46. Cranes and Man Baskets

CRANE SAFETY PROGRAM

46.1 PURPOSE

Colonna's Shipyard Inc. is committed to protecting our employees, contractors and customers from unsafe conditions and practices. The Crane Safety Program is a critical element in the success of our commitment to that goal. This program must be complied with by persons charged with the responsibility of operating, servicing, and managing fixed and mobile cranes, and related equipment.

46.2 POLICY

The Crane Safety Program has been developed to provide our employees and contractors with safe methods for working with cranes and related equipment (e.g., rigging).Colonna's restricts the operation of cranes to those personnel who have been properly trained, qualified, authorized, or certified to operate cranes. The Crane Safety Program applies to employees as well as contractors conducting crane operations while on any Colonna's worksite. The intent of this program is to control crane hazards by ensuring the following:

- Equipment is maintained and operated according to manufacturer's recommendations. Responsible persons are trained, qualified, authorized, or certified.
- Safe work practices and safety regulations are followed.
- Environmental conditions affecting lift operations are monitored.
- Critical Lift Plans are developed for high hazard lifts.

46.3 DEFINITIONS

Boom: A structural member attached to the revolving superstructure used for guiding and acting as a support for a hook or other end attachment for securing load.
Bridge: Principal horizontal beam(s) of the overhead crane which supports the trolley.
Crane Operator: Any person operating a crane.
Critical Lift: A non-routine crane lift requiring detailed planning and additional or unusual safety precautions.
Counterweight: Weights used for balancing loads and the weight of the crane in providing stability for lifting.
Chart (Load): The manufacturer's minimum and maximum lifting limitations for any particular crane.
Designated Signal Person: An individual who is assigned to give recognized hand signals to the crane operator during any crane lifting operation.
Drum: The spool or cylindrical unit around which wire rope is wound to raise and lower loads.
Frequent Inspection: Daily to monthly intervals.
Ground worker: An individual who performs a variety of duties to support crane lift operations including unskilled physical labor and specialized equipment operation.

Hoist (Boom): A hoist drum and rope reeving system used to raise and lower the boom.
Supervisor: Individual responsible for direct oversight of a crane lift operation, and ensuring the operation meets regulatory requirements for inspection, personal qualification and site preparations.
Load Chart: The manufacturer's absolute limitations of a crane based on structural strength and stability of the crane.
Mechanic: Performs technical duties and responsibilities in the maintenance, repair, service, and troubleshooting of cranes and other mobile equipment.
Mobile Crane: Hydraulic or lattice booms on wheeled or crawler-tracked under carriages.
Outriggers: Support members attached to the crane's carrier frame which is used to raise the crane off the rubber wheels for increased capacity and stability.
Overhead Crane: Any hoisting device where the hook-and-line mechanism runs along a horizontal beam that runs along two rails or the hook-and-line mechanism runs along a cantilevered (jib) boom arm.
Pendant Control: Suspended push button controls from crane to floor for operator control of functions.
Periodic Inspection: 1 to 12 month intervals.
Qualified/Competent Person: A person designated by the employer who by reason of training, has demonstrated the ability to safely perform all assigned duties and, if required, is properly licensed.
Qualified Rigger: A trained person who is trained to handle and move loads during a crane lift operation.
Rated Capacity: The maximum load values shown on a load chart for a particular crane configuration.
Reeving: Refers to a rope system in which the rope travels around drums and sheaves.
Rope: For all hoisting operations any reference to rope will mean wire rope.
Shock Loading: A sudden or unexpected load that is imposed upon a crane, or related equipment.
Spotter: A safety observer whose sole task is observing and warning against the unsafe approach to hazards, such as overhead power lines.
Trolley: Carries drum and hoist mechanism and travels on the bridge rail.

46.4 RESPONSIBILITIES

46.4.1 Supervisors shall:

- Make sure operators are properly trained, qualified, authorized, or certified.
- Ensure that crane contractors have satisfactory procedures for inspection of equipment.
- Ensure that personnel are familiar with equipment manufacturer's procedures.
- Coordinate communications between the crane operator and others working near the crane.
- Thoroughly evaluate environmental conditions, wind speed, overhead power lines, and cancel crane lift operations in the event of severe weather warnings.

CSI policy is to stop all crane operations when wind gust are recorded at 35 MPH or greater.

- Develop and follow a general lift plan or a written Critical Lift Plan.
- Ensure that certifications for all cranes, personnel and operators on site are current.
- Keep affected workers clear of hoisted loads.
- Notify affected workers before a lift begins.
- Determine the load weight and inform the crane operator.
- Ensure the load is properly rigged and the rigging will not slip out from the hook due to a missing safety latch.
- Ensure that personnel involved in the lift know their duties and is capable of executing them responsibly.
- Perform and document a pre-lift meeting if the lift is considered to be critical.
- Ensure that all safety processes have been followed and is in place prior to and during the lift operations.

46.4.2 Operators shall:

- Complete training, qualification and/or certification in safe crane operation.
- Read and be familiar with the operator manual for each crane operated.
- Conduct a documented pre-use inspection.
- **Submit all pre-use inspection check-lists to the Safety Department daily.**
- Utilize the crane manufacturer's load chart for each crane.
- Determine the weight of each load.
- Follow the manufacturer's procedures for proper outrigger deployment.
- Inspect the condition of the ground and blocking materials regularly to ensure ground conditions are able to support the equipment and any supporting materials per the manufacturer's specifications. If the conditions are found unacceptable, the cranes will not be used until the issues are resolved.
- Inspect for overhead power lines and other obstructions.
- Account for wind, temperature and other environmental conditions when making any lift.
- Obey a stop signal regardless of who gives it.
- Not operate equipment if wire rope is not seated in drum or sheave grooves.
- Not use a crane for the purpose of pushing or pulling.
- Avoid hoisting, moving or swinging suspended loads over or near workers.
- Not engage in any activity that diverts attention while operating the crane.
- Stop and refuse to handle loads, if there is a safety concern.
- Inform their supervisor of any problems with the equipment prior to use.
- Review plans and requirements with the supervisor.
- Determine load and rigging weight and where the load is to be placed.
- Configure the crane (boom length and configuration, setup location, outrigger placement), to best suit the metrological and lift conditions for a successful lift.
- Assume responsibility for the setup of the crane, the rigging and lift of the load.
- Maintain communication with signalman
- Operate in a smooth, controlled, and safe manner.

- Shut down and secure the crane properly.

46.4.3 Spotters, Riggers, and Ground Workers, Tag Line Handlers shall:
- Use standard hand signals (see Appendix C).
- Be observant of hoisting operations in your work area.
- Be attentive and watch for signs of problems during each lift.
- Check for overhead power lines and other obstructions.
- Use rigging in accordance with manufacturers recommendations.
- Never work or position yourself directly under a suspended load.
- Maintain vigilance in their assigned duties during all crane operations.
- Inform the lift director of any perceived un-safe situations that may or is occurring.
- Use audible warning devices during lift operation.
- Do not signal the crane operator unless designated as the signal man, **only** to perform an emergency stop do to an unsafe condition or damage to equipment is eminent.

46.4.4 Mechanics shall:
- Be qualified by their Resource Manager to make adjustments and repairs.
- Ensure all maintenance, inspections and testing conducted is based on manufacturer's recommendations, and/or specific site conditions.
- Seek written approval of crane manufacturer for any modifications of the crane that will change the structural or lift characteristics of the equipment.
- Ensure all maintenance related inspections occur at frequency specified by the manufacturer and/or this manual.

46.4.5 Resource Manager shall:
- Review and approve Critical Lift Plans or projects.
- Coordinate quarterly inspections for rigging.
- Train, qualify and/or certify operators/riggers/handlers etc. in safe crane operation for each different unit operated by each individual operator.
- Maintain a list of qualified individuals

46.5 PROCEDURES

46.5.1 All Cranes
- Operator's manuals are required to be in the cab of the cranes in good condition, load charts are part of the manual.
- The rated load of a crane must be clearly marked on each side of a crane.
- All cranes and equipment must not be operated in excess of rated capacity.
- Cranes shall have all required signage and decals on the crane body.
- No one is permitted to ride on loads, hooks, or slings of any hoist or crane.
- The empty hook, headache ball, or block should not swing freely.
- Note: extendable boom cranes with multiple hooks should not secure the hooks during operations
- Cranes shall be equipped with the applicable/required safety devices.

- No safety devices shall be by-passed at any time.
- Manufacturer instructions and prohibitions must be followed when assembling and/or disassembling equipment and must be performed by a competent and qualified person.

46.5.2 Overhead and Gantry cranes

- Access to the bridge walkway shall be provided by a ladder, stairs or other safe means.
- When starting the bridge and when the load or hook approaches personnel, a warning signal shall be sounded.
- A brake mechanical drive shall be provided on bridge cranes.
- Operators must maintain a minimum clearance overhead and laterally between the overhead crane and any obstructions per the manufacturer's recommendations.
- When necessary to provide access to bridge to service the crane, each bridge shall be equipped with a substantial walkway. The remote control or pendant shall be in the mechanics possession or a qualified operator on the ground to ensure no unintentional operations is performed during the servicing of the crane.
- The control power must be off when the crane is not in use.
- The hook and rigging must be at a height not to allow a person to hit either when walking past.
- Remote control boxes shall be left near the hook of the appropriate crane, or in the supervisors' office.
- Rigging left on the hook shall be securely attached not to allow it or any parts of it to fall.
- The crane shall not be used in excess of its rated capacity.
- Any problems with the operation of the crane shall be reported to the supervisor immediately.
- The crane shall not be left hooked to any load while unattended.
- The crane shall not be used beyond its intended use or the manufacturers recommended use.
- The crane shall only be operated by qualified personnel who has passed the required company safety course. Inexperienced operators will only operate under the direct supervision of a qualified operator during the training phase, but must pass the safety course first, (time of training will be determined by a safe operations test witnessed by a trainer designated by the safety department after the trainee is deemed competent by their supervisor).
- When 2 or more cranes are used or 75% of any single cranes capacity is exceeded a Critical Lift Plan must be in effect and all required safety processes and procedures must be followed.
- A tag line must be used if rotation could be a problem.
- All below the hook attachments, (i.e. Magnets, clamps etc.), shall be used properly. Product manufacturers recommended use, applications and applicable OSHA standards for below the hook rigging must be followed.

46.5.3 Hydraulic and boom-type mobile cranes

A pre-operation hazard assessment is conducted and shall comply with the following safe work practices:

- Assume all overhead lines are energized and potentially dangerous.
- Keep all equipment, load lines or loads at least 20 feet away from all power lines.
- A fire extinguisher of not less than 10-ABC rating shall be kept in serviceable condition and readily accessible to the operator.
- A crane must not be operated when its wheels or tracks are off the ground unless it is properly supported on outriggers.
- Crawler and wheel mounted cranes must not be operated without the full amount of any counterweight in place unless otherwise specified by the manufacturer.
- No employee shall be directly under the load.
- The boom or other parts of the equipment must not contact any obstruction.
- The equipment must not be used to drag or pull loads sideways.
- The operator must test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes.
- No less than two full wraps of rope must remain on their drums at all times, unless otherwise specified by the manufacturer.
- If a crane is to travel with a lifted load, the employer must ensure that a Critical Lift Plan is submitted to the Resource Manager for approval.
- Rotational speed of load must not hinder ability to control load. A tag or restraint line must be used as needed to control rotation of the load.
- In travel the boom shall be carried in line with the direction of motion and the superstructure shall be secured against rotation.
- Swing radius of the crane in operation must be identified and barricaded to prevent unauthorized personnel from entering the work zone.

46.5.4 Slings, wire ropes, tag lines and attachments

- Damaged or defective slings shall be taken out of service.
- Selection and installation of equipment on cranes must meet recommendations of the wire rope manufacturer, crane manufacturer, or a qualified person.
- Fiber core ropes may not be used for boom hoist reeving.
- Rotational resistant ropes may be used at the discretion and under the guidance of a qualified person. Chain or wire rope slings shall not be shortened with knots, bolts, or other makeshift devices.
- Slings shall not be kinked, knotted, loaded in excess of their rated capacities, or be pulled from under a load when the load is resting on the sling as damage to the sling may result.
- Slings shall be set to avoid slippage, be padded or protected from the sharp edges of their loads, and slings used in a basket hitch shall have the loads balanced to prevent slippage.
- Suspended loads shall be kept clear of all obstructions.
- Hands or fingers shall not be placed between the sling and its load while the sling is being tightened around the load.
- Shock loading is strictly prohibited.

- Only use slings with permanent affixed identification markings that show the maximum load for each sling.
- All rigging must be inspected prior to use by a qualified rigger.
- All below the hook rigging and attachments must comply with current OSHA/ANSI regulations for below the hook rigging.

46.6 CRITICAL LIFT PLANS

Before making a critical lift, a Critical Lift Plan must prepared by the Resource Manager. The Critical Lift Plan should be documented in writing and made available to all personnel involved in the lift. A pre-lift meeting involving the participating personnel (i.e. crane operator, lift supervisor, rigger) should be conducted prior to making a critical lift. The Critical Lift Plan should be reviewed/approved by the Resource Manager/Professional Engineer to ensure that the project team is prepared to safely execute the lift. Critical Lift Form is located in 46.15.

46.7 INSPECTION

Inspections should be performed at the recommended intervals, and conducted or coordinated by the responsible party listed in Table 1, and records shall be maintained by the responsible parties (**Safety Department**)

Frequency	Responsible Party		
	(Mobile Boom Crane)	*(Overhead and Gantry)*	*(Rigging)*
Pre-Use	Operator	Operator	Operator
Monthly	Competent Person	Competent Person	Competent Person
Quarterly	Competent Person	Competent Person	Competent Person
Annual	Competent Person	Competent Person	
Quadrennial	Competent Person	Competent Person	

Current inspection documentation shall be verified for all equipment. If documentation is unavailable, the equipment shall not be used until a qualified individual completes an inspection, and any necessary repairs have been made and documented.

46.7.1 Running Ropes Inspection

A thorough inspection of all ropes shall be made at least once per month and recorded. The inspection must include the date of inspection, the person's name who performed the inspection and an identifier for the ropes that were inspected. These records must be kept on file and readily available for review. Any defect causing loss of strength of the rope shall be reviewed and taken out of service should it be warranted as a safety issue. Inspection points should include:

Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion or wear of outside wires.

A number of broken outside wires and the degree of distribution or concentration of such broken wires.

Corroded or broken wires at end connections.

Corroded, cracked, bent, worn or improperly applied end connections.

Severe kinking, crushing, cutting or unstranding.

All ropes that have been idle for a period of one month or more installed on a crane shall be subjected to the same criteria as above before being operated.

46.8 MAINTENANCE

Mobile crane maintenance, and overhead and gantry crane inspections shall be coordinated by Facilities Dept. Maintenance must be conducted in accordance with the manufacturer's recommended procedures and instructions. Guards removed during maintenance shall be reinstalled, and safety devices reactivated after maintenance is performed. The equipment shall be tested for proper operation before being returned to service after maintenance is performed. The following steps must take place before maintenance or adjustments are performed.

The crane must be repaired in an area that will not interfere with other cranes and operations.

All controllers must be in the off position.

The main or emergency switch must be open and locked in the open position.

The crane must be visibly marked with signage stating "Out of Order"

If other cranes are in operation in the same area suitable means must be provided to prevent interference with the idle crane.

46.9 TRAINING

Operators shall be trained and written documentation of training shall be available. In addition, each employee (i.e., rigger, signal person, and spotter) involved in crane operations must be trained in the hazards associated with crane hoist/lifting operations. Training should include overhead power line awareness, crush/pinch points prevention, Fall Protection, and Lockout/Tagout procedures. Each employee must be evaluated (e.g., tested) on the training topic to ensure the training provided is understood.

46.10 REFERENCES/ RELATED LINKS:

a) OSHA Standard 29 CFR1915 Subpart G

b) American Society of Mechanical Engineers (ASME) B30.17-2006 and B30.2 -2011, Overhead and Gantry Cranes.
c) American Society of Mechanical Engineers (ASME) B30.5-2007, Mobile and Locomotive Cranes.
d) American Society of Mechanical Engineers (ASME) B30.9-2010, Slings.
e) American Society of Mechanical Engineers (ASME) B30.10-2009, Hooks.
f) American Society of Mechanical Engineers (ASME) B30.23-2011, Personnel Lifting Systems.

46.11 Crane Inventory

Jib Cranes
Building 7 - 30 ea 2 ton
Pipe Shop – 1 ea 5 ton
Plate Shop – 1ea 5 ton

Overhead Cranes
Building 7 – 1 ea 50 ton
1ea 30 ton
1ea 20 ton
Plate Shop – 2 ea 5 ton
IMS – 2 ea 20 ton
2ea 10 ton
OMS- I ea 5 ton
501 Warehouse – 1ea 10 ton

Wingwall Cranes – 2 ea 15 ton

Gantry Crane – 1ea 11.2 ton (OOC)

Mobile Cranes
Crawler – 1 ea 230 ton B(OOC)
2 ea Link Belt 60 ton
1 ea Grove 28 ton
1 Brodeson 15 ton
2 ea Omega 20 ton

46.12 Training and Qualifications

46.12.1 A Crane Operator person shall:
Be qualified by the Resource Manager or when required, be certified to operate by an accredited certifying entity, such as the National Commission on the Certification of Crane Operators (NCCCO).

46.12.2 A Designated Signal Person shall:

- Complete training from qualified trainer.
- Know, understand, and be competent in the types of signals used.
- Have a basic understanding of the equipment operation and limitation.
- Be competent in the Standard Methods for hand signals, understand signal person requirements contained in Appendix C.

46.12.3 A Qualified Rigger shall:

- Be trained in the selection, inspection, and rigging practices for the rigging devices used.
- Demonstrate the ability to solve problems related to rigging loads.
- Appropriately trained for hazards (e.g., confined space) encountered during rigging operations.

46.12.4 A Mechanic performing maintenance on a crane shall:

- Operate equipment only when, operation is critical for a maintenance task.
- Be familiar with the equipment, or operate under the direct supervision of a qualified operator.
- Be qualified to perform maintenance on the equipment.

46.13 Signaling Requirements

- A designated signal person must be provided when the equipment travel is not in full view of the operator.
- When using hand signals, Standard Methods must be used (see Figure 13-1).
- Signals must be suitable for the site conditions, and tested before beginning operations, if necessary.
- The operator must safely stop operations if the ability to transmit signals is interrupted.
- Only one person may give signals to one crane operator at a time.
- When a device is used to transmit signals for one crane (or multiple cranes), it must be on a dedicated channel, and the operator must use a hand-free device for reception of signals.
- Applicable hand signal charts (See Figures 13-1 thru 13-3) must be posted conspicuously on equipment or in the vicinity of the operations

Figure 13-1
Recommended Hand Signals for Controlling Crane Operations

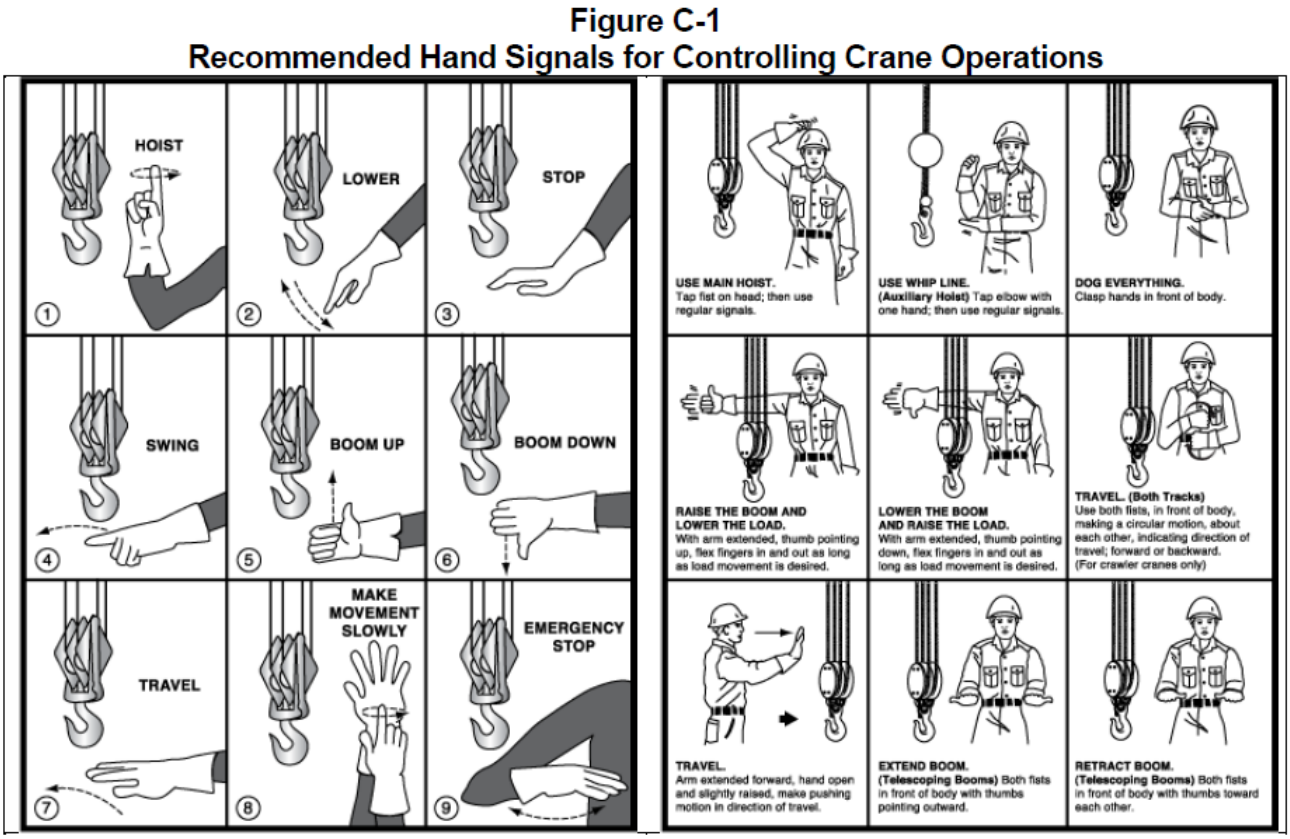


Figure 13-2
Recommended Hand Signals For Boom Equipment Operations

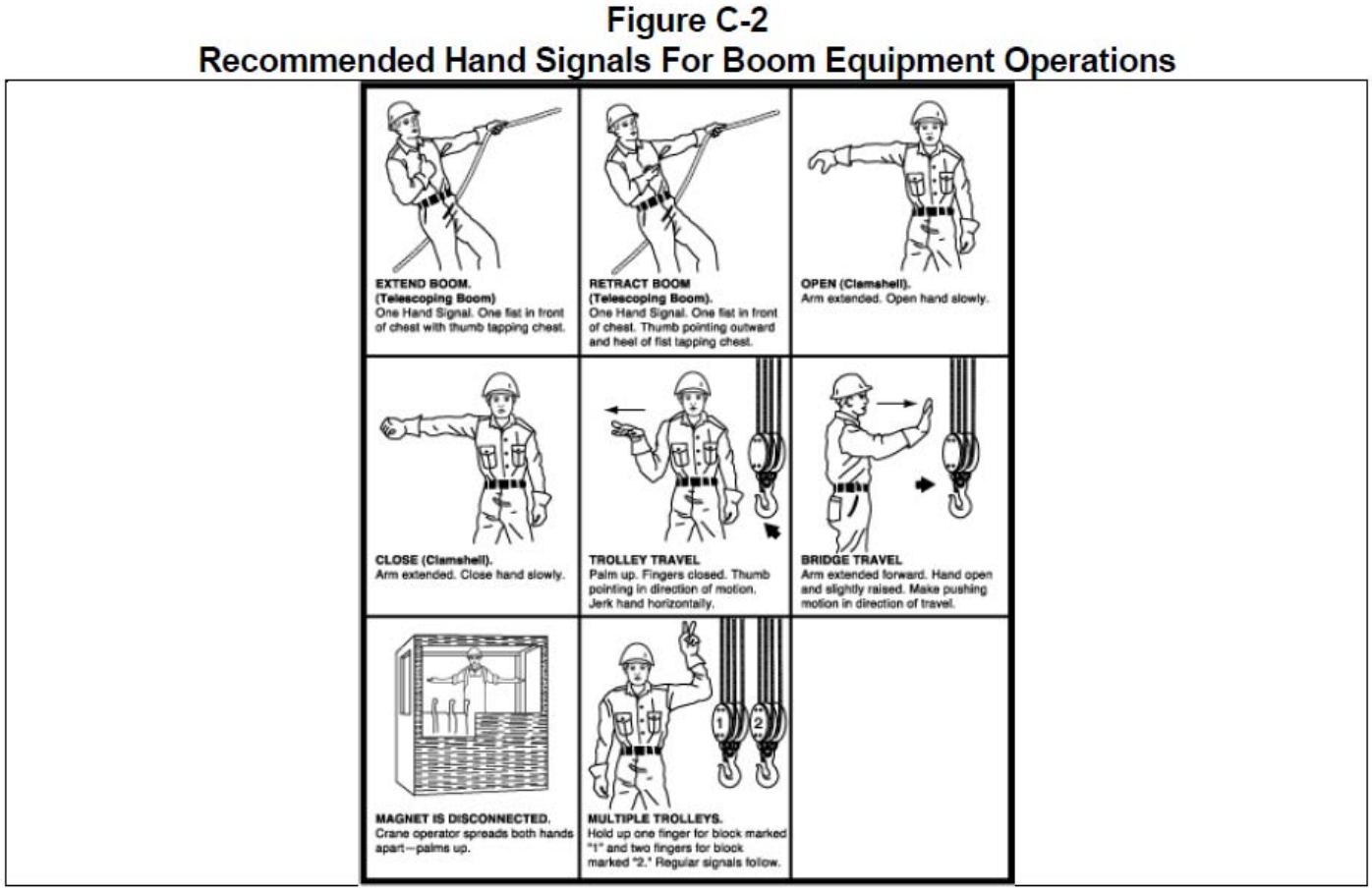
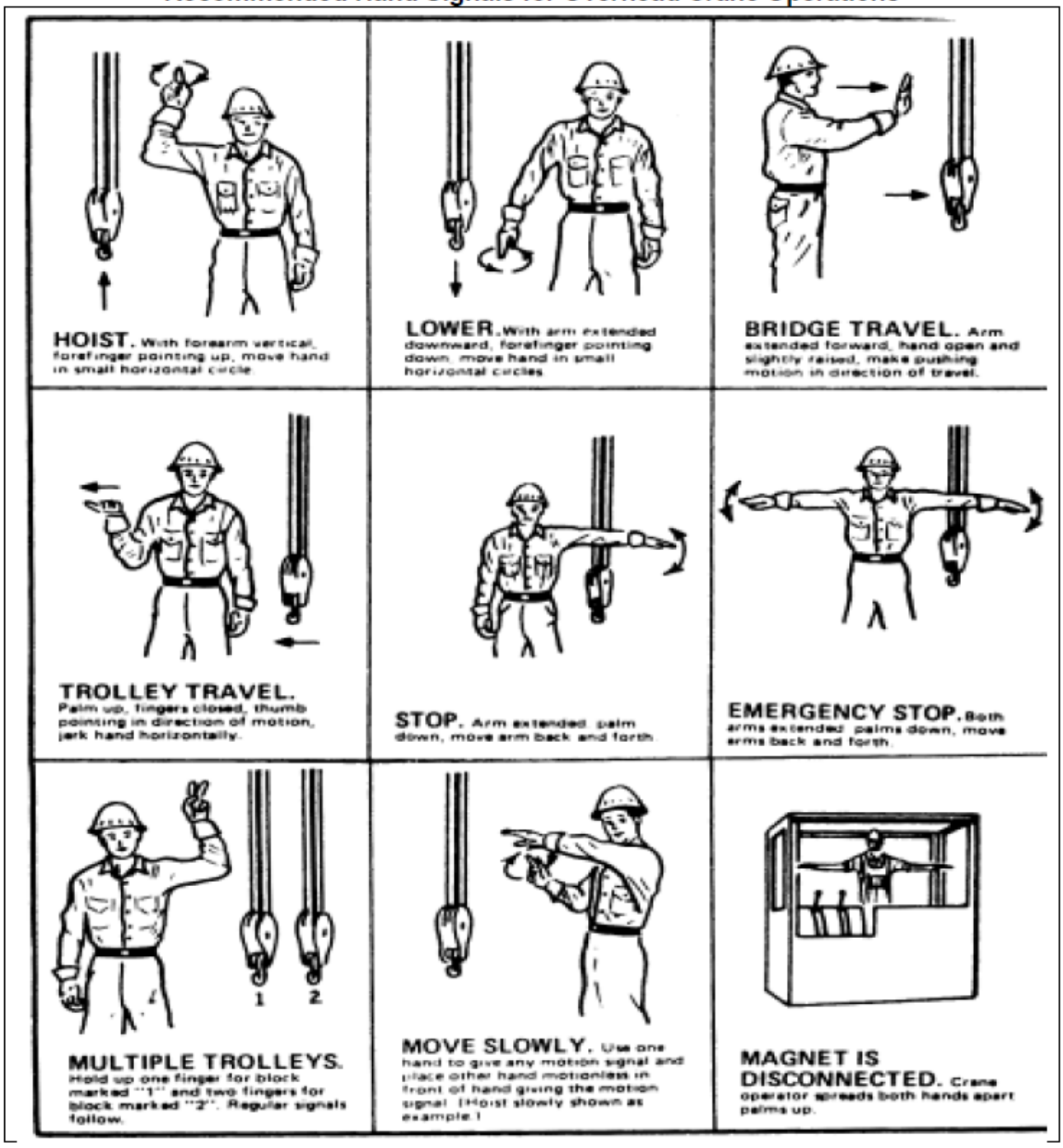


Figure 13-3
Recommended Hand Signals for Overhead Crane Operations

Figure C-3
Recommended Hand Signals for Overhead Crane Operations



46.14 Fall Protection Requirements

When hoisting personnel:

- A body harness and lanyard six feet or less in length must be used for fall protection.
- Personal fall arrest and positioning systems must be anchored to a substantial part of the equipment.
- Fall restraint systems must be anchored to any part of the equipment capable of withstanding 5000 lbs. A personal fall arrest systems is permitted to be anchored to the crane's hook (or other part of the load line) when approved by a Critical Lift Plan.
- Employees exposed to fall hazards during equipment operation must receive training in Fall Protection/Safety Harness use.

46.15 Critical Lift Planning

46.15.1 Crane lifts are classified into two categories: critical lifts and general lifts. Critical lifts shall have the following additional planning requirements:

- A qualified person shall prepare the Critical Lift Plan (see 14.15.1 for form).
- The qualified person preparing the plan may be the crane operator, lift supervisor, or designated rigger, and shall include the other qualified individuals in the lift plan.
- The plan shall be documented, and a copy provided to the contractor and Resource Manager for review prior to any critical lift.
- The plan shall be reviewed by, and signed by, all personnel involved with critical lift.

46.15.2 The Critical Lift Plan shall be used when any of the following characteristics or conditions exist:

- Anytime a load will be lifted over an occupied building.
- Any lift which meets or exceeds 75% of the crane's capacity at the given radius as Posted in the load chart for the specific crane and its configuration.
- Any lift that requires two or more cranes.
- Any lift of 100,000 pounds or more.
- Any lifts involving of personnel platforms.
- Using a crane where fully extended outriggers and /or the 360 degree load chart (if applicable) cannot be used.
- Operating a crane in a position where it could possibly exceed the minimum distances from overhead power lines.
- Any lifts over operating facilities where they may endanger personnel.
- Any operations involving traveling with a lifted load.

46.15.3 The Critical Lift Plan shall include details of:

- The make, model and capacity of the crane(s) and proof of current inspection and/or testing.
- Exact weight of the load to be lifted and rigging components that adds to the weight.
- The manufacturer’s maximum load limits for the entire range of the lift as listed in the load charts.
- Lift points, rigging procedures and the required lifting hardware.
- The plan shall describe ground conditions, outrigger or crawler track requirements, and if necessary, the design of mats or cribbing.
- Weather conditions or environmental conditions under which lift operations must be stopped.
- Operational signaling, coordination and communication requirements.
- Any site obstructions (buildings, boom clearances, vehicles etc.)
- Drawings and any other detailed information required to ensure the safe and successful execution of the lift.

46.15.1 Critical Lift Plan Form

CRITICAL LIFT EVALUATION FORM (CLEF)

___Critical Lift ___Pre-engineered Lift

PERSON REQUESTING THE LIFT

Print Name_____Dept/Div._____Date_____

PERSON IN CHARGE (PIC)

Print Name_____

PIC must be present during the entire CRITICAL LIFT and be QUALIFIED to resolve any question or problems that might arise during the lifting operation.

DETERMINING FACTOR FOR CRITICAL LIFT

_____Load is greater than 7% of mobile crane rated capacity, or greater than 90% of rated fixed crane capacity, or greater than 50 tons.

_____Two or more cranes/booms are required or special hoisting/rigging equipment will be used.

OPERATING EQUIPMENT (mobile crane)

Type of Crane_____ Manufacturer_____

Model No._____ Serial No._____

Manufacturer Restriction for WIND SPEED_____(no lifts at wind speeds of 25 mph or greater)

Crane Equipped with Anemometer_____

Copies of Latest Annual Inspection_____

Operator Licensed/Qualified for Equipment_____ Expiration Date_____

OPERATING EQUIPMENT (overhead cranes)

Type of Crane_____ Manufacturer_____

Capacity_____

Date of Latest Annual Inspection _____

DESCRIPTION OF ITEMS TO BE LIFTED

HOW WEIGHT OF OBJECT OBTAINED

A. Certified Weight Scale _____ Calibration date due_____

B. Calculated Independently by More than One Source

1. Source_____ Weight_____

2. Source_____ Weight_____

C. If lift is an existing item (being removed or demolished), the weight must be recalculated, taking into account all modifications, including internal, as well as an Allowance for Scale, Sediment, Sludge, and Insulation. Calculation Work Sheets SHALL be included in the LIFT PLAN and be signed off by a QUALIFIED PERSON. *(When weights are calculated, a 10% tolerance margin shall be added. This value may be increased at the discretion of the Resource Manager).*

D. Shipping Manifests Weight _____ Manufacturer Data Weight _____

DESCRIPTION & <u>WEIGHT OF ALL</u> RIGGING EQUIPMENT & CRANE ATTACHMENTS

Type of slings _____ Rated Capacity _____ Weight _____

Shackles - List size/amount

_____

Lifting Rings

_____

Eyebolts

_____

Riggings
Hooks_____

Load Block/Jib _____

Wire rope; parts of line/pounds per foot_____ / _____

Spreader Bars/Below the Hook Lifting Devices

Rated Capacity_____ Unit Weight_____

Rated Capacity_____ Unit Weight_____

(Must comply with ASME B30.20 Standard for Design, Testing, and Appropriate Markings)

WEIGHT OF OBJECT, RIGGING EQUIPMENT & CRANE ATTACHMENTS

Source_____

Total Weight (U.S.)_____

EQUIPMENT AND LIFT RELATIONSHIP

A. Maximum Operating Radius:_____

B. Planned Operating Radius:_____

C. Allowable load at maximum lift radius anticipated (from Load Chart)

D. Ratio of Lift to Allowable Load_____

E. Clearance between Boom & Lift_____

F. Clearance to Surrounding Facilities/Utilities _____

G. Clear Path for Load Movement:_____

STABILITY OF GROUND AREA

A. Soil Bearing Capacity:_____ Source:_____

B. Mats Required:_____ Size & Number:_____

C. Underground Utilities Location:_____

D. Ratio of Soil Bearing Capacity to Actual:_____

LIFTING OPERATION

A detailed drawing, MUST be included showing the Set-up Area, Lifting Area, Load Placement Area, and Sling Attachment Points w/sling angle reduction factor. A documented Critical Lift Plan or Pre-engineered Lift Procedure, as applicable, shall be included.

INSPECTION OF CONTRACTORS EQUIPMENT

All contractors' Lifting and Rigging Equipment must be inspected before use by a qualified rigger/rigging supervisor/Person in charge (PIC)

LIFT APPROVAL SIGNATURES

Professional Engineer/Qualified Person_____

Person in Charge (PIC) (Critical Lift)_____

Operators of Equipment

_____ /_____

_____ /_____

Responsible Manager or Designee_____

Lift supervisor: Approve0.d:_____**Disapproved:**_____

FINAL APPROVAL SIGNATURE:

Rigging & Crane Resource Manager _____

PRE-LIFT MEETING

Date:_____**Time:**_____**Location:**_____

46.16 Special Lift Operations

46.16.1 Personnel Handling

The use of a crane to hoist employees on a personnel platform is prohibited, except when the use of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous. In addition to the aforementioned requirements for a Critical Lift Plan, the additional conditions for lifting personnel with a crane shall be:

- Crane capacity must be reduced by 50%
- Outriggers must be properly extended with crane leveled (as applicable).
- No lifts shall be made on an auxiliary load line while personnel are suspended on a platform.
- Hooks used shall be of a type that can be closed and locked.
- Boatswains' chairs may be used instead of a personnel platform, if the employer can demonstrate that use of a personnel platform is infeasible due to circumstances at the worksite.
- Fall Protection must be provided per Colonna's Shipyard Inc. and OSHA Standards.
- Follow all manufacturers' recommendations for the use of a boatswains' chair or personnel platform.

46.17 Crane Inspection Requirements

46.17.1 Pre-use (Daily/shift)

A qualified person shall visually inspect and document (same recording criteria as rope inspections) the crane's carrier, controls, rigging and operating mechanism prior to the first operation on any work shift to ensure that all safety items are in proper working order before operation begins. Any unsafe conditions shall be corrected promptly. Defective components of equipment which create an imminent safety hazard shall be replaced, repaired or adjusted prior to use. Daily visual inspections by the operator or other qualified person shall be made of/for:

- All functional mechanisms for maladjustment interfering with proper operation;
- The operation of limit switches without a load on the hook;
- Lines, tanks, valves, pumps, and other parts of air or hydraulic systems for deterioration or leakage;
- Hook with safety latch for deformation, cracks and proper function (follow manufacture's recommendations)
- Hoist or load attachment chains including end connections for excessive wear, twist, distorted or stretched links interfering with proper function;
- Excessive wear, broken wires, stretch, kinking, or twisting of ropes and rope slings, including end connections.

- Crane Pre-Operational Inspection form completed. (Any safety failure the crane must be secured and maintenance notified for repairs before normal operations may resume) *See attached inspection sheet example.

46.17.3 Annual (Comprehensive)
At a minimum the equipment shall be inspected every 12 months by a certificating agency and shall include the following:

- All functional operating mechanisms for improper function, maladjustment, and excessive component wear.
- Safety devices and operational aids for proper operation (including significant inaccuracies).
- Chains and chain drive sprockets for excessive wear of sprockets and excessive chain stretch.
- Travel steering, brakes, and locking devices, for proper operation.
- Tires for damage or excessive wear.
- Hydraulic and pneumatic components for leaks and excessive wear.
- Outrigger or stabilizer pads/floats for excessive wear or cracks.
- Slider pads for excessive wear or cracks.
- Electrical components and wiring for cracked or split insulation and loose or corroded terminations.
- Missing warning labels and decals originally supplied with the equipment by the manufacturer.
- Missing or modified original equipment: operator seat, steps, ladders, handrails, guards.
- Load, boom angle, or other indicators shall be checked for any inaccuracy.
- Rope reeving for compliance with certified agent's recommendations.
- Other examinations deemed necessary under the circumstances.

46.17.4 Modification, Repair, or Severe Use.
Where the severity of use/conditions causes a reasonable probability of damage or excessive wear, the employer shall stop using the equipment and it should be inspected by a qualified person for structural damage.

46.17.5 Crane Inspection Forms

- Forms are maintained by the **Safety Department** for a minimum of 5 years.

46.17.6 General Inspection Procedures

Cranes in Periodic Use:

- A crane or overhead gantry that has not been used for a period of one month or more shall be inspected by the employee trained to use such equipment before each use and the focus for such an inspection is as follows:
- Inspect all functional operating mechanisms
- Check for damage to or leaks from lines, tanks, valves, drain pumps, and air or hydraulic systems
- Check the load hook for deformities or cracks
- Check hoist chains for excessive wear, including end connectors
- Check chains for kinks, twists and distorted links and stretches that are beyond what is recommended by the manufacturer
- Inspect the rope for damage such as kinks, cracks, cutting, bending, broken wires, and unraveling, corroded or improperly connected end connections.

Regardless of how often a crane or overhead gantry is used, the unit shall be inspected annually by an outside contractor qualified to inspect the unit. This inspection shall be the responsibility of the Facilities department to arrange. The contractor shall document and provide the owner with a copy of the findings who will provide copies to Facilities.

Maintenance
Preventive maintenance shall be performed as prescribed by the manufacturer as detailed in the owner's manual. Maintenance of the units shall be performed by personnel qualified to perform maintenance.

Off-Site Crane Use:
If cranes are required for off-site use, Colonna’s Shipyard, Inc. subcontracts the assembly and disassembly of the crane out to a qualified and competent person/vendor.

Colonna's Shipyard, Inc.

Crane (Telescopic Boom) Pre-Operational Inspection

Mfg: Omega | Model # 100 Org | Date: 1/17/17

Check the appropriate box: S = Satisfactory | M = Marginal | U = Unsafe Conditions | NA = Not Applicable

Marginal: Repair Within 1 week | Unsafe Conditions: Repair Immediately

	Conditions	S	M	U	NA	Number item for reference remarks below:
FLUID LEVELS	1. Crankcase Oil	✓				
	2. Coolant	✓				
	3. Hydraulic Oil	✓				
CAB(S)	4. Electrical System	✓				
	5. Service/Parking Brake	✓	✓			
	6. Swing Brake/House Lock	✓				
	7. Gauges		✓		✓	
	8. Housekeeping	✓				
	9. Fire Extinguisher(s)	✓				
	10. Load Chart	✓			✓	
	11. Windows/Mirrors	✓			✓	
FUNCTIONS	12. Travel				✓	
	13. Steering				✓	
	14. Outriggers	✓				
	15. Boom Up/Down	✓				
	16. Boom In/Out	✓				
	17. Hoist(s) Up/Down	✓				
	18. Swing	✓				
SAFETY DEVICES	19. Anti-Two-Block	✓				
	20. LMI/Load Wt. Indicator				✓	
	21. Boom Length Indicator				✓	
	22. Boom Angle Indicator				✓	
	23. Radius Indicator				✓	
	24. Warning Lights/Buzzers				✓	
	25. Back-Up Alarm/Horn				✓	
ACCESSORIES	26. Load Block/Ball/Hook(s)	✓				
	27. Safety Latches	✓				
	28. Wedge Socket(s)	✓				
	29. Sheaves	✓				
	30. Wire Rope Retainers	✓				
	31. Main Boom	✓				
	32. Jib/Extension				✓	
	33. Lift Cylinder(s)	✓				
WORKS	34. Tires/Inflation				✓	
	35. Carrier	✓				
	36. Outriggers	✓				
	37. Machine Guards	✓				
	38. Hoist Brake(s)	✓				
	39. Hoses/Tubing	✓				
	40. Hoist(s)	✓				
	41. Wrapping on Drum(s)	✓				
	42. Rope Reeving	✓				
	43. Wire Rope	✓				

CONSULT operator's manual for additional inspection items

DO NOT operate crane until unsafe conditions are corrected

Operator Signature [signature] Supervisor Signature

Personnel platform/Man Basket criteria.

MAN BASKET SAFETY DO'S AND DON'TS…

Do wear a safety harness when occupying the man basket, with the lanyard attached preferably to the lower load block or overhaul ball or to a structural member within the man basket capable of supporting a fall impact. OSHA regulations require you to "tie on" when occupying a man basket except over water. When working over water a PFD must be worn.

Do wear a hard hat.

Do perform a complete inspection of the man basket before each use.

Do be aware of any clearances required before initiating any crane function **EXAMPLE: OSHA** requires a minimum clearance of 10 feet from any live electrical line up to 50 KV.

Do understand all procedures before using the man basket.

Do perform the required lift/proof test, throughout the full range of the intended lift, every time the crane is set up.

Do use Extreme Caution at all times when using the man basket. Remember, crane manufacturers do not authorize the use of man baskets. A procedure for the use of man basket has been outlined by **OSHA** and **ANSI**. Familiarize yourself with these documents before using the man basket. The use of a man basket must be the safest alternative to access the work.

DO NOT...

Do not use the man basket without first having the crane inspected by a qualified crane inspector.

Do not use a defective or damaged crane.

Do not use a defective or damaged man basket.

Do not breach the require clearance of a live electrical line.

Do not permit unauthorized Personnel to use the man basket.

Do not allow personnel in the man basket with its test weight attached.

Do not permit persons to use this man basket who are not familiar with this procedure or with applicable OSHA and ANSI regulations concerning man baskets and cranes or Derrick's.

Do not attach test weights by any means other than what is recommended by the manufacturer.

Do not attach your safety harness and lanyard to an adjacent structure when occupying the man basket.

Do not sit, stand, or climb on the man basket guardrail. Do not use boards, ladders, other devices, or extensions in the man basket as a work position.

Do not use a man basket as a convenience. **EXAMPLE:** do not use the man basket as an elevator if a Stairway can be used.

Do not use the man basket if the man baskets permanent data plates are missing, defaced, or not legible.

Do not use a man basket has not been first subjected to the required trial lift and proof test.

CRANE REQUIREMENTS...

Hoisting of the Personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or Derrick, or the platform.

Load line shall be capable of supporting, without failure, at least seven times the maximum intended load, except that where rotational resistant rope is used, the line shall be capable of supporting without failure, at least 10 times the maximum intended load. The required design factor is achieved by taking the current safety factor of 3.5 and applying the 50% derating of the capacity.

Load and boom hoist drum brakes, swing brakes, and locking devices such as Pawls or dogs shall be engaged when the occupied Personnel platform is in a stationary working position.

The load line hoist drum shall have a system or device on the power train, other than load hoist brake, which regulates the lower lowering rate of speed of the hoist mechanism (controlled load lowering). Free Falling is prohibited.

The crane shall be uniformly level within 1% of level grade and located on firm footing. Cranes equipped with Outriggers shall have them all fully deployed following manufacturer's specifications, as applicable, when hoisting employees.

The total weight of the loaded Personnel platform and related rigging shall not exceed 50% of the rated capacity for the radius and configuration of the crane or Derrick.

The use of machines having live booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds is prohibited.

INSTRUMENTS & COMPONENTS...

Cranes and Derricks with variable angle booms shall be equipped with a boom angle indicator, readily visible to the operator.

Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the booms extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel.

A positive acting device shall be used which prevents contact between the load block or overhaul ball and the boom tip (anti-two blocking device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two block damage prevention features).

PERSONNEL PLATFORMS…

(A) The Personnel platform and suspension system shall be designed by qualified person competent in structural design.

(B) The suspension system shall be designed to minimize tipping of the platform due to movement of employees occupying the platform.

(C) The Personnel platform itself, except the guardrail system and body harness anchorages, shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load.

PLATFORM SPECIFICATIONS...

(A) Each Personnel platform shall be equipped with a guardrail system which meets the requirements specified by OSHA regulations and shall be enclosed at least from the toeboard to the mid rail with either solid construction or expanded metal having openings no greater than 1/2 inch.

(B) A grab rail shall be installed inside the entire perimeter of the Personnel platform.

(C) Access gates, if installed, shall not swing outward during hoisting.

(D) Access gates, including sliding or folding Gates, shall be equipped with a restraining device to prevent accidental opening.

(E) Headroom shall be provided which allows employees to stand upright in the platform.

(F) In addition to the use of hard hats, employee shall be protected by overhead protection on the Personnel platform when employees are exposed to Falling objects.

(G) All rough edges exposed to contact by employees shall be surfaced or smooth in order to prevent injuries to employees from punctures or lacerations.

(H) All welding of the Personnel platform and its components shall be performed by a qualified welder familiar with the weld grades, types and materials specified in the platform design.

(I) The Personnel platform shall be conspicuously posted with a plate or other permanent marking which indicates the weight of the platform and its rated load capacity or maximum intended load.

PERSONNEL PLATFORM LOADING...

(A) The Personnel platform shall not be loaded in excess of its rated load capacity. When a Personnel platform does not have a Rated load capacity, the Personnel platform shall not be loaded in excess of its maximum intended load.

(B) The number of employees occupying the Personnel platform shall not exceed the number required for the work being performed.

(C) Personnel platform shall be used only for employees, their tools, and the materials necessary to do their work, and shall not be used to hoist only materials or tools when not hoisting personnel.

(D) Materials and tools for use during a personnel lift shall be secured to prevent displacement.

(E) Materials and tools for use during a Personnel lift shall be evenly distributed within the confines of the platform while the platform is suspended.

RIGGING...

(A) When a wire rope Bridle is used to connect a Personnel platform to the load line, each Bridal leg shall be connected to a master link or Shackle in such a manner to ensure that the load is evenly divided among the bridal legs.

(B) Hooks on overhaul ball assemblies, lower Load Blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

(C) Wire rope, shackles, rings, master links, and other rigging Hardware must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings shall be capable of supporting without failure at least seven times the maximum intended load.

(D) All Eyes in wire rope slings shall be fabricated with thimbles.

(E) Bridles and Associated rigging for attaching the Personnel platform to the Hoist line shall be used only for the platform and the necessary employees, their tools and the materials necessary to do their work, and shall not be used for any other purpose when not hoisting personnel.

TRIAL LIFT INSPECTIONS AND PROOF TESTING…

(1) A trial lift with the unoccupied Personnel platform loaded at least to the anticipated lift weight shall be made from ground level, or any other location where employees will enter the platform, to each location at which the Personnel platform is to be hoisted and positioned. This trial lift shall be performed immediately prior to placing Personnel on the platform. The operator shall determine that all systems, controls and safety devices are activated and functioning properly; that no interferences exist; and that all configurations necessary to reach those work locations will allow the operator to remain under the 50% limit of the Hoist's rated capacity. Materials and tools to be used during the actual lift can be loaded in the platform. A single trial lift may be performed at one time for all locations that are to be reached from a single setup position.

(2) The trial lift shall be repeated prior to hoisting employees whenever the crane or Derrick is moved and set up in a new location or returned to a previously used location. Additionally, the trial lift shall be repeated when the lift route is changed unless the operator determines that the route change is not significant.

(3) After the trial lift, and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. Employee shall not be hosted unless the following conditions are determined to exist:

(a) Hoist ropes shall be free of Kinks;

(b) Multiple part lines shall not be twisted around each other;

(c) The primary attachment shall be centered over the platform; and

(d) The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly Seated on drums and in sheaves.

(e) A visual inspection of the crane or Derrick, rigging, personnel platform, and the crane or Derrick base support or ground shall be conducted by a competent person immediately after the trial lift to determine any adverse effect upon any components or structure.

(f) Any defects found during inspection which create a safety hazard shall be corrected before hoisting personnel.

(g) At Each job site, prior to hoisting employees on the Personnel platform, and after any repair or modifications. The platform and rigging shall be proof tested to 125% of the platforms rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform

(this may be done concurrently with the trial lift). After proof testing, a competent person shall inspect the platform and rigging. Any deficiencies found shall be corrected and another proof test shall be conducted until the proof testing requirements are satisfied.

SAFE WORK PRACTICES…

(1) Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning. This does not apply to an occupant that is providing hand signals.

(2) Before employees exit or enter a hoisted Personnel platform that is not landed, platform shall be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe situation.

(3) Taglines shall be used unless their use creates an unsafe condition.

(4) The crane or Derrick operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.

(5) Hoisting of employees shall be promptly discontinued upon indication of any dangerous weather conditions or other impending Danger.

(6) Employees being hoisted shall remain in continuous sight of and in direct communication with the operator or signal person. In those situations where direct visual contact with the operator is not possible, and the use of a signal person would create a greater Hazard for that person, direct communication alone such as By Radio may be used.

(7) Except over water, employees occupy in the Personnel platform shall use a harness system with a lanyard appropriately attached to the lower load block or overhaul ball, or to a structural member within the Personnel platform capable of supporting a fall impact for employees using the Anchorage. When working over water an approved PFD shall be worn.

(8) No lifts shall be made on another of the cranes or Derrick load lines while Personnel are suspended on a platform.

TRAVELING...

(1) Hoisting of employees while the crane is traveling is prohibited, except for portal, tower and locomotive cranes, or were the employer demonstrates that there is no less hazardous way to perform the work.

(2) Under any circumstances where a crane would travel while hoisting personnel, the employer shall implement the following safety procedures to safeguard employees:

(A) Crane travel shall be restricted to a fixed track or Runway;

(B) Travel shall be limited to the load radius of the boom used during the lift; and

(C) A complete trial run shall be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift required.

(D) If travel is done with a rubber tired carrier, the conditions and air pressure of the tires shall be checked. The chart capacities for lifts on rubber shall be used for applications of the 50% reduction of the rated capacity.

PRE-LIFT MEETING…

(1) A meeting attended by the crane operator, signal person, employees to be lifted, and the person responsible for the task to be performed shall be held to review the appropriate requirements of this procedure.

(2) This meeting shall be held prior to the trial lift at each new work location, and shall be repeated for any employees newly assigned to the operation.

WARNINGS...

Never attempt to lengthen or shorten sling legs. Replace sling legs when damaged.

Keep area around eyebolts clear when lifting the man basket off of test weights.

Exercise Extreme Caution to prevent hoisting, swinging, or lowering into or onto any obstructions.

Know the weight of all persons and objects located in or attached to the man basket, do not exceed rated capacity of the man basket.

Know the weight of all load handling devices such as the man basket (see the data plates), load block, overhaul ball, jib and or extension and make the proper deductions according to the crane manufacturers load capacity chart. Do not exceed 1/2 the rated net load of the crane.

(2) It is not recommended than anyone, including but not limited to welding lead, air hose, oxygen acetylene torch rubber, electrical line, etc., be attached to the man basket. However, if it should become necessary to do so, weight **must be known** and included in the weight that may be loaded into the man basket.

COLONNA'S SHIPYARD PRE-USE PERSONNEL HOIST INSPECTION

Crane # _____ Location: _____ Date: _____

# of Trained Personnel Lifted: _____ Approx. Weight: _____

Reason for Lift: _____

INITIAL	SECTION/ITEM INSPECTED	SAT	UNSAT	N/A	COMMENTS
	Master Link(s) (Cracks, deformed)				
	Slings (ID tag, condition, weight)				
	Sling Eyes and swage upper end fitting (Deformed, damaged)				
	Swaged lower end fitting (Deformed)				
	Shackles/Cotter Pins (Proper pins, rated for load, pins intact)				
	Data Plate (weight, limit, intact)				
	Frame (bent, cracks, welds, damage)				
	Top Guard Rails (bent, welds)				
	Inner Grab Rail (bent, welds)				
	Mid Rail (bent, welds)				
	Access gate lock and hinges (closes, hinges, locks)				
	Perforated Panels (trash, debris, damage)				
	Floor grating (trash, debris, damage)				
	Toe boards (intact)				
	Test weight (attachments)				
	Test weight Attachment Point (intact)				

CRANE SET UP

INITIAL	SECTION/ITEM INSPECTED	SAT	UNSAT	N/A	COMMENTS
	Crane has been leveled and outriggers fully deployed.				
	Total weight of the load does not exceed 50% of rated capacity of the crane.				
	Two means of controlling decent of platform are available to prevent free fall. Brakes and another automatic means.				
	Variable angled booms must have boom angle indicator.				
	Telescoping boom have boom length clearly indicated.				
	Anti-two-blocking device which prevents load block and boom tip contact				

CRANE SET UP (Cont.)

INITIAL	SECTION/ITEM INSPECTED	SAT	UNSAT	N/A	COMMENTS
	Load line has device which regulates the lowering rate of speed. Prevent free fall.				
	When wire rope bridle/rigging is used it must be connected to a master link, not directly to the personnel platform.				
	Hook on overhaul ball must be closed and locked.				

TRIAL LIFT PROOF TESTING

INITIAL	SECTION/ITEM INSPECTED	SAT	UNSAT	N/A	COMMENTS
	Trial lift with the unoccupied personnel platform loaded to anticipated weight.				
	Platform lifted to each location at which the personnel platform is to be hoisted.				
	Hoist ropes are free of kinks and multiple part line is not twisted around each other.				
	No slack in load rope around drums.				
	Visual inspection of platform and crane after trial lift test looking for defects.				
	At each job site, prior to hoisting employees on the platform, it must be tested to 125% of platform rated capacity by holding it in a suspended position for **FIVE** minutes.				

Inspected by (print): _____ Date: _____

Inspected by (signature): _____

Supervisor (Print/Initial): _____ I certify the above inspection is complete and the lift may proceed.

COLONNA'S SHIPYARD INC
www.colonnashipyard.com

Date: _____

Time: _____

COLONNA DOWN RIVER DIVISION · NORFOLK BARGE CO. · STEEL AMERICA www.steelamerica.net · TRADE TEAM