following:

- Conduct daily check before use (e.g. for oil leakage and damage, all safety devices); tower and mobile crane operators must keep a register with records
- Ensure that the cribbing and ground conditions are suitable to support the lifting devices (e.g. not too close to excavations)
- Ensure that the weight and geometry of the load do not exceed the maximum capacity of the lifting devices (or the required percentage (according to local legislation) thereof)
- Define and cordon off the hazardous area to prevent personnel from entering it during lifting (see 5.5.1)
- Leave the lifting devices/crane only when it is in safe condition, e.g. loads are not left suspended, control devices are locked
- Ensure good communication is agreed with involved persons, e.g. signaller rigger
- Ensure that control is maintained over the lifting device at all times, with no distractions during the lifting operation
- Ensure that lifting is conducted at the proper speed and height
- Never commence work under any of the following circumstances:
 - loads are not attached safely
 - the signal is vague, visibility is insufficient
 - the object is embedded or stuck in the ground or similarly prevented from free movement
 - the load exceeds the required capacity or is unclear
 - the sling angle (i.e. the angle of a sling from vertical) exceeds the angle limit of 60°
 - a person is on the load
 - a safety device is insufficient or does not work
 - a sharp edge of the load is unprotected
 - weather conditions are not conducive to the lifting operation
 - the load is to pass above persons or hazardous equipment which could cause serious consequence in the case of failure, e.g. a pneumatic pressure vessel. If this cannot be avoided, sufficient controls must be established to mitigate the risks to personnel/equipment from the lifting operation.
 - the lift may be unsafe for any reasonable cause.
- Report any unsafe or stopped work to CONTRACTOR supervisor in charge of the area.

5.4.1.2 Rigger

The duties of the rigger include the following:

- Ensure that the lifting equipment (slings, shackles, etc.) is inspected and in good condition before use
- Perform a visual inspection of lifting equipment
- Select suitable lifting equipment for the purpose and combine it appropriately
- Verify the integrity and stability of the load
- Ensure that the load has been attached securely and that no unsecured objects can fall off during the lift
- Ensure that the sling angle (i.e. the angle of a sling from vertical) does not exceed 60°
- Ensure that the lifting equipment has been properly protected from any sharp edges of the load
- Use suitable tag lines, if necessary, to stabilize the load from swinging
- Ensure that the load stands safely and stably before it is disconnected from the lifting equipment
- Remove any damaged lifting gear from use immediately
- Ensure that all personnel are in a safe area during lifting
- Define and cordon off the hazardous area to prevent personnel from entering it during lifting

5.4.1.3 Signalman

A signalman can be the same person as the rigger or the lifting operator. A signalman must be deployed whenever it is impossible for the lifting operator to maintain an unobstructed view of the entire lift area at all times.

The duties of the signalman include the following:

- Support the lifting operator by providing the proper manoeuvring signals
- Observe and monitor the movement of the load during the entire lifting operation
- Wear at all times a high visibility top

5.4.1.4 Lifting Supervisor

The duties of the lifting supervisor (i.e. an individual supervising lifting operations by the team assigned to him/her) include the following:

- Assess and plan lifts regarding the selection of lifting devices, lifting gear and personnel
- Apply for a permit to work
- Ensure compliance with HSE requirements and regularly monitor lifting execution, based on risks
- Ensure that all involved personnel are trained and qualified
- Ensure that lifting devices and gear are adequately inspected and maintained
- Stop any unsafe operation and report any incidents that occur anytime during the entire lifting operation

5.4.2 Qualification, Competency and Training Requirements

5.4.2.1 Lifting Operators

- A lifting operator must maintain a valid training status or – if required by local legislation – a lifting operator qualification or certification for the corresponding type of lifting devices to be used.
- Operators have received the necessary training and certification or qualification to safely operate the make, model, configuration and capacity of equipment they are assigned to operate.
- A lifting operator must have a medical fitness certificate or any other evidence satisfying the local regulations and being in good physical and mental condition to perform work.

- A lifting operator of mobile and tower cranes must have a formal authorization to operate (a) specified lifting crane(s) by the employing company and must only operate the cranes he/she was assigned for.

5.4.2.2 Riggers

- A rigger must maintain a valid training or – if required by local legislation – a rigger qualification or certification.
- A rigger must have appropriate knowledge and competency to execute assigned lifting work, e.g. correct hand signals, determination of the weight and the centre of gravity, reaction of load during lifting, different slinging techniques, inspect wire rope and other rigging equipment etc.

5.4.2.3 Signalman / Signal Person

- A signalman must maintain a valid training or qualification or – if required by local legislation – a signalman qualification or certification.

5.4.2.4 Lifting Supervisor

- A lifting supervisor must be experienced and trained and have sufficient understanding of lifting operations and a safe system of work.
- A lifting supervisor must be competent in COMPANY's lifting and local legislation requirements.
- A lifting supervisor must have the necessary authority and competence to give relevant instructions and to stop a lift.

5.4.2.5 Execution of Lifting Operations

5.5 General Requirements

- CONTRACTOR is required to observe all locally applicable regulations for crane, rigging, lifting and transportation work.
- CONTRACTOR must classify, plan, and execute lifting and rigging operations as stated in this document.
- CONTRACTOR must receive written approval from COMPANY site representative before utilizing COMPANY or CLIENT owned lifting equipment, device.
- CONTRACTOR must submit a site-specific lifting plan (incl. type of crane, rigging, lifting characteristics and transportation) to detail the particular requirements and controls to be used on the project to further define details needed to enhance this global practice and it must be approved by COMPANY
- Lifting operations must be assessed to identify potential hazards and make sure suitable risk control measures are put in place (including risk assessments, job safety analyses, lifting studies, permits to work as required).
- Lifting equipment must be certified and/or inspected fit for use.
- Lifting operations must be performed only by competent (i.e. trained, qualified and/or certified) and familiarised personnel.
- Daily checks must be performed of lifting equipment as required.
- CONTRACTOR must ensure that lifting equipment operators have received the required training and certification or qualification to safely perform their tasks and ensure that safety conditions of each specific piece of lifting equipment they are assigned to operate.

5.5.1 Exclusion Zones

- The area of lifting operation must be identified and controlled. If necessary, the hazardous area must be cordoned off by barrier tape, hard barricades or ropes. Alternatively, one or more spotters can be assigned to monitor access to the lifting area.
- Barriers must be removed, as soon as possible, after finishing the lifting activities in the relevant area.
- This exclusion zone should include the crane and give due consideration to other activities in the surrounding areas. The only persons allowed inside this zone must be the person performing the work and the designated signalman.
- All parts of mechanical lifting devices must maintain sufficient safety clearance from surrounding objects, areas and buildings at all times. If not possible, and hazardous crushing areas are existing, these need to be barricaded by the use of hard barricades or ropes (no barrier tape).
- In all cases no lifting operations must be permitted over areas where personnel are working or where critical equipment is located. In situations where lifting over personnel/equipment cannot be avoided sufficient controls must be established to mitigate the risks to personnel from the lifting operation.

5.5.2 Load

- The relevant specification of load (e.g. weight, centre of gravity, lifting point, contents, etc.) must be obtained before lifting.
- If not possible, a test lift must be conducted to determine the load specification. A plan for test lifting incl. relevant safety precautions must be prepared and approved by CONTRACTOR's responsible person and COMPANY's permit to work.
- The integrity and stability of the load must be verified before lifting.
- It must be ensured that the load will not be allowed to exceed rated load capacity and working radius and that the centre of gravity of the load will not shift during the lifting operation.
- Any load must be inspected for loose items before lifting.
- CONTRACTOR must use taglines on all suspended loads, unless the tagline creates a greater hazard, as determined by the CONTRACTOR Lift Supervisor/Coordinator.

5.5.3 Rigging and De-Rigging of a Crane

- CONTRACTOR must not erect any crane or other lifting appliance unless under the direct supervision of a competent person.
- The de-rigging of a crane must only be carried out under the supervision of a Competent Person and as recommended by the crane manufacturer. Care must be taken to see that no personnel stands under any jib section while the connecting pins are being withdrawn.

5.5.4 Operating Environment

5.5.4.1 Ground

The stability of the lifting equipment is highly dependent on the ground condition of the location where the lifting equipment will be set up.

- Special care must be taken to ensure that the ground is levelled and has sufficient bearing capacity.
- Before erection or cribbing of a lifting device, the ground conditions must be checked, e.g. for stability, slope etc. If necessary, an assessment of density and compaction must be performed. If needed, the safe load limit must be adjusted to the specific ground conditions on site.

- Outriggers of mobile cranes must be set up as specified by the manufacturer and at least 1m/3,2ft from the edge of any excavation. If the weight of the crane is more than 12T, the distance with the edge of the excavation must be at least 2m/6.5ft. For any other distance between crane and excavation, an engineering calculation must be done to ensure that there is not any risk of collapse in the excavation.
- Proper reinforcement must be positioned under each outrigger pad to distribute the load.
- Outriggers must be properly set fully extended and locked where locking devices are provided.

5.5.4.2 Wind & Severe Weather

- During the planning of any lifting operation, i.e. when preparing risk assessments, job safety analysis and/or lifting studies, the anticipated wind speed at the site must be taken into consideration including aspects such as the shape, mass and size of load and the capability of the crane to be used.
- A wind-indicating device must be provided which will give a visible or audible alarm to the crane operator at a pre-determined wind velocity.
Note: Wind speed is stronger (by as much as 35% or more) at higher ground.
- Cranes must stop operation when the wind speed exceeds 30km/h / 20mph or as per safe operating level recommended in the manufacturer's specifications.
- Lifting operation must not be carried out during severe weather conditions which are not conducive to safety, e.g. insufficient visibility, heavy fog, ice on the main structure of the lifting device, lightning, thunderstorms, heavy rain (e.g. when impacting the crane's stability) etc.

5.5.4.3 Lighting

- CONTRACTOR must ensure sufficient artificial light will be provided for all night crane work to be performed, in order for work to be carried out safely and efficiently.

5.5.5 Overhead Power Lines

For all crane operation, either lifting or walking, near power lines:

- CONTRACTOR must assume that all power lines are energized unless COMPANY confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.
- CONTRACTOR must identify by signage all overhead powerlines, which site roads intersect, that are within the project's boundaries.
- maintain the required clearance distances specified in table below:

Power Line Clearance Distances (Uninsulated Lines)	
Voltages	Distances from Power Lines
up to 1000 V	1 m
1 kV – 110 kV	3 m
110 kV – 220 kV	4 m
220kV - 380 kV	5 m
if voltage is not known	5 m

If cranes could possibly reach into the clearance distances specified in the table above, following control measures must apply:

- CONTRACTOR must receive COMPANY approval before crane operation starts
- CONTRACTOR must use a proximity device to warn the operator or preferably to enable the equipment to reach or turn into the clearance distances.
- CONTRACTOR must consider lifts below or above power lines as Critical Lifts and apply control measures specific to that lift class.
- If control measures stated above cannot be implemented, following must be agreed with the utility owner/operator of the overhead power line:
 - de-energize adjacent electrical infrastructure or equipment under power or
 - cover overhead-lines with non-conductive insulation material or
 - erect a physical barricade to avoid reaching into the safety clearance

5.5.6 Monitoring of Critical Lifting Operations

- Continuous monitoring by COMPANY and CONTRACTOR is required during Critical Lifts.
- COMPANY's Construction Manager or delegate (i. e. respective Discipline Superintendent or Supervisor) must be permanently present during the critical lift to monitor the work and confirm that it is being performed as planned and that everyone involved is complying with defined safety controls and their role's requirements.

5.5.7 Precautions after completed lift

CONTRACTOR must ensure compliance to the following requirements:

- Visual inspection of the load for damages
- Visual check of all lifting equipment for wear or damages
- Transfer of all lifting equipment to their storage place
- Damaged equipment must be sent for repair or taken out of use immediately

5.6 Special Requirements

5.6.1 Assembly and Disassembly

- CONTRACTOR cranes received for use (through purchase, contract obligations, or rental) will be assembled in accordance with the manufacturer's instructions, recommendations, limitations, and specifications under the direction of the CONTRACTOR Assembly / Disassembly Director.
- Once the crane is assembled, set up and ready to operate, COMPANY site representative will review crane assembly and perform pre-use inspection using COMPANY "Crane Pre-Entry Inspection Form" (attachment 1). COMPANY inspection form must be filed by CONTRACTOR and remain on site for the duration of the crane mobilization.

5.6.2 Traveling with load

- Mobile cranes travelling with freely suspended loads must be operated on firm level ground.
- The ground should be level and capable of supporting the crane and its load.
- With 'pick and carry' operations, the load should be carried with the minimum boom length, with lowered load as close to the ground as possible and moved at walking pace.
- When moving the load, tag lines must be attached to prevent the load from swinging which can reduce the crane's capacity by inducing a side load on the boom.

- A signalman must permanently be present.
- Operators must keep the load up-hill of the crane, i.e. drive in reverse down a slope to keep the load close to the crane.

5.6.3 Remote Control of Lifting Equipment

Remote controlled equipment includes, (but not limited to): overhead cranes, tower cranes, truck mounted cranes, service / maintenance trucks, concrete placer / pump trucks, ground compacter, etc.

- A remote-control CONTRACTOR must manipulate only one lifting device at a time.
- CONTRACTOR remotely controlling the lifting device must retain a good view of the lifting device and the load.
- During remote controlled operation, CONTRACTOR is prohibited to stand on an unstable object (e.g. a moving vehicle).
- CONTRACTOR must turn off the switch and remove the key from the remote-control device when not in use in order to prevent unauthorised use.
- CONTRACTOR must ensure wireless remote controls are secured while not in use, at the end of each shift and before leaving site

5.6.4 Coordination of multiple cranes at site

When multiple cranes are simultaneously present or used to perform operations, including marching, at a construction site, CONTRACTOR must consider the following elements during planning of respective activities incl. preparation of Risk Assessments, Job Safety Analyses and lifting studies (if relevant).

Specific risks identified and related to marching are:

- Colliding with other cranes moving and/or marching
- Colliding with parts of other cranes, especially their outriggers, booms etc.

Necessary control measures to be considered for safe marching of cranes are:

- Barricading hazardous areas of other cranes.
Important: Rotation of free rotating booms of tower cranes must be considered – these might change depending on wind directions
- Blocking of free rotating booms of tower cranes (if possible, as per OEM instructions)
- Assignment of signalman trained and experienced in crane operations

Specific risks identified and related to operation are:

- Getting in contact with other cranes' hoist ropes, booms, hook blocks

Necessary control measures to be considered for safe operation of cranes are:

- Positioning of cranes in a way that operating radii do not overlap
- Establish "give way" regulations and proper communication of crane operators, typically via radios
- Assignment of signalman trained and experienced in crane operations, especially in cases where crane operators cannot see the overlapping work areas

In case, cranes which are not operated by CONTRACTOR pose a risk to CONTRACTOR's crane operations, CONTRACTOR is requested to coordinate with respective companies on site. In case of difficulties or deficiencies CONTRACTOR must inform COMPANY's site management.

6 Documentation and Records

This document and relevant records must be controlled as defined in "Preparation of Internal Documents" (&AZ-Q-PP 1050.060.010 (EN)), "Distribution of Documents" (&AZ-Q-PP 1050.063.010 (EN)) and "Archiving of Documents" (&AZ-Q-PP 1050.066.010 (EN)).

6.1 COMPANY's Documents

Reference	Title
&A?-W-PQ 9601	HSE Program Site
&A?-W-SC 9601	Permit to Work System
&A?-W-SC 9606	Working at Height

Referenced document numbers with the originator code "&A?" in this project always refer to project documents with entity originator code "&AA".

7 Revisions

Proposals for revisions of this Safe Work Procedure should be forwarded in writing to the Global Construction department 'Construction and Commissioning HSE'.

8 Distribution

This document will be administered and distributed by the Global Construction department 'Construction and Commissioning HSE'.

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ATTACHMENT 1: CRANE PRE-ENTRY INSPECTION FORM

Contactor:		Owner of crane:	
Machine Details			
Machine No:		Serial No:	
Type:	Crawler []	Wheel []	Last Service Date:
Third party Certification Details			
Lifting Machine, No:		Distinction No:	
Date of Print of Certificate:		Expiry Date of Certificate:	
Site Acceptance Visual Inspector Details			
Contractor's Representative – Checker 1		Company's Representative – Checker 2	
Inspected By (Name & Sign.):		Inspected By (Name & Sign.):	
Date:		Date:	

S/No	Items	Checker 1	Checker 2	Remarks
1	Reverse Alarm			
2	Hoisting Motor/Brake			
3	Warning Light Horn			
4	Lubrication on Live Pulley/Shaft			
5	Lubrication on Jib Foot Rope & Hook			
6	Lubrication on Hoisting Rope & Hook			
7	Hooks (cracks, twisting, straightening, hook throat opening or other signs of wear or damage, safety latches, springs)			
	Anti-two block chains, cables or wires not altered or shortened			
8	Load Indicator, Max Height/Depth Limit Switch			
9	Limit Switches Electronic Operational System			
10	Limit Load Blocks and Safety Wires			
11	Fitting free from Distortion			
12	Slewing/Motor Brakes			
13	Electrical Operational			
14	No loose connections of wires & mount bolts			
15	Wire rope condition, lubrication, kinks, cuts, breaks, corrosion, reduced diameter, broken strands of wires or other signs of wear or damage, wire rope size, wire rope termination)			
16	Steel Plate Requirement & Condition			
17	Crane Hook Block Condition			

18	Safety Devices/Switches Operational?			
19	Swing Alarm Operational			
20	Outriggers and pads			
21	Visibility, e.g. mirrors, windows and windscreen			
22	Tires (pressure, cuts, bulges or signs of wear past the normal expected life of the tire)/ Tracks			
23	No Oil Leakage			
24	Load Chart in language understandable by Operator inside Cabin			
25	Crane Operating Manual in language understandable by Operator inside Cabin			
26	Fire Extinguisher			
27	Provision of Data Logger			
28	Validity of Insurance			
29	Crane wire drum			
30	No Fabricated/home-made safety override switches			

Legends: √ = OK X = defect NA = Not Applicable



Safe Work Procedure

Proj No : XXXX XXXX
 Proj Code : Project Code
 Doc No: &A?-W-SC 9607 (EN)
 Issue: 02

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ATTACHMENT 2: CRITICAL LIFTING OPERATION SAFETY CHECKLIST

Equipment being lifted description:			CONTRACTOR Lifting/Rigging Superintendent / coordinator	CONTRACTOR HSE Manager	CONTRACTOR Construction/Site Manager	COMPANY HSE Manager	COMPANY Site Manager or Site Representative
No	Items	Unit _____					
1	Load charts available and highlighted (for both cranes where applicable)						
2	Certified copies of rigger competencies conducting the lift						
	Crane pre-entry Inspection Form (attachment 1)						
3	Lifting Permit available						
5	Route plan assessed with a photographic picture indicating height restrictions, width restrictions and potential risks						
6	Ground compaction certificates and plotted readings of the area						
7	Pre-lift meeting held with management and register available						
8	Operators certified to the special legal requirement codes						
9	Complete Method statement including loading and installation sequence						
10	Task specific Risk assessment work shopped with rigging team						
11	Auto cad type Engineering drawing showing both top and side view signed by the responsible engineer and Rigging study						
12	Valid certificates for the rigging equipment, colour coded, and gear verified / Daily inspection performed						
13	COMPANY Crane badge issued (if applicable) and still valid (for both cranes where applicable)						
			Name:	Name:	Name:	Name:	Name:
			Sign:	Sign:	Sign:	Sign:	Sign: