Cranes

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1 Purpose

The purpose of this policy is to provide safety measures for use during crane operations.

2 General Requirements / Assembly / Disassembly

- Only persons qualified by training or experience will be allowed to operate equipment or machinery.
- All manufacturer procedures applicable to the operational functions of equipment, including its use with attachments, must be complied with.
- The manufacturer's procedures and prohibitions shall be complied with when assembling and disassembling equipment. The assembly/disassembly of equipment must be directed by a competent and qualified person.
- The manufacturer must approve all modifications or additions that may affect the capacity or safe operation of the equipment in writing. A registered professional engineer must be qualified with respect to the equipment involved, and must ensure the original safety factor of the equipment is not reduced.
- Each member of the assembly / disassembly crew must have a clear understanding of their part in the process prior to any assembly or disassembly tasks commence. These specific directions must come from the competent/qualified person. Each crew member must be informed of the specific hazards of the assembly / disassembly process. This information must also come directly from the competent/qualified person.
- All areas in the assembly / disassembly area that are restricted must be marked in a clearly visible fashion and all crew members must be shown these areas and instructed that they are never to enter these areas with specific instructions from the competent/qualified person.
- A post assembly inspection must be completed by a competent/qualified person prior to the commencement of operation of the mobile crane.
- During the assembly and disassembly process rated capacity limits shall not be exceeded for equipment components to include lifting lugs, rigging, accessory equipment and any other piece of the mobile equipment.
- Rated capacity limits for loads on the assembled equipment is not to be exceeded.

3 Addressing Specific Hazards

- The A/D Director that is in charge and or supervising the assembly or the disassembly operation must address each of the specific hazards that are associated with this process.

- Site and Ground Bearing Conditions: these conditions must be found to be adequate for the assembly or disassembly of the equipment. Cranes can not be used unless ground conditions are adequate for lifting operations. Ground conditions must be dry and firm and graded in such a manner that they fall within the manufacturers specifications.
- Blocking Material: blocking must be sufficient with regards to its size, condition, amount and the method of stacking that is used.
- Proper Location of Blocking: blocking must be appropriately place when used to support lattice booms or any components of the crane or lattice booms. The structural integrity of the lattice boom must be protected and proper blocking is necessary to prevent dangerous movement or a catastrophic collapse.
- Verifying Assist Crane Loads: when an assist crane is used, the loads that will lifted by the assist crane will be verified at each phase in accordance with 1926.1417(o)(3).
- Boom and Jib Pick Points: The rigging points of attachment to the boom must be suitable and not cause structural damage and they must enable safe handling of these components.
- Center of Gravity: must be identified. When there is insufficient data and information to adequately find the center of gravity, methods and measures must be used to prevent the unintended dangerous movement.
- Stability Upon Pin Removal: boom sections and components must be supported or rigged so that they remain stable upon removal of the pins.
- Snagging: all measures must be taken to ensure no snagging of the suspension ropes and pendants on the boom or jib connection pins.
- Stuck by Counterweights: the counterweights must be secured to ensure no unintentional movement and proper care must be used when hoisting counterweights.
- Boom Hoist Brake Failure: the boom brake must be tested prior to each time that reliance is placed on that system.
- Loss of Backward Stability: must be ensured before swinging the upperworks, travel and when removing or attaching equipment and or components.
- Wind Speed and Weather: the affect of wind speed and hazardous weather must be taken into account.

4 Safe Work Operations

- All lifts shall be preplanned to determine items such as condition of rigging equipment, load orientation, swing path, load placement, designated signal man (if necessary) etc.
- A pre-operation hazard assessment will be performed to identify the work zone and determine if any part of the equipment could reach closer than 20 feet to a power line. If

it is determined that any part of the equipment, load line or load could get closer than 20 feet to a power line then at least one of the following measures must be taken:
    - Ensure the power lines have been deenergized and visibly grounded.
    - Ensure no part of the equipment, load line or load gets closer than 20 feet to the power line.
    - Adhere to the line's voltage and minimum approach distance permitted in Table A.
- All rated load capacities, recommended operating speeds, special hazard warnings or instructions and operator's manual must be available and in the cab of the crane at all times.
- The crane operator has the authority to stop and refuse to handle loads whenever there is a safety concern until a qualified person has determined that safety has been assured.
- A signal person must be provided for the following situations:
    - The point of operation is not in full view of the operator.
    - The view is obstructed when the equipment is traveling.
    - The operator or the person handling the load determines it is necessary due to site specific concerns.
- The competent person on site will ensure that the flooring on which equipment may be placed is substantial enough to safely hold the weight of the load per the manufacturer's specifications. If the strength of the floor is unknown and / or cannot be determined, a professional engineer will determine the pounds per square foot required and, if necessary, the appropriate shoring to be installed to sustain the weight. Cranes will not be used unless grounding conditions can support the equipment and all supporting material and all conditions meets manufactures requirements.
- Do not allow personnel get on or off the crane while it is in motion, or to ride the hook block, bucket or grapple. Mobile cranes are intended to lift objects and not people.
- Care must be taken to ensure that areas within the swing radius of the rear of the rotating superstructure of the crane are barricaded to prevent a person from being struck or crushed.
- An accessible fire extinguisher of "5-ABC" rating or higher, shall be available at all operator stations or cabs.
- All personnel shall stand clear while loads are lifted and lowered. No person shall be allowed under a suspended load or allow a load to be suspended over their head.
- All safety devices must be in proper working order before operation begins. If any of the devices are not in proper working order the equipment must be taken out of service and operations must not resume until the device is working properly again. Safety devices may include, but are not limited to, crane level indicator, boom stops, jib stops, foot pedal brake locks, swing locks, horn and anti two-blocking device.

5 Inspections and Maintenance

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Inspections as described below shall be performed on all mobile cranes. Deficiencies found during an inspection shall be documented and corrected before use. Cranes with identified hazards shall be tagged “Out of Service”. All inspections shall be conducted by a competent designated person.

A competent person must conduct a visual inspection for apparent deficiencies of equipment prior to each shift each day. Daily inspection items shall include, but not limited to:

- Control mechanisms for proper use and function.
- Control mechanisms for excessive wear and contamination by lubricants or foreign matter.
- All safety devices for proper function.
- Deterioration or leakage in air or hydraulic systems.
- Crane hooks and latches for deformation or cracks.
- Rope reeving for noncompliance with manufacturer's recommendations.
- Electrical apparatus for malfunction, sign of excessive wear, dirt or moisture accumulation.

Equipment must be inspected monthly and annually and shall be documented by a competent person. Documentation must include the date and results of the inspection, unit identification, name and signature of the inspector, and corrective actions taken. Documentation must be retained for a period of at least 3 months. Documented monthly and annual inspections shall include, but are not limited to:

- Deformed, cracked or corroded members in the crane structure or boom.
- Loose bolts or rivets.
- Excessively worn or damaged tires.
- Cracked or worn sheaves or drums.
- Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers and locking devices.
- Excessive wear on brake and clutch.
- Load, boom angle, and other indicators over their full range for accuracy.
- Gasoline, diesel, electric or other power plants for improper performance or noncompliance with safety requirements.
- Excessive wear of chain-drive sprockets and excessive chain stretch.
- Travel steering, braking, and locking devices for malfunction.

6 Critical Lifts

Critical lifts are those that are non-routine, greater than 80% rated capacity of the lifting equipment, unknown or difficult to estimate weight, a dynamic lift, up-ending an object, require special rigging, are required to be performed without line of sight, involve lifting an object of

substantial value or one-of-a-kind items, and/or designated by a manager as a critical lift. All critical lifting operations require a lift plan. The lift plan must include a drawing showing:

- The position of the load.
- The weight of the load.
- The position of the crane at the pick up location and the position of the crane at the set down location.
- The distance from the center of the crane to the center of the load at the pick up and set down locations must be measured and recorded.
- The height of the load is to be recorded on the drawing.
- The length of rigging and the SWL is to be recorded on the drawing.
- The hook height of the crane at the pick up and set down radius is to be recorded.

The percentage of the cranes capacity at the pick up and set down locations must be calculated by dividing the weight of the load by the crane's capacity. Lifts greater than 75% of the crane's load chart require a manager's approval.

A foreman is required to be present during all critical lifting operations. The crane operator and the signal man must be in radio communications if outside of each other's line of sight. If communication between the signal person and crane operator is broken, all crane operation must cease immediately. The communication devices must be tested on-site, and before work is to commence. During lifting operations, only the designated signal person will give directions to the crane operator except in an emergency, where anyone has the right to signal the cease of lift operations by activating the "halt operations" signal. If hand signals are used between the signal person and the crane operator, they must follow the Standard Method in Appendix A of Subpart CC as denoted in 29 CFR.

Each signal person must have the following qualifications:

- Must understand the Standard Method for hand signals and know and understand the different types of hand signals.
- Must demonstrate competency in hand signaling to the site foreman before any lift operations.
- Must demonstrate that they have the necessary qualifications either by producing a certificate of qualification from a certified training facility or by passing our company written and practical test.
- Must have a basic understanding of the type of crane being used, its load limitations, load stopping, boom deflection and load swinging. This understanding must be demonstrated to the crane operator and the site supervisor before the lifting operations commence.

A JSA must be prepared for every crane lift operation whether critical or routine. The JSA must list the position of the signal-man and riggers during lifting operations and all rigging to be used

on the lift. A JSA / Lift Plan review is required before the lift. Participation is mandatory by the operator, foreman, riggers, and any contract personnel that will be required to participate in the lift. A copy of the critical lift form, and lift plan shall be attached to the JSA and posted at the lift site for reference.

7 Training

All Crane operators must be trained in accordance with the manufacturer's operating and maintenance manual, the user's work instructions, and the requirements listed in this policy before operating. Retraining, Certification, vision and medical condition evaluations for all Company employed Crane Operators shall be required every 4 years.

Training shall incorporate the use of portable fire extinguishers. The HSE Manager will maintain a written record of all training conducted by qualified 3rd Party vendors including employees trained as well as the name and signature of the person conducting the training.