COMPANY POLICY AND PROCEDURE

This Company's policy on lifting equipment is adopted from the OSHA Standards for Cranes and Derricks. The following procedures and practices will be enforced at the workplace to ensure no employee is exposed to hazards from the operation of cranes or lifting devices:

- Only certified personnel trained in safe operating procedures, and designated to operate overhead or gantry cranes or lifting equipment will be allowed to operate such equipment for the company.
- A load-rating chart must be permanently mounted in the cab of each crane, easily readable from the operator's normal operating station.
- Inspection certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected will be made monthly on critical items in use such as brakes, crane hooks, ropes, structural members, & welds. This certification record will be kept readily available with the equipment.
- Certified production written operational and rated load tests will be obtained from the manufacturer and kept available with the equipment. Equipment will be re-tested after any structural repairs or modifications which may only be made by the manufacturer or technician certified by the manufacturer.
- A thorough inspection of all wire ropes in use, including running ropes, will be made at least once a month. A record which will include the date of inspection, the signature of the person who performed the inspection, and an identifier for the ropes will be made and kept on file in the office at the company. All inspections will be performed by the job-site supervisor, who is certified as the company's competent person for operation and inspection of overhead and gantry cranes, hoisting equipment, and derricks. Any deterioration, resulting in appreciable loss of original strength will be kept under observation to determine whether further use of the rope would constitute a safety hazard. Particular care will be taken to inspect ropes at equalizer sheaves or other sheaves where rope travel is limited, or with saddles.

- All rope which has been idle for a period of a month or more due to shut down or storage of a crane on which it is installed will be given a thorough inspection before it is used. The inspection will be for all types of deterioration and will be performed by the job-site supervisor, whose approval will be required for further use of the rope. A certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier for the rope which was inspected will be made and kept readily available.
- A carbon dioxide, dry chemical or equivalent fire extinguisher will be kept in the cab or vicinity of the crane, and the operator and maintenance personnel will be made familiar with the use and care of the fire extinguisher.
- If crane operations are to be performed in the vicinity of overhead power lines, the lines must be de-energized and grounded, or other protective measures provided before work is started. If the lines are to be de-energized, arrangements will be made with the utility operator involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions must prevent employees from contacting lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.
- Lifting hooks or shackles will be visually inspected before each use, and monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the hook inspected will be performed by the job-site supervisor. Hooks or shackles with cracks or having more than 15 percent in excess of normal throat opening or more than 10° twist from the plane of the unbent hook will be taken out of service and replaced.
- Hoist chains, including end connections, will be inspected before each use for excessive wear, twist, distorted links interfering with proper function, or stretch beyond manufacturer's recommendations. Monthly inspection with a certification record which includes the date of inspection, the signature of the person who performed the inspection, and an identifier of the chain which was inspected will be made by the job-site supervisor.
- A preventive maintenance program based on the crane manufacturer's recommendations will be established, and performed. Maintenance records will be kept of all repairs or replacements made. Only certified technicians may perform repairs on lifting equipment. Before any servicing or maintenance of equipment is done, personnel will perform proper applicable lockout/blockout/tagout procedures to ensure the safety of personnel performing these tasks.

MOBILE CRANE OPERATIONS AND INSPECTION

Construction sites are often communities within themselves consisting of a variety of activities with numerous pieces of equipment and tools in use simultaneously. An important piece, and one of the most expensive pieces, of equipment in use on most construction sites is the crane. Statistics indicate that a significant number of construction injuries and fatalities are crane related accidents that also cost hundreds of thousands of dollars in equipment damage and other related costs. An example of the tremendous loss potential occurred a few years ago when two cranes, working in tandem, while traveling, dropped their load onto a sports stadium under construction and some other construction equipment. Although no personal injuries were experienced, the cost due to equipment damage and the project delays was extremely high. For instance, the cost of one 150-200 ton mobile crawler crane alone is in excess of $800,000.00, and, depending upon capacity and added components, can sell for more than $1,000,000.00. Construction delays and investigative costs can easily run the cost into the millions of dollars.

Today, manufacturers design and build stronger and lighter cranes in response to specific industry needs. Speed, utility, capacity, and reach (radius) have been improved to the point that the crane has become an indispensable workhorse for construction. Therefore, a thorough understanding of cranes, their capabilities and limitations is critically important for everyone involved in construction today. The crane can perform safely and economically when operated within the design parameters set by the manufacturer.

Due to significant advances in lifting technology, crane operators, site supervisors, and safety professionals need to keep abreast of modern crane technology and changes in operating procedures to help them recognize problems before potentially unsafe conditions lead to accidents that result in injuries and/or fatalities, as well as equipment damages.

With these factors in mind, the need for a better understanding of crane operations and the implementation of appropriate maintenance schedules is evident in preventing accidents.

A recent study indicates that although mechanical failures represent only 11% of the causes of crane accidents, they usually result in the major accidents involving injuries, fatalities, substantial material costs, and usually spectacular media coverage.

Studies and analyses of crane accidents involving mechanical failure show they are frequently due to a lack of preventive maintenance or adequate training and/or experience on the part of the personnel involved. It is important that not only crane operators but also other personnel working with cranes receive training in crane operations. Cranes and associated rigging equipment must be inspected regularly to identify any existing or potentially unsafe conditions. In addition, preventive

maintenance must be performed as required by the crane manufacturer and/or the supplier to ensure safe crane operation. The inspections performed by OSHA compliance officers and/or other safety professionals also can play an important role by identifying hazards as well as safe crane operations.

This chapter addresses major issues related to the crane itself and provides some basic information on crane capacities and inspection criteria for OSHA compliance. Since it would be difficult to fully address all types of cranes available in today's market, two types of cranes typically found on construction sites are discussed in this section. Some of the issues encountered during inspections cover the following three areas:

- Basic Crane Operations – Lifting principles/mechanics and some operational criteria.
- Typical Crane inspection Checklist – Listing of critical items and components recommended for periodic inspection.
- Regulations – OSHA regulations and applicable ASME/ANSI and PCSA standards.

This section also contains general guidelines for crane inspections, as well as some suggested operational considerations and inspection items recognized by a number of construction companies.

Cranes are designed for both general use and for specific purposes. Similar to the vast automobile industry, crane manufacturers produce similar models or types of cranes for the same purpose, often with different sizes of the same model of crane. Each type, model, or size of crane manufactured, may have different operating controls and require specialized operator training, individualized inspection criteria, and different preventive maintenance schedules.

Two commonly used cranes, a hydraulic rough terrain crane and a crawler lattice boom friction crane, are used as examples for comparison in this chapter. There are several significant differences between these two cranes, primarily in boom hoist and load line controls. The somewhat smooth operation of the boom control adjustments on the hydraulic cranes may suggest falsely to the novice operator or inspector that it is a simple crane to operate. On the other hand, the lattice boom friction cranes' movement of its boom, or its adjustment in load position, tends to be a little jerky requiring more skill and experience to operate smoothly. Another clear difference between the two types of cranes is their load charts. Due to the fixed boom length, the lattice boom friction crane has a somewhat simplified load chart. This requires extensive motion control and an anticipation of boom movement to accurately lift or place loads. Conversely, the hydraulic crane's load charts are more extensive or complicated due to the variations in boom length, thus requiring more training in the multiple charts available.

The differences between these two types of cranes are significant enough to require specific training on each type of crane. Crane operators cannot be expected to be totally knowledgeable and proficient in the operation of the many diverse types of cranes available today. They cannot be expected to move from one type of crane to another without adequate education and training on the specifics of each piece of equipment.

TRAINING AND SAFETY REQUIREMENTS

Moving large, heavy loads is crucial to today's manufacturing and construction industries. Considerable technology has been developed for these operations, including careful training and extensive workplace precautions. To a crane operator, few experiences can be as frightening as when a crane becomes unbalanced while a load is being lifted or when the crane collapses under the weight of an excessive load. There are significant safety issues to be considered, both for the operators of the diverse "lifting" devices, and for workers in proximity to them. The following references aid in recognizing and evaluating lifting and hoisting hazards in the workplace.

Safety measures employers should take regarding cranes

Employers must permit only thoroughly trained and certified workers to operate cranes. Operators should know what they are lifting and what it weighs. For example, the rated capacity of mobile cranes varies with the length of the boom and the boom radius. When a crane has a telescoping boom, a load may be safe to lift at a short boom length or a short boom radius, but may overload the crane when the boom is extended and the radius increases.

To reduce the hazard of injury, follow these precautions:

- Equip all cranes that have adjustable booms with boom angle indicators.
- Provide cranes with telescoping booms with some means to determine boom lengths unless the load rating is independent of the boom length.
- Post load rating charts in the cab of cab-operated cranes. (All cranes do not have uniform capacities for the same boom length and radius in all directions around the chassis of the vehicle.)
- Require workers to always check the crane’s load chart to ensure that the crane will not be overloaded by operating conditions.
- Instruct workers to plan lifts before starting them to ensure that they are safe.
- Tell workers to take additional precautions and exercise extra care when operating around power lines.

- Teach workers that outriggers on mobile cranes must rest on firm ground, on timbers, or be sufficiently cribbed to spread the weight of the crane and the load over a large enough area. (Some mobile cranes cannot operate with outriggers in the traveling position.)
- Direct workers to always keep hoisting chains and ropes free of kinks or twists and never wrapped around a load.
- Train workers to attach loads to the load hook by slings, fixtures, and other devices that have the capacity to support the load on the hook.
- Instruct workers to pad sharp edges of loads to prevent cutting slings.
- Teach workers to maintain proper sling angles so that slings are not loaded in excess of their capacity.
- Ensure that all cranes are inspected frequently by persons thoroughly familiar with the crane, the methods of inspecting the crane, and what can make the crane unserviceable. Crane activity, the severity of use, and environmental conditions should determine inspection schedules.
- Ensure that the critical parts of a crane—such as crane operating mechanisms, hooks, air, or hydraulic system components and other load-carrying components—are inspected daily for any maladjustment, deterioration, leakage, deformation, or other damage.

Safe use of slings

As an employer, you must designate a competent person to conduct inspections of slings before and during use, especially when service conditions warrant. In addition, you must ensure that workers observe the following precautions when working with slings:

- Damaged or defective slings must be removed from service immediately.
- Do not shorten slings with knots or bolts or other makeshift devices.
- Do not kink sling legs.
- Do not load slings beyond their rated capacity.
- Keep suspended loads clear of all obstructions.
- Remain clear of loads about to be lifted and suspended.
- Do not engage in shock loading.
- Avoid sudden crane acceleration / deceleration when moving suspended loads.
- Look for the permanent label on the sling with the rated load capacity and replace if missing or ineligible.

MOBILE CRANES

Lifting Principles

There are four basic lifting principles that govern a crane's mobility and safety during lifting operations:

Center of Gravity

The center of gravity of any object is the point in the object around which its weight is evenly distributed. The location of the center of gravity of a mobile crane depends primarily on the weight and location of its heaviest components (boom, carrier, upperworks, and counterweight).

Leverage

Cranes use the principle of leverage to lift loads. Rotation of the upperworks (cab, boom, counterweight, and load) changes the location of the crane's center of gravity, its leverage point or fulcrum.

As the upperworks rotates, the leverage of a mobile crane fluctuates. This rotation causes the crane's center of gravity to change and causes the distance between the crane's center of gravity and its tipping axis to also change. Stability can be affected by the fluctuating leverage the crane exerts on the load as it swings. The crane's rated capacity is therefore altered in the load chart to compensate for those changes in leverage.

Provided the ground is capable of supporting the load, a crane can be made more stable by moving the tipping axis further away from its center of gravity. The extra stability gained by moving the tipping axis can then be used to carry larger/heavier loads.

INCREASED STABILITY = MORE LOAD

Stability

Is the relationship of the load weight, angle of the boom and its radius (distance from the cranes center of rotation to the center of load) to the center of gravity of the load. The stability of a crane could also be affected by the support on which the crane is resting. A crane's load rating is generally developed for operations under ideal conditions, i.e., a level firm surface. Un-level surfaces or soft ground therefore must be avoided. In areas where soft ground poses a support problem for stability, mats and or blocking should be used to distribute a crane's load and maintain a level, stable condition.

In addition to overturning (stability failure), cranes can fail structurally if overloaded enough. Structural failure may occur before a stability failure. In other words, a mobile crane's structure may fail long before it tips. As loads are added beyond its rated capacity, a crane may fail structurally before there is any sign of tipping. Structural failure is not limited to total fracture; it includes all permanent damage such as overstressing, bending and twisting of any of the components. When a crane is overstressed, the

damage may not be apparent. Nevertheless, a structural failure has occurred and overstressed components are then subject to catastrophic failure at some future time.

Structural Integrity

The crane's main frame, crawler track and/or outrigger supports, boom sections, and attachments are all considered part of the structural integrity of lifting. In addition, all wire ropes, including stationary supports or attachment points, help determine lifting capacity and are part of the overall structural integrity of a crane's lifting capacity. The following elements may also affect structural integrity:

- The load chart capacity in relationship to stability;
- The boom angle limitations which affect stability and capacity; and
- The knowledge of the length of boom and radius in determining capacity.

Stability failures are foreseeable, but in structural failure it is almost impossible to predict what component will fail at any given time. No matter what the cause, if the crane is overloaded, structural failure can occur.

Operational Considerations

Cranes are carefully designed, tested, and manufactured for safe operation. When used properly they can provide safe reliable service to lift or move loads. Because cranes have the ability to lift heavy loads to great heights, they also have an increased potential for catastrophic accidents if safe operating practices are not followed.

Crane operators and personnel working with cranes need to be knowledgeable of basic crane capacities, limitations, and specific job site restrictions, such as location of overhead electric power lines, unstable soil, or high wind conditions. Personnel working around crane operations also need to be aware of hoisting activities or any job restrictions imposed by crane operations, and ensure job site coordination of cranes. Crane inspectors therefore should become aware of these issues and, prior to starting an inspection, take time to observe the overall crane operations with respect to load capacity, site coordination, and any job site restrictions in effect.

CRANES AND DERRICKS IN CONSTRUCTION: ASSEMBLY / DISASSEMBLY

OSHA Construction Requirements

The assembly and disassembly requirements of subpart CC – Cranes and Derricks in Construction as specified in 29 CFR 192, 1403-1926, 1406 and 192.1412.

Procedures

Follow all manufacturer prohibitions regarding assembly and disassembly, and either the manufacturer or your own established procedure. You must follow manufacturer procedures when using synthetic slings during assembly or disassembly rigging. Synthetic slings must be protected from abrasive, sharp or acute edges and configurations that might reduce the sling's rated capacity.

Employer procedures must be developed by a qualified person and satisfy specific requirements: providing adequate support and stability for all parts of the equipment, and positioning employees involved to minimize exposure to any unintended movement or collapse.

Responsibilities

Work is required to be directed by an A/D (Assembly/Disassembly) director. The A/D director must meet the criteria for both a competent person and a qualified person or be a competent person assisted by a qualified person.

The A/D director must:

- Understand the applicable procedures.
- Review procedures immediately prior to beginning work unless they understand the procedures and has used them before for that equipment type and configuration.
- Ensure that each crew member understands their tasks, the hazards, and any hazardous positions or locations to avoid.
- Verify all capacities of any equipment used, including rigging
- Address hazards associated with the operation, including 12 specified areas of concern: site and ground conditions, blocking material, proper location of blocking, verifying assist crane loads, boom & jib pick points, center of gravity, stability upon pin removal, snagging, struck by counterweights, boom hoist brake failure, loss of backward stability and wind speed and weather.

Inspection

Before using the completed assembly, have a qualified person inspect the assembly to ensure it is configured in accordance with the manufacturer equipment criteria. If the criterion is unavailable, the qualified person, with the assistance of a registered professional engineer, must develop the appropriate configuration criteria and ensure they are met.

General Requirements

A crew member who moves out of the operator's view where the crew member could be injured by the equipment or load must inform the operator before going. The operator must not move equipment until that crew member informs the operator that they have moved to a safe position.

Employees must never be under the boom or jib when pins (or similar devices) are being removed, unless it is required by site constraints and the A/D director has implemented procedures minimizing the risk of unintended movement and the duration and extent of exposure under the booms.

Have component weights available for all components to be assembled. All rigging must be done by a qualified rigger

Pins may not be removed during disassembly when the pendants are in tension.

Booms supported only by cantilevering must not exceed manufacturer limitations or RPE limitations.

Component selection and equipment configuration that affects the capacity or safe operation of the equipment must be in accordance with manufacturer requirements and limits or RPE requirements and limits.

Outriggers and stabilizers

Outriggers and stabilizers must be fully extended or, if permitted by manufacturer procedures, deployed as specified in the load chart.

Set outriggers to remove equipment weight from the wheels, except for locomotive cranes. Outrigger floats, if used, must be attached to the outriggers; stabilizer floats, if used, must be attached to the stabilizers.

Each outrigger or stabilizer must be visible to the operator or to a signal person during extension and setting.

Place outrigger and stabilizer blocking under the float/pad of the jack or, if there is no jack, under the outer bearing surface of the outrigger or stabilizer beam. Blocking must be sufficient to sustain the loads and maintain stability and must be properly placed.

Tower Cranes

Tower cranes are subject to additional requirements for erecting, climbing and dismantling, including a pre-erection inspection (29 CFR 1926.1435).

CRANES AND DERRICKS IN CONSTRUCTION: OPERATOR QUALIFICATION AND CERTIFICATION

The operator qualification and certification requirements of subpart CC – Cranes and Derricks in Construction, as specified in 29 CFR 1926.1427. State or local government licensing is effective November 8, 2010. Other certification and qualification is effective November 10, 2014.

Any person operating a crane engaged in a construction activity is covered by the cranes and derricks rule except:

- Sideboom cranes.
- Derricks.
- Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less.

Digger Derricks

Operators of digger derricks are required to be qualified or certified unless the digger derrick is being used to auger holes for poles carrying electric or telecommunication lines, place or remove the poles or handle associated materials to be installed on or removed from the poles.

Testing and Certification Requirements

Certification has two parts:

1. A written examination of the safe operating procedures for the type of equipment the applicant will be operating and technical understanding of the subject matter criteria required in 1926.14.27(j).
2. A practical exam showing the applicant has the skills needed to safely operate the equipment, including, among other skills, the ability to properly use load chart information and recognize items required in the shift inspection.

There are four ways an equipment operator can be qualified or certified, meeting OSHA requirements.

1. A certificate from an accredited crane operator testing organization.
2. Qualification from the employer through an audited employer program.
3. Qualifications by the US Military. This only applies to employees of Department of Defense or Armed Forces and does not include private contractors.
4. Licensing by a state or local government, if that licensing meets the OSHA minimum requirements.

Accredited crane operator testing organization

The testing organization must be accredited by a nationally recognized accrediting agency and test according to criteria listed at §§ 1926.1427(j) (1) and (j) (2). This certification is portable from employer to employer. The testing organization must have its accreditation reviewed every three years. The certification must note the type and capacity of equipment for which the operator is tested and certified, and is valid for five years.

Audited employer program

An employer may provide a crane operator testing program under the oversight of an independent auditor. An accredited crane operator testing organization must certify the auditor to evaluate the administration of written and practical tests. The auditor must conduct audits of the employer's program according to nationally recognized auditing standards. Crane operator qualification under an employer program is only valid while the operator is an employer and operating a crane for the employer. The qualification is valid up to 5 years.

U.S. Military

This qualification applies only to civilian employees of the Department of Defense or Armed Services and is not portable. This qualification does not include employees of private contractors.

Licensing by a government entity

This license is obtained from a government entity such as a city or state with a required certification program. When this license meets the minimum requirements of 1926.1427(e) (2) and (j), OSHA requires a crane operator to have this license when operating in the applicable city, county, or state. This license is not portable outside the boundaries of the government entity that issues the license, and is valid for a maximum of five years.

CRANES AND DERRICKS IN CONSTRUCTION: QUALIFIED RIGGER

Describes the qualified rigger requirements of subpart CC – Cranes and Derricks in construction, as specified in 29 CFR 1926.1401, 1926.1404, and 1926.1425. Employers must use qualified riggers during hoisting activities for assembly and disassembly work (1926.1404(r) (1). Qualified riggers are also required whenever workers are within the fall zone and hooking, unhooking, or guiding a load, or doing the initial connection of a load to a component or structure (1426.1425(c).

Qualified Rigger

A qualified rigger is a rigger who meets the criteria for a qualified person. Employers must determine whether a person is qualified to perform specific rigging tasks. Each qualified rigger may have different credentials or experience. A qualified rigger is a person that:

- Possesses a recognized degree, certificate, or professional standing; or
- Has extensive knowledge, training and experience; and
- Can successfully demonstrate the ability to solve problems related to rigging loads.

The person designated as the qualified rigger must have the ability to properly rig the load for a particular job. It does not mean that a rigger must be qualified to do every type of rigging job.

Each load that requires rigging has unique properties that can range from the simple to the complex. For example, a rigger may have extensive experience in rigging structural components and other equipment to support specific construction activities. Such experience may have been gained over many years.

However, this experience does not automatically qualify the rigger to rig unstable, unusually heavy, or eccentric loads that may require a tandem lift, multiple-lifts, or use of custom rigging equipment.

In essence, employers must make sure the person can do the rigging work needed for the exact types of loads and lifts for a particular job with the equipment and rigging that will be used for that job.

Riggers do not have to be certified by an accredited organization or assessed by a third party. A certified operator does not necessarily meet the requirements of a qualified rigger. Determining whether a person is a qualified rigger is based on the nature of the load, lift, and equipment used to hoist that load plus that person's knowledge and experience. A certified/qualified operator may meet the requirements of a qualified rigger, depending on the operator's knowledge and experience with rigging.

CRANES AND DERRICKS IN CONSTRUCTION: SIGNAL PERSON QUALIFICATION

The signal person qualification requirements of subpart CC – Cranes and Derricks in Construction, as specified in 29 CFR 1926.1419 and 1926.1428. Other requirements related to signal persons can be found at 29 CFR 1926.1404, 1926.1430, 1926.1431, and 1926.1441.

A signal person is required when:

- The point of operation is not in full view of the operator (1926.1419(a).
- The operator's view is obstructed in the direction the equipment is traveling.
- Either the operator or the person handling the load determines that a signal person is needed because of site-specific safety concerns.

The signal person is considered qualified if they:

- Know and understand the type of signals used at the worksite
- Are competent in using these signals
- Understand the operations and limitations of the equipment, including the crane dynamics involved in swinging, raising, lowering and stopping loads and in boom deflection from hoisting loads.
- Know and understand the relevant signal person qualification requirements specified in subpart CC (1926.1419-1926, 1422; 1926.1428)
- Passes an oral or written test and a practical test.

Employers must use one of the following options to ensure a signal person is qualified (1926.1428)

1. Third party qualified evaluator. The signal person has documentation from a third party qualified evaluator showing that he or she meets the qualification requirements.
2. Employer's qualified evaluator (not a third party). The employer's qualified evaluator assesses the individual, determines the individual meets the qualification requirements, and provides documentation of that determination.

Employers must make the documentation of the signal person's qualifications available at the worksite, either in paper form or electronically. The documentation must specify each type of signaling for which the signal person is qualified under the requirements of the standard.

MOBILE CRANE INSPECTIONS

This section on crane inspection is included for the purpose of giving contractors a perspective on what an OSHA Compliance Officer will be looking for to ensure compliance with regulations.
Since cranes impact such a large segment of work going on at any job site, crane inspections must include a survey or walk around of the entire operation that questions how the crane will be operating and how other crafts will be effected by working with and around the crane. Observation of crane operations prior to an inspection, or simply asking how cranes have or will be used, can indicate possible problem areas that may need a closer review during the inspection process.

Pre-inspection

Before the actual inspection begins, the Compliance Officer will gather some general information about the crane operator's qualifications & the crane's certifications, such as:

Operator Qualifications

The Compliance Officer will observe the operator in action and when the opportunity permits ask a few question concerning the cranes capacity and restrictions imposed, either due to activity involved in or functional limitations.

Crane Records

The Compliance Officer will ask for inspection and maintenance records and verify that the appropriate operator's manual and load charts are available for that particular crane in use.

Crane Setup

In the Compliance Officer’s initial survey of crane operations, he or she will look for crane stability, physical obstructions to movement or operation, and proximity of electrical power lines, as well as the following:

Leveling

Has the crane operator set the crane up level and in a position for safe rotation and operation?

Outriggers

Are the outriggers, where applicable, extended and being used in accordance with manufacturer's recommendations?

Stability

The relationship of the load weight, angle of boom, and its radius (the distance from the cranes center of rotation to the center of load) to the center of gravity of the load. Also, the condition of crane loading where the load moment acting to overturn the crane is less than the moment of the crane available to resist overturning.

Structural Integrity

The crane's main frame, crawler, track and outrigger supports, boom sections, and attachments are all considered part of structural components of lifting. In addition, all wire ropes, including stationary supports, help determine lifting capacity and are part of the structural elements of crane operations.

Electrical Hazards

Working around or near electrical power lines is one of the most dangerous practices for crane operations. The OSHA requirements limit crane operations to a minimum clearance of 10 feet.

Cranes should not be used to handle materials or loads stored under electric power lines. In addition, operation of mobile cranes near de-energized electric power lines is not recommended until the following steps have been taken:

- The Power Company or owner of the power line has de-energized the lines.
- The lines are visibly grounded and appropriately marked at jobsite.
- Durable warning signs are installed at the operator's station and on the outside of the crane identifying the clearance requirements between the crane/load and electrical power lines.
- A qualified representative of the power company or owner of the electrical power line are on the job site to verify that the power lines have been de-energized or properly grounded.

Load Charts

Load Charts are the principle set of instructions and requirements for boom configurations and parts of line which establish crane capacity for safe crane operations.

- Availability – The crane operator must have in his/her possession the appropriate load charts related to the crane in use and for the loads being lifted.
- Correct Use – The crane operator must show adequate understanding and proficient use of the load charts as related to the equipment in use and the loads being lifted.

Safe Operating Precautions

As stated above, cranes are carefully designed, tested, and manufactured for safe operations. When used properly they can provide safe reliable service to lift or move loads. Because cranes have the ability to lift heavy loads to great heights, they also have an increased potential for catastrophic accidents if safe operating practices are not followed.

Accidents can be avoided by careful job planning. The person in charge must have a clear understanding of the work to be performed and consider all potential dangers at the job site. A safety plan must be developed for the job and must be explained to all personnel involved in the lift.

Before operations begin for the day, a walk around inspection needs to be conducted to ensure that the machine is in proper working condition. Only qualified and properly designated people shall operate the crane. Regular inspections are important; they provide a means of detecting potential hazards or conditions that could contribute to a

sequence of events leading to an accident. Safe, reliable, and the economic operation of lifting equipment, cannot be ensured without regular safety inspections and thorough preventive maintenance programs. A thorough inspection program can forecast maintenance needs or potential equipment failures or malfunctions. The lack of such a program could result in serious deterioration of the equipment that might lead to excessive replacement, or repair charges, as well as an increased potential for accidents.

Due to the wide variation of conditions under which a crane may operate, it is impossible for the manufacturer to determine inspection intervals appropriate for every situation. Inspection intervals recommended in manufacturer's publications represent minimum intervals for average operating conditions. More frequent inspection intervals should be required if use and site conditions are severe and warrant it. Inspections are also designed as maintenance checks and/or as a verification that proper repairs or modifications of equipment have been completed which, if not checked could affect capacities as well as personnel safety. Since the initial load rating for cranes was determined and set under ideal conditions, inspections are required by manufacturers to guarantee optimal operating efficiency and capacity as determined by the load charts.

The American National Standards Institute, ANSI B30.5, 1968, and OSHA both require inspections be divided into two categories: frequent and periodic. In addition to the performance of these regular inspections, equipment is required to be inspected and tested to ensure that it is capable of safe and reliable operation when initially set or placed in service and after any major repairs or any design modification.

Inspection Types

Frequent Inspections (daily to monthly intervals)

Frequent inspections are usually performed at the start of each shift by the operator who walks around the crane looking for defects or problem areas. Components that have a direct bearing on the safety of the crane and whose status can change from day to day with use must be inspected daily, and when possible, observed during operation for any defects that could affect safe operation. To help determine when the crane is safe to operate, daily inspections should be made at the start of each shift. Frequent inspections should include, but are not limited to the following:

- Check that all exposed moving parts are guarded. A removed guard may indicate that a mechanic is still working on part of the crane.
- Check to make sure any swing area of the cab is barricaded to prevent crush hazards, and that the lift area is barricaded and designated as a controlled access zone.
- Visually inspect each component of the crane used in lifting, swinging, or lowering the load or boom for any defects that might result in unsafe operation.

- Inspect all wire rope (including standing ropes), sheaves, drums rigging, hardware, and attachments. Remember, any hook that is deformed or cracked must be removed from service. Hooks with cracks, excessive throat openings of 15%, or hook twists of 10 degrees or more, must be removed from service. Check for freedom of rotation of all swivels.
- Visually inspect the boom and jib for straightness and any evidence of physical damage, such as cracking, bending, or any other deformation of the welds. Look for corrosion under any attachments that are connected to the chords and lacing. Watch carefully for cracking or flaking of paint. This may indicate fatigue of the metal which often precedes a failure. On lattice booms, look for bent lacing. If they are kinked or bent, the main chord can lose substantial support in that area. When lacing is bent, the ends also tend to draw together which pulls the main chords out of shape. This precaution is especially important on tubular booms where every component must be straight and free from any dents. Do not attempt to straighten these members by hammering or heating them and drawing them out. They must be cut out and replaced with lacing to the manufacturer's specifications, procedures, and approval.
- Inspect tires for cuts, tears, breaks, and proper inflation.
- Visually inspect the crane for fluid leaks, both air and hydraulic.
- Visually check that the crane is properly lubricated. The fuel, lubricating oil, coolant and hydraulic oil reservoirs should be filled to proper levels.
- Check that the crane is equipped with a fully charged fire extinguisher and that the operator knows how to use it.
- Check all functional operating mechanisms such as: sheaves, drums, brakes, locking mechanisms, hooks, the boom, jib, hook rollers brackets, outrigger components, limit switches, safety devices, hydraulic cylinders, instruments, and lights.
- Check the turntable connections for weld cracks and loose or missing bolts. If they are loose, there is a good chance that they have been stretched.
- When checking the outriggers be sure that neither the beams nor the cylinders are distorted. Check that the welds are not cracked and that both the beams and cylinders extend and retract smoothly and hold the load. Check the condition of the floats, and check that they are securely attached.
- Inspect and test all brakes and clutches for proper adjustment and operation.
- Always inspect boom hoist lockout and other operator aids, such as anti-two-block devices (ATB) and load moment indicators (LMI), for proper operation and calibration.

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- While the engine is running, check all gauges and warning lights for proper readings and operate all controls to see that they are functioning properly.
- Check for any broken or cracked glass that may affect the view of the operator.

Periodic Inspections (1 to 12 month intervals)

The periodic inspection procedure is intended to determine the need for repair or replacement of components to keep the machine in proper operating condition. It includes those items listed for daily inspections as well as, but not limited to, structural defects, excessive wear, and hydraulic or air leaks.

Inspection records of the inspected crane shall be maintained monthly on critical items in use, such as brakes, crane hooks, and ropes. These inspection records should include, the date of inspection, the signature of the person who performed the inspection, and the serial number, or other identifier. This inspection record should be kept readily available for review. The manufacturer's maintenance and inspection records, forms/checklist, or equivalent should be used.

- Inspect the entire crane for structural damage. Be careful to check for distortion or cracks in main frame, outrigger assemblies, and structural attachments of the upperworks to the carrier.
- Inspect all welded connections for cracks. Inspect the main chords and lacings and other structural items for paint flaking and cracking which may indicate potential failure, as well as for dents, bends, abrasions, and corrosion. Check hydraulic booms for bending, side sway, or droop.
- Check for deformed, cracked, or corroded members in the load/stress bearing structure.
- Magnetic particle or other suitable crack detecting inspection should be performed at least once each year by an inspection agency retained by the owner. Inspection reports should be requested and retained in the crane file.
- Inspect cracked or worn sheaves and drums.
- Inspect for worn, cracked, or distorted parts such as: pins, bearings, shafts, gears, rollers, locking devices, hook roller brackets, removable outrigger attachments lugs, and welds.
- Inspect for excessive wear on brake and clutch system parts, linings, pawls, and ratchets.
- Inspect all indicators, including load and boom angle indicators, for proper operation and calibration.
- Inspect all power plants for proper operation.
- Inspect for excessive wear on drive sprockets and/or chain stretch.

- Inspect for correct action of steering, braking, and locking devices.
- Check that the counterweight is secure.
- Check that the identification number is permanently and legibly marked on jibs, blocks, equalizer beams, and all other accessories.
- Inspect all hydraulic and pneumatic hoses, fittings, and tubing. Any deterioration of any system component will cause the inspector to question whether further use would constitute a safety hazard. Conditions, such as the following, require replacement of the part in question:
    - Any evidence of oil or air leaks on the surfaces of flexible hoses or at the point at which the hose in question joins the metal end couplings.
    - Any abnormal deformation of the outer covering of hydraulic hose, including any enlargement, local or otherwise.
    - Any leakage at connections which cannot be eliminated by normal tightening.
    - Any evidence of abrasive wear that could have reduced the pressure retaining capabilities of the hose or tube effected. The cause of the rubbing or abrasion must be immediately eliminated.

Starting the Inspection

Since most crane inspections begin with a general walk-around and observation of the overall crane set up and operation, followed by a specific inspection of items or components, the following guidelines are presented in that order. The first section addresses the general items and operational considerations when inspecting any type of crane, followed by the specific inspection items for two specific types of cranes: Grove Rough Terrain 45 Ton (hydraulic) and Manitowoc 4100 150 Ton Crawler (lattice boom friction) cranes.

In general, the following should be considered when inspecting any crane:

Review all inspection and maintenance documents for the crane being inspected, including the crane manufacturer's inspection and maintenance requirements.

- Conduct a walk around inspection, paying particular attention to mechanical systems leaks or damage (oil, hydraulic, air) and structural deficiencies.
- Look at crane cab for properly marked controls, damaged instruments and for properly displayed and legible load charts.
- Ask the operator, ground crew (riggers), and/or supervisor's appropriate questions on load charts, rigging and load weight determinations, and capacities.
- Request the operator to raise and lower the boom/load line, where practical, and inspect, from the cab position, the running line or rope of the main hoist drum and secondary line or jib line. Check brake action and its ability to stop.
- If practical, request the operator to lower boom to look at the condition of booms sections, lacing, lifting components, anti-two-block devices, jib back stops, and the condition of the hook.
- Check crane set up and stability of outriggers on hydraulics and/or the effectiveness of cribbing on crawlers. If possible, request that the crane be rotated to check all clearances and overall stability.

Specific Inspection Items and References

The following table identifies the specific inspection items for cranes as well as a brief description and purpose to help the inspector to have a better understanding of what and why the item is being inspected.

Inspection Items & Description	
ITEM	**DESCRIPTION / PURPOSE**
Manufacturer's Operating and Maintenance Manuals	Manufacturer's operating and maintenance manuals shall accompany all mobile hoisting equipment. These manuals set forth specific inspection, operation and maintenance criteria for each mobile crane and lifting capacity.
Guarding	All exposed moving parts such as gears, chains, reciprocating or rotating parts are guarded or isolated.
Swing Clearance Protection	Materials for guarding rear swing area.
High-Voltage Warning Sign	High-voltage warning signs displaying restrictions and requirements should be installed at the operator's station and at strategic locations on the crane.
Boom Stops	Shock absorbing or hydraulic type boom stops are installed in a manner to resist boom overturning.
Jib Boom Stops	Jib stops are restraints to resist overturning.

Boom Angle Indicator	A boom angle indicator readable for the operator station is installed accurately to indicate boom angle.
Boom Hoist Disconnect, Automatic Boom Hoist Shutoff	A boom hoist disconnects safety shutoff or hydraulic relief to automatically stop the boom hoist when the boom reaches a predetermined high angle.
Two-Blocking Device	Cranes with telescoping booms should be equipped with a two-blocking damage prevention feature that has been tested on-site in accordance with manufacturer's requirements. All cranes hydraulic and fixed boom used to hoist personnel must be equipped with two-blocking devices on all hoistlines intended to be used in the operation. The anti-two blocking device has automatic capabilities for controlling functions that may cause a two-blocking condition.
Power Controlled Lowering	Cranes for use to hoist personnel must be equipped for power controlled lowering operation on all hoistlines. Check clutch, chains, and sprockets for wear.
Leveling Indicating Device	A device or procedure for leveling the crane must be provided.
Sheaves	Sheave grooves shall be smooth and free from surface defects, cracks, or worn places that could cause rope damage. Flanges must not be broken, cracked, or chipped. The bottom of the sheave groove must form a close fitting saddle for the rope being used. Lower load blocks must be equipped with close fitting guards. Almost every wire rope installation has one or more sheaves – ranging from traveling blocks with complicated reeving patterns to equalizing sheaves where only minimum rope movement is noticed.
Main Hoist and Auxiliary Drums System	Drum crushing is a rope condition sometimes observed which indicates deterioration of the rope. Spooling is that characteristic of a rope which affects how it wraps onto and off a drum. Spooling is affected by the care and skill with which the first larger of wraps is applied on the drum. Manufacturer's criteria during inspection usually specify: • Minimum number of wraps to remain on the drum. • Condition of drum grooves • Condition of flanges at the end of drum. • Rope end attachment. • Spooling characteristics of rope. • Rope condition.
Main Boom, Jib Boom, Boom Extension	Boom jibs, or extensions, must not be cracked or corroded. Bolts and rivets must be tight. Certification that repaired boom members meet manufacturers original design standard shall be documented. Non-certified repaired members shall not be used until recertified.
Load Hooks and Hook Blocks	Hooks and blocks must be permanently labeled with rated capacity. Hooks and blocks are counterweighted to the weight of the overhaul line from highest hook position. Hooks must not have cracks or throat openings more than 15% of normal or twisted off center more than 10o from the longitudinal axis. All hooks used to hoist personnel must be equipped with effective positive safety catches especially on hydraulic cranes.

Hydraulic Hoses Fittings and Tubing	Flexible hoses must be sound and show no signs of leaking at the surface or its junction with the metal and couplings. Hoses must not show blistering or abnormal deformation to the outer covering and no leaks at threaded or clamped joints that cannot be eliminated by normal tightening or recommended procedures. There should be no evidence of excessive abrasion or scrubbing on the outer surfaces of hoses, rigid tubing, or hydraulic fittings.
Outriggers	Outrigger number, locations, types and type of control are in accordance with manufacturer's specifications. Outriggers are designed and operated to relieve all weight from wheels or tracks within the boundaries of the outriggers. If not, the manufacturer's specifications and operating procedures must be clearly defined. Outriggers must be visible to the operator or a signal person during extension or setting.
Load Rating Chart	A durable rating chart(s) with legible letters and figures must be attached to the crane in a location accessible to the operator while at the controls. The rating charts shall contain the following: A full and complete range of manufacturer's crane loading ratings at all stated operating radii. Optional equipment on the crane such as outriggers and extra counterweight which effect ratings. A work area chart for which capacities are listed in the load rating chart, i.e. over side, over rear, over front. Weights of auxiliary equipment, i.e. load block, jibs, boom extensions. A clearly distinguishable list of ratings based on structural, hydraulic or other factors rather than stability. A list of no-load work areas. A description of hoistline reeving requirements on the chart or in operator's manual.
Wire Rope	Main hoist and auxiliary wire rope inspection should include examining for Broken wires. Excess wear. External damage from crushing, kinking, cutting or corrosion.
Cab	Contains all crane function controls in additional to mechanical boom angle indicators, electric wipers, dash lights, warning lights and buzzers, fire extinguishers, seat belts, horn, and clear unbroken glass.
Braking Systems	Truck cranes and self-propelled cranes mounted on rubber-tired chassis or frames must be equipped with a service brake system, secondary stopping emergency brake system and a parking brake system. Unless the owner/operator can show written evidence that such systems were not required by the standards or regulations in force at the date of manufacture and are not available from the manufacturer. The braking systems must have been inspected and tested and found to be in conformance with applicable requirements. Crawler cranes are provided with brakes or other locking devices that effectively hold the machine stationary on level grade during the working cycle. The braking system must be capable of stopping and holding the machine on the maximum grade recommended for travel. The brakes or locks are arranged to engage or remain engaged in the event of loss of operating pressure or power.
Turntable/Crane Body	Make sure that the rotation point of a crane gears and rollers are free of damage, wear and properly adjusted and the components are securely locked and free of cracks or damage. The swing locking mechanism must be functional (pawl, pin) and operated in the cab.
Counterweight	The counterweight must be approved and installed according to manufacturer's specifications with attachment points secured.

GENERAL TERMS & DEFINITIONS

Auxiliary Hoist: A supplemental hoisting unit, usually of lower load rating and higher speed than the main hoist.

Axis of Rotation: The vertical axis around which the crane's superstructure rotates.

Boom: In cranes and derricks usage, an inclined spar, strut, or other long member supporting the hoisting tackle. Also defined as a structural member attached to the revolving superstructure used for guiding and acting as a support for the load.

Boom Angle Indicator: An accessory device that measures the angle of the boom base section centerline to horizontal.

Boom Stops: A device used to limit the angle of the boom at its highest position.

Brake: A device used for retarding or stopping motion by friction or power means.

Block: Sheaves or grooved pulleys in a frame provided with hook, eye, and strap.

Crane: A machine consisting of a rotating superstructure for lifting and lowering a load and moving it horizontally on either rubber tires or crawler treads.

Counterweight: Weights used for balancing loads and the weight of the crane in providing stability for lifting.

Deck: The revolving superstructure or turntable bed.

Drum: The spool or cylindrical member around which cables are wound for raising and lowering loads.

Gantry: A structural frame work (also known as an A Frame) mounted on the revolving superstructure of the crane to which the boom supporting cables are reeved.

Headache Ball: A heavy weight attached above the hook on a single line or whip line to provide sufficient weight to lower the hook when unloaded.

Holding Brake: A brake that automatically sets to prevent motion when power is off.

Jib: An extension attached to the boom point to provide added boom length for lifting specified loads.

Load: The weight of the object being lifted or lowered, including load block, ropes, slings, shackles, and any other ancillary attachment.

Load Block: The assembly of the hook or shackles, swivel, sheaves, pins, and frame suspended from the boom point.

Main Hoist; Hoist system or boom used for raising and lowering loads up to maximum rated capacity.

Mechanical Load Brake: An automatic type of friction brake used for controlling loads in the lowering direction. This device requires torque from the motor to lower a load but does not impose additional loads on the motor when lifting a load.

Outriggers: Support members attached to the crane's carrier frame which are used to the

crane and may be blocked up to increase stability.

Pawl: Also known as "dog". It is a gear locking device for positively holding the gears against movement.

Pendants: Stationary cables used to support the boom.

Radius: The horizontal distance from the axis of rotation of the crane's superstructure to the center of the suspended load.

Reeving: The path that a rope takes in adapting itself to all sheaves and drums of a piece of equipment.

Running Sheave: Sheaves that rotate as the hook is raised or lowered

Superstructure: The rotating frame, gantry and boom or other operating equipment.

Test Load: Any load or force, expressed in pounds, used for testing or certifying the limitations within acceptable tolerances of the anticipated load.

Two-Block: The condition in which the lower load lock or hook assembly comes in contact with the upper load block or boom point sheave assembly.

Quadrant of Operation: The area of operation that the lift is being made in. Usually divided into four quadrants, i.e. front, rear and side(s) - left side and right side.

GENERAL LOAD CHARTS AND OPERATIONAL CONSIDERATIONS

General Load Chart

Manufacturer's operating notes supplied with the machine contain important information concerning proper set-up, operation and additional points that need to be considered when calculating load handling capacities of cranes. Mistakes in calculating capacity can cause accidents.

Several factors to be considered when calculating a cranes load capacity, including the following:

- Load Radius: the horizontal distance between the center of the crane rotation to center of the load.
- Boom length: including the jib, swing away extension or any other attachments that may increase length of the boom.
- Parts of line:
- Quadrant of operation: the area of operation that the lift is being made in; note different quadrants usually have lower lifting capacities.
- Boom angle: the angle formed between the horizontal plane of rotation and center line of the boom.
- Weight of any attachments: jib, lattice extension or auxiliary boom point.
- Weight of handling devices: ball, block, and/or any necessary rigging.

Operational Considerations:

- When working at boom lengths or radii between the figures shown on the load capacity chart, the next lower capacity rating should be used. It is dangerous to guess the capacity for boom lengths or radii between those listed on the rating plate.
- It is very dangerous to lift a load without knowing whether it is within the rated capacity while expecting the crane to start to tip to warn of an overload. Cranes may suddenly tip over or the boom may collapse if the load is too heavy.
- Always stay within the rated capacity. Operators must reduce the load capacity under adverse field conditions until, it is determined, the machine can safely handle the lift.
- Loads shall not be allowed to exceed rated load capacity and working radius.
- Do not use counterweights heavier than the manufacturer's recommended weight.
- Even a light wind can blow the load out of control, collapse booms, or tip machines.
- Winds aloft can be much stronger than at ground level.
- Proper precautions shall be taken when the velocity of wind exceeds 20-mph.
- Crane capacity can be adversely affected when the machine set is not level.
- Do not lift loads when winds create an unsafe or hazardous condition. Booms should be lowered, if possible, under high wind conditions.
- Foot pedal brake locks are furnished on some cranes to allow the operator to rest his legs when suspending the load for short periods of time. Operators should keep their feet on the pedals while foot pedal brake locks are in use. Brakes may cool allowing the load to fall.
- No one, except the oiler, instructor, or designated person should be allowed on a crane with the operator when the crane is in operation.

SITE-SPECIFIC CRANE OPERATION PLAN

A site-specific operation plan must be created prior to any crane work. This plan will be developed by a competent person and reviewed by all involved parties. Employers should refer to the OSHA standard 1926.1400-1442 for specific crane requirements.

SITE-SPECIFIC CRANE OPERATION PLAN & CHECKLIST

Company:		Job Name & Location:	
Job Supervisor:		Date(s) on Site:	
Project Engineer:		Qualified Person:	
Crane Operator:		Qualified Rigger:	
Scope of Work			
Roofing	□	Sq. Ft.:	Tons:
Siding	□	Sq. Ft.:	Tons:
Decking	□	Sq. Ft.:	Tons:
General Miscellaneous	□	Sq. Ft.:	Tons:
General Description of Work:			
Site Layout			
1. Has controlling contractor provided adequate access to site?			□Yes □No
2. Is laydown area firm, properly graded, well drained, and accessible?			□Yes □No
Pre-Construction Site Conference			
Has a Pre-Construction Site Conference been held?			□Yes □No
Please list those attending:			
Sequence of Crane Activity			
1. Give a general sequence of Crane activities:			
2. Material delivery date:			
3. How will activities be coordinated with other trades:			
Cranes			
1. Crane Type:			
2. Crane Brand:			
3. Crane Capacity:			
4. How is the site prepared for the crane?			
5. How many different locations will the crane have and where are they?			
6. What is the path for overhead loads?			
7. How will employees be notified of overhead loads?			
8. Are there any critical lifts? (75% of capacity or dual crane)			□Yes □No
a. How many?			
9. Describe critical lifts:			
10. Are lift permits attached for critical lifts?			□Yes □No
11. Are lift permits attached for all lifts over 5,000 lbs.			□Yes □No

Fall		
Has fall protection training been documented?	□Yes □No	
Is a Competent Person on-site at all times?	□Yes □No	
Were fall protection systems designed by a Qualified Person?	□Yes □No	
Falling Object Protection		
Method for securing loose items aloft:		
Are all personnel wearing hard hats?	□Yes □No	
Are Crane operation areas properly barricaded?	□Yes □No	
Hazardous Non-Routine Tasks		
Are Job Hazard Analyses performed on all non-routine tasks?	□Yes □No	
Attach Job Hazard Analyses.		
Training		
Are all personnel properly trained for performing job-related activities?	□Yes □No	
Are all personnel properly trained for the use of fall protection systems?	□Yes □No	
Attach documentation of training.		
List of Qualified and Competent Persons		
1. Qualified Person for fall protection system design:		
2. Qualified Rigger:		
3. Crane Operator:		
4. Crane Inspector:		
5. Fall Protection Competent Person:		
Emergency Rescue Procedures		
□Self-Rescue	□Emergency Response Team	□Manbasket
□Stair Tower	□First Aid Trained Personnel	□Hoists
□Aerial Lifts	□Other	
Other Considerations Specific to this Site:		
Comments:		
Completed By:	***Date:***	
Reviewed By:	***Date:***	

CRANE/BOOM INSPECTION REPORT

Company Name:		Date:
Job Site Location:		Time:
Job Foreman/Supervisor:		
Person(s) Making Inspection:		
Subcontractors On-Site (List Name and Trade):		
Equipment Type:	Equipment #s:	Manufacturer:

Columns: A = Adequate at time of inspection; B = Needs consideration; C = Needs immediate attention; N/A = Not applicable

	A	B	C	N/A	Action Taken
GENERAL JOB SITE INFORMATION:					
Copy of safety manual on site?					
OSHA 300 and 301 Forms Posted and Complete?					
Are required OSHA Posters posted?					
Phone number to nearest medical center posted?					
Toolbox talks up-to-date?					
Copy of HazCom program & MSDS sheets on site?					
Work areas properly signed and barricaded?					
CRANE/BOOM – Carrier Vehicle:					
Motor					
Crank case oil is clean and full					
Engine coolant is about 2 inches below cap					
Clutch /Converter					
Drive Line					
Transmission fluid at proper level					
Frame					
Brakes					
Differentials					
Outriggers					
Cab					
Steering					
Lights					
Tires properly inflated (look on load charts for manufacturing recommendations)					
Cuts or bulges in the tires					
Rims & Bolts					
Fire Extinguisher					
Glass					
Warning Lights					
Access					

HYDRAULICS:	A	B	C	N/A	Action Taken
Relief Valve(s)					
Restrictor Valves					
Pipe Lines					
Hose Lines					
Outrigger Cylinders					
HYDRAULICS (Continued):					
Boom Hoist Cylinder					
Boom Crowd Cylinder					
Control Valves					
Swing Motor					
Hoist Motor					
Pumps					
Bearings					
Check hydraulic oil level					
Mounting Bolts					
Swing Gear					
Swing Pinion					
Seals - Hydraulic					
BOOM:					
Shipper Welds					
Boom Welds					
Pins - Boom Pivot					
Support Roller					
Boom Pins					
Bearing Sheave					
Load Block Sheave					
Load Block Hook					
Boom Main Section					
WEDGE SOCKETS:					
Wire rope size and wedge socket is a proper match?					
Dead end of wire rope extends at least 9 inches beyond wedge socket?					
Dead end of the wire rope is secured properly?					
SHEAVES:					
The wire rope is seated properly in the sheaves?					
The wire rope keepers (keeps cable from coming out of the sheaves) are in good shape?					
Check the bolts on the sheave plates for tightness?					
Check for any weld cracks?					
Signs of bent or buckled panels or parts?					

OPERATIONAL CHECKS:	A	B	C	N/A	Action Taken
Crane operators' logs up-to-date and on-site?					
Operators familiar with load charts?					
Load chart is in cab?					
Hand signal charts on crane?					
Handrails leading into crane cab are good condition?					
Out rigger pads not cracked?					
Outriggers extended & swing radius barricades in place?					
Hydraulic hoses in good condition?					
The drum cable is properly spooled?					
Boom angle indicator is available and working?					
Swing through 360 degrees, does boom angle indicator stay the same throughout rotation?					
Does boom swing break work properly?					
Back-up alarm is working?					
Does the horn work?					
Engine started, gauges are checked & working properly?					
Out riggers are extended out; working properly?					
OPERATIONAL CHECKS (Continued):					
Crane is leveled, working properly?					
Boom up, unlock the swing break, does it swing when level?					
Extend out the boom, are all sections extending evenly?					
Brakes & brake systems check out?					
Safety pressure relief valves check out?					
Is equipment a safe distance from edge of trench or excavation?					
MATERIALS HANDLING:					
Chains and slings inspected and tagged as required?					
Employees kept from under suspended loads?					
Materials properly stored or stacked?					
Employees using proper lifting methods?					
Tag lines used to guide loads?					
HOOKS – Replace If:					
If hook throat opening has increased by 15%					
If load-bearing point (throat) has been worn by 10%, the hook must be replaced.					
If hook tip is twisted by 10° or more, the hook must be replaced.					
Check for excessive damage from chemicals and for deformation and cracks.					
Check for and replace damaged, inoperative, or missing hook latches.					

Unsafe Conditions, Situations, Acts, or Practices Observed:

Comments:

Operator's Signature Date

Signature (person(s) performing inspection/evaluation) Date

Signature (person(s) performing inspection/evaluation) Date