

Rigging, Crane and Hoist Safety

Purpose:

Many types of cranes, hoists, and rigging devices are used at Pagoda Electrical, Inc. for lifting and moving materials. It is Pagoda Electrical, Inc.'s policy is to maintain a safe workplace for its employees; therefore, it cannot be overemphasized that only qualified and licensed individuals shall operate these devices.

The safety rules and guidance in this chapter apply to all operations at Pagoda Electrical, Inc. that involve the use of cranes and hoists installed in or attached to buildings and to all Pagoda Electrical, Inc. employees, supplemental labor, and subcontractor personnel who use such devices.

Responsibilities:

Supervisors are responsible for:

- Ensuring that employees under their supervision receive the required training and are certified and licensed to operate the cranes and hoists in their areas.
- Providing training for prospective crane and hoist operators. This training must be conducted by a qualified, designated instructor who is a licensed crane and hoist operator and a full-time employee.
- Evaluating crane and hoist trainees using the Crane Safety Checklist and submitting the Qualification Request Form to the Safety Office to obtain the operator's license.
- Ensuring that hoisting equipment is inspected and tested monthly by a responsible individual and that rigging equipment is inspected annually.

Crane and Hoist Operators are responsible for:

- Operating hoisting equipment safely.
- Conducting functional tests prior to using the equipment.
- Selecting and using rigging equipment appropriately.
- Having a valid operator's license on their person while operating cranes or hoists.

- Participating in the medical certification program, as required.
- Equipment will not be operated within 10 feet of energized electrical transmission lines or distribution lines.
- Ensuring that a fire extinguisher, rated at least 5BC, shall be located in the cab of the crane

Maintenance Department is responsible for:

- Performing annual maintenance and inspection of all Pagoda Electrical, Inc. cranes and hoists that are not covered by a program with maintenance responsibility.
- Conducting periodic and special load tests of cranes and hoists.
- Maintaining written records of inspections and tests, and providing copies of all inspections and test results to facility managers and building coordinators who have cranes and hoists on file.
- Inspecting and load testing cranes and hoists following modification or extensive repairs (e.g., a replaced cable or hook, or structural modification.)
- Scheduling a non-destructive test and inspection for crane and hoist hooks at the time of the periodic load test, and testing and inspecting before use new replacement hooks and other hooks suspected of having been overloaded. The evaluation, inspection, and testing may include, but are not limited to visual, dye penetrant, and magnetic particle techniques referenced in ASME B30.10 (Hooks, Inspection and Testing.)
- Maintaining all manuals for cranes and hoists in a central file for reference.

Safety Department is responsible for

- Conducting training for all Crane & Hoist Operators
- Issuing licenses to Crane and Hoist Operators
- Periodically verifying monthly test and inspection reports.
- Interpreting crane and hoist safety rules and standards.

Safe Operating Requirements:

All workers who use any Pagoda Electrical, Inc. crane or hoist shall have an operator's license. Pagoda Electrical, Inc. issues licenses for authorized employees who have been specifically trained in crane and hoist operations and equipment safety.

New Training Requirements: 1926.20 (b)(4)

By November 10, 2014 in all states, crane and derrick operators must be certified, qualified, or meet the criteria for operator-in-training before they are allowed to operate such equipment. This certification/qualification requirement will be achieved by one of the following methods:

1. Certification by a State or Federally accredited crane operator testing/training organization
2. Qualification by an audited employer program
3. Qualification by the US Military
4. Licensing by a government entity

Pagoda Electrical, Inc. will ensure the above is done and will bear the full cost of all training and certification.

Crane and Hoist Operators

To be qualified as a Crane and Hoist Operator, the candidate shall also have received hands-on training from a licensed, qualified crane and hoist operator designated by the candidate's supervisor. Upon successful completion of training, the licensed crane and hoist operator and the candidate's supervisor will fill out and sign the Qualification Request Form and Crane Safety Checklist and send them to the Safety Office for approval. The candidate will be issued a license upon approval by the Safety Manager. Crane and Hoist Operators must renew their license every three years by satisfying the requirements described above.

Crane and Hoist Safety Design Requirements:

Following are the design requirements for cranes and hoists and their components:

- The design of all commercial cranes and hoists shall comply with the requirements of ASME/ANSI B30 standards and Crane Manufacturer's Association of America standards (CMAA-70 and CMAA-74). Pagoda Electrical, Inc.'s fabricated lifting equipment shall comply with the requirements in Chapter 2.2 (Lifting Equipment) of Mechanical Engineering Design Safety Standards (latest edition).
- All crane and hoist hooks shall have safety latches.
- Hooks shall not be painted (or re-painted) if the paint previously applied by the manufacturer is worn.
- Crane pendants shall have an electrical disconnect switch or button to open the main-line control circuit.

- Cranes and hoists shall have a main electrical disconnect switch. This switch shall be in a separate box that is labeled with lockout capability.
- Crane bridges and hoist monorails shall be labeled on both sides with the maximum capacity.
- Each hoist-hook block shall be labeled with the maximum hook capacity.
- Directional signs indicating N-W-S-E shall be displayed on the bridge underside, and a corresponding directional label shall be placed on the pendant.
- A device such as an upper-limit switch or slip clutch shall be installed on all building cranes and hoists. A lower-limit switch may be required when there is insufficient hoist rope on the drum to reach the lowest point.
- All cab and remotely operated bridge cranes shall have a motion alarm to signal bridge movement.
- All newly installed cranes and hoists, or those that have been extensively repaired or rebuilt structurally, shall be load tested at 125% capacity prior to being placed into service. If an overload device is installed, a load test to the adjusted setting is required.
- Personnel baskets and platforms suspended from any crane shall be designed in accordance with the specifications in 29 CFR 1926.550(g).

General Safety Rules:

Operators shall comply with the following rules while operating the cranes and hoists:

- Do not engage in any practice that will divert your attention while operating the crane.
- Respond to signals only from the person who is directing the lift, or any appointed signal person. Obey a stop signal at all times, no matter who gives it.
- Do not move a load over people. People shall not be placed in jeopardy by being under a suspended load. Also, do not work under a suspended load unless the load is supported by blocks, jacks, or a solid footing that will safely support the entire weight. Have a crane or hoist operator remain at the controls or lock open and tag the main electrical disconnect switch.
- All employees shall be kept clear of loads about to be lifted and of suspended loads.
- Ensure that the rated load capacity of a crane's bridge, individual hoist, or any sling or fitting is not exceeded. Know the weight of the object being lifted or use a dynamometer or load cell to determine the weight.

- Check that all controls are in the OFF position before closing the main-line disconnect switch.
- If spring-loaded reels are provided to lift pendants clear off the work area, ease the pendant up into the stop to prevent damaging the wire.
- Avoid side pulls. These can cause the hoist rope to slip out of the drum groove, damaging the rope or destabilizing the crane or hoist.
- To prevent shock loading, avoid sudden stops or starts. Shock loading can occur when a suspended load is accelerated or decelerated, and can overload the crane or hoist. When completing an upward or downward motion, ease the load slowly to a stop.

Operation Rules:

Pre-operational Test

At the start of each work shift, operators shall do the following steps before making lifts with any crane or hoist:

1. Test the upper-limit switch. Slowly raise the unloaded hook block until the limit switch trips.
2. Visually inspect the hook, load lines, trolley, and bridge as much as possible from the operator's station; in most instances, this will be the floor of the building.
3. If provided, test the lower-limit switch.
4. Test all direction and speed controls for both bridge and trolley travel.
5. Test all bridge and trolley limit switches, where provided, if operation will bring the equipment in close proximity to the limit switches.
6. Test the pendant emergency stop.
 7. Test the hoist brake to verify there is no drift without a load.
 8. If provided, test the bridge movement alarm.
 9. Lock out and tag for repair any crane or hoist that fails any of the above tests.

Moving a Load

- Center the hook over the load to keep the cables from slipping out of the drum grooves and overlapping, and to prevent the load from swinging when it is lifted. Inspect the drum to verify that the cable is in the grooves.

- Use a tag line when loads must traverse long distances or must otherwise be controlled.
Manila rope may be used for tag lines.
- Plan and check the travel path to avoid personnel and obstructions.
- Lift the load only high enough to clear the tallest obstruction in the travel path.
- Start and stop slowly.
- Land the load when the move is finished. Choose a safe landing.
- Never leave suspended loads unattended. In an emergency where the crane or hoist has become inoperative, if a load must be left suspended, barricade and post signs in the surrounding area, under the load, and on all four sides. Lock open and tag the crane or hoist's main electrical disconnect switch.

Parking a Crane or Hoist

- Remove all slings and accessories from the hook. Return the rigging device to the designated storage racks.
- Raise the hook at least 2.1 m (7 ft) above the floor.
- Store the pendant away from aisles and work areas, or raise it at least 2.1 m (7 ft) above the floor.
- Place the emergency stop switch (or push button) in the OFF position.

Rigging:

Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe.

Defective rigging equipment shall be removed from service. Defective equipment shall not be used and shall be removed from service immediately.

Rigging equipment shall not be loaded in excess of its recommended safe working load. Load identification shall be permanently attached to the rigging.

Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

General Rigging Safety Requirements:

Do not move a load over people. People shall not be placed in jeopardy by being under a suspended load. Also, do not work under a suspended load unless the load is supported by blocks, jacks, or a solid footing that will safely support the entire weight. Have a crane or hoist operator remain at the controls or lock open and tag the main electrical disconnect switch.

All employees shall be kept clear of loads about to be lifted and of suspended loads.

Only select rigging equipment that is in good condition. All rigging equipment shall be inspected annually; defective equipment is to be removed from service and destroyed to prevent inadvertent reuse. The load capacity limits shall be stamped or affixed to all rigging components.

Pagoda Electrical, Inc. policy requires a minimum safety factor of 5 to be maintained for wire rope slings. The following types of slings shall be rejected or destroyed:

- Alloy steel chain slings with
 - Cracked, bent, or elongated links or components.
 - Cracked hooks.
 - Shackles, eye bolts, turnbuckles, or other components that are damaged or deformed.

Pagoda Electrical, Inc. policy requires a minimum safety factor of 5 to be maintained for wire rope slings. The following types of slings shall be rejected or destroyed:

- Nylon slings with
 - Abnormal wear.
 - Torn stitching.
 - Broken or cut fibers.
 - Discoloration or deterioration.
- Wire-rope slings with
 - Kinking, crushing, bird-caging, or other distortions.
 - Evidence of heat damage.
 - Cracks, deformation, or worn end attachments.
 - Six randomly broken wires in a single rope lay.
 - Three broken wires in one strand of rope.

- Hooks opened more than 15% at the throat.
- Hooks twisted sideways more than 10deg. from the plane of the unbent hook.

Rigging a Load

Do the following when rigging a load:

- Determine the weight of the load. Do not guess.
- Determine the proper size for slings and components.
- Do not use manila rope for rigging.
- Make sure that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
- Make sure that ordinary (shoulderless) eye bolts are threaded in at least 1.5 times the bolt diameter.
- Use safety hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
- Pad sharp edges to protect slings. Remember that machinery foundations or angle-iron edges may not feel sharp to the touch but could cut into rigging when under several tons of load. Wood, tire rubber, or other pliable materials may be suitable for padding.
- Do not use slings, eye bolts, shackles, or hooks that have been cut, welded, or brazed.
- Install wire-rope clips with the base only on the live end and the U-bolt only on the dead end. Follow the manufacturer's recommendations for the spacing for each specific wire size.
- Determine the center of gravity and balance the load before moving it.
- Initially lift the load only a few inches to test the rigging and balance.

Use of Taglines:

Tag lines shall be used unless their use creates an unsafe condition.

Safety Latches:

All crane and hoist hooks shall have safety latches. 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.

Crane Overloading:

Cranes or hoists shall not be loaded beyond their rated capacity for normal operations.

Any crane or hoist suspected of having been overloaded shall be removed from service

by locking open and tagging the main disconnect switch. Additionally, overloaded

cranes shall be inspected, repaired, load tested, and approved for use before being

returned to service.

Working at Heights on Cranes or Hoists:

Anyone conducting maintenance or repair on cranes or hoists at heights greater than (4 ft) shall use fall protection. OSHA regulations state (6 ft) but Pagoda Electrical, Inc. is more conservative and requires protection at (4 ft). Fall protection includes safety harnesses that are fitted with a lifeline and securely attached to a structural member of the crane or building or properly secured safety nets.

Use of a crane as a work platform should only be considered when conventional means of reaching an elevated worksite are hazardous or not possible. Workers shall not ride a moving bridge crane without an approval from the Safety Office, which shall specify the following as a minimum:

- Personnel shall not board any bridge crane unless the main disconnect switch is locked and tagged open.



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- Personnel shall not use bridge cranes without a permanent platform (catwalk) as work platforms. Bridge catwalks shall have a permanent ladder access.
- Personnel shall ride seated on the floor of a permanent platform with approved safety handrails, wear safety harnesses attached to designated anchors, and be in clear view of the crane operator at all times.
- Operators shall lock and tag open the main (or power) disconnect switch on the bridge catwalk when the crane is parked.

Hand Signals

Signals to the operator shall be in accordance with the standard hand signals unless voice communications equipment (telephone, radio, or equivalent) is used. Signals shall be discernible or audible at all times. Some special operations may require addition to or modification of the basic signals. For all such cases, these special signals shall be agreed upon and thoroughly understood by both the person giving the signals and the operator, and shall not be in conflict with the standard signals. See Common Hand Signals at end of chapter.

Inspection, Maintenance, and Testing:

All tests and inspections shall be conducted in accordance with the manufacturer's recommendations.

Monthly Tests and Inspections

All in-service cranes and hoists shall be inspected monthly and the results documented on Pagoda Electrical, Inc.'s Crane and Hoist Inspection Form

Defective cranes and hoists shall be locked and tagged "out of service" until all defects are corrected. The inspector shall initiate corrective action by notifying the facility manager or building coordinator.

Annual Inspections

The Maintenance Department shall schedule and supervise (or perform) annual preventive maintenance (PM) and annual inspections of all cranes and hoists. The annual PM and inspection shall cover :

- Hoisting and lowering mechanisms.
- Trolley travel or monorail travel
- Bridge travel.
- Limit switches and locking and safety devices.
- Structural members.
- Bolts or rivets.
- Sheaves and drums.
- Parts such as pins, bearings, shafts, gears, rollers, locking devices, and clamping devices.
- Brake system parts, linings, pawls, and ratchets.
- Load, wind, and other indicators over their full range.
- Gasoline, diesel, electric, or other power plants.
- Chain-drive sprockets.
- Crane and hoist hooks.
- Electrical apparatus such as controller contractors, limit switches, and push button stations.
- Wire rope.
- Hoist chains.

Load Testing:

- Newly installed cranes and hoists shall be load tested at 125% of the rated capacity by designated personnel.
- Slings shall have appropriate test data when purchased. It is the responsibility of the purchaser to ensure that the appropriate test data are obtained and maintained.
- Re-rated cranes and hoists shall be load tested to 125% of the new capacity if the new rating is greater than the previous rated capacity.
- Fixed cranes or hoists that have had major modifications or repair shall be load tested to 125% of the rated capacity.
- Cranes and hoists that have been overloaded shall be inspected prior to being returned to service.
- Personnel platforms, baskets, and rigging suspended from a crane or hoist hook shall be load tested initially, then re-tested annually thereafter or at each new job site.

- All cranes and hoists with a capacity greater than 2722 kg (3 tons) should be load tested every four years to 125% of the rated capacity. Cranes and hoists with a lesser capacity should be load tested every eight years to 125% of the rated capacity.
- All mobile hoists shall be load tested at intervals to be determined by referencing the manufacturer's recommendations or as determined by the Safety and Health Manufacturer.

Records:

The Maintenance Department shall maintain records for all cranes, hoist and rigging equipment.

Two Resources to Check before Rigging and Signaling:

OSHA Qualified Rigger Fact Sheet: <https://www.osha.gov/Publications/cranes-qualified-rigger-factsheet.pdf>

OSHA Signal Person Fact Sheet: <https://www.osha.gov/Publications/cranes-signal-person-factsheet.pdf>

Crane & Hoist Operator License

Operator's name: _____ **Employee No:** _____

Job Title _____ **Dept./Div.:** _____

SUPERVISORS please note that by completing and signing this form, you are certifying that the operator

1. Is required to operate a crane or hoist as part of his/her job assignment.
2. Has completed Crane Operation & Safety Training on _____
3. Has had on-the-job training for a period of ____ months operating a crane or hoist
under supervision.
4. Has been evaluated using the Safety Checklist and Is capable of operating a crane or
hoist and making lifts safely.

Supervisor: _____

**Forward the completed form to Safety Office for approval.
Attach Safety Checklist.**

Safety Office Approval: _____ **Date:** _____

Safety Checklist for Crane and Hoist Operator Qualification

A licensed operator, certified to operate the type of equipment for which the new operator is being evaluated, shall complete this checklist by initialing each item in the space provided to indicate that the new operator has demonstrated knowledge in the particular area or by marking "NA" for items that do not apply. Both the licensed operator and new operator's supervisor shall sign the completed checklist.

Operator's Name: _____ *Date completed:* _____

_____ 1. Describe the difference between a bridge crane and a hoist. (A bridge crane operates on two tracks; a hoist operates on a single monorail track.)

_____ 2. Why is a bridge crane more versatile than a hoist? (The bridge crane has 4-way horizontal movement, while a hoist has only 2-way horizontal movement.)

_____ 3. What are the components of a bridge crane? (Bridge, trolley, hoist drum, hoist cables, hoist block and hook, pendant, stops, bumpers, and limit switches.)

_____ 4. What are the standard markings used on a bridge crane control pendant? (Raise, lower, trolley east, trolley west, bridge north, bridge south, on/off switch.)

_____ 5. Why are on/off switches required on control pendants? (For emergency stops in the event that any of the pendant controls fails.)

_____ 6. If a crane's bridge, trolley, and hoist have more than one speed, describe the proper lifting procedures. (Start with the slowest speed and progressively Increase to the highest.)

_____ 7. Explain the term "drum overlapping," as it pertains to a bridge crane, and the primary cause of overlapping. (The hoist cables will not lie properly in the grooves on the hoist drum If the operator does not center the hook over the load and start lifting the load from an angle.)

_____ 8. When should a bridge crane be checked for drum overlapping? (Prior to each use.)

_____ 9. How many wraps of wire must still be on the hoist drum when the hoist hook reaches the lowest working level in the work area? (No less than two full wraps of wire must be left on the hoist drum.)

_____ 10. Which hoists are required to have upper-limit switches, and how often these switches should be tested? (All motor-driven bridge cranes and hoists are required to have upper-limit switches, and they must be tested each day the crane is used.)

_____ 11. When are lower-limit switches required? (In any area that has lower working levels (e.g., pits). Hoists that do not have enough wire on the drum to lower the hook to the lowest level and maintain at least two full wraps of wire on the drum must be fitted with lower-limit switches.)

_____ 12. Should limit switches be depended upon to stop the hoist movement? (Never. Limit switches are installed for safety only, and no operator should depend upon them for normal stopping.)

_____ 13. Where is the main electric disconnect for the bridge crane or hoist located? (Normally, a separate disconnect switch is located in a wall-mounted box with lockout capability.)

_____ 14. What are the proper procedures for cranes found to be defective (e.g., the upper-limit switch does not operate, a pendant control fails, the hoist does not hold the load)? (Report the defect to the supervisor Immediately, lock out and tag the crane's main electrical disconnect switch, report the defect to Maintenance Department)

_____ 15. Are movement alarms required on pendant-operated bridge cranes? (Alarms are not required; however, if a crane is fitted with a movement alarm, it must be maintained in working condition.)

_____ 16. Is a written, signed inspection report required for all bridge cranes and hoists, and who should complete that report? (The inspection is completed monthly by a responsible individual assigned by the supervisor and documented on the Monthly Inspection Report Form)

_____ 17. Explain the action required if there is a hoist brake drift when the hoist stops with a load suspended. (There should be no hoist drift; if there is, the brake is not holding and should be reported to the Maintenance Department)

_____ 18. Why is the hook always centered over the load? (To prevent drum overlapping and stress on the hoist and lifting fixtures.)

_____ 19. At what height should a load be lifted when it is being moved. (Only lift a load high enough to clear all obstructions in its path. Never move a load over personnel or costly equipment.)

_____ 20. When it is permissible to leave a load suspended on a crane hook, and who should be notified if mechanical problems prevent landing the load? (It is never permissible to leave a load suspended. The load must be landed and the slings removed from the hook. If there are mechanical problems, the maintenance department must be notified.)

_____ 21. Describe the procedures for parking a crane. (Remove all accessories from the hook, raise the hook 2.1 m (7 ft) above the floor level, store the pendant clear off work areas or aisles or 2.1 m above the floor level if the crane is fitted with a pendant-retracting reel, and place the stop switch in the OFF position.)

_____ 22. Can a person work under a suspended load? (Never. Unless the load is supported by blocks or jacks.)

_____ 23. Can operators exceed the maximum capacity of a crane or hoist? (An operator shall never exceed the maximum capacity marked on both sides of the bridge or monorail for a hoist.)

_____ 24. What is the minimum safety factor for slings? (The safety factor for slings is 5 to 1.)

_____ 25. What precautions should be taken when using wire-rope slings or synthetic-webbing slings? (Protect the slings from sharp edges by using padding. This is especially important when using synthetic-webbing slings.)

_____ 26. Explain the proper procedure to follow if a synthetic sling is too short. (Use a shackle to join the two slings together. Never tie a knot in a sling, as this will weaken it considerably.)

_____ 27. What precautions should be taken when using eye bolts as lifting fixtures? (Ordinary eye bolts should only be used for straight pulls and must have a minimum of 1-1/2 times the bolt diameter threaded into the load. Shoulder-type eye bolts must have the shoulder tightly secured against a flat surface. The safe working load of an eye bolt decreases rapidly as the angle of the pull increases. Safety hoist or swivel rings are preferred and recommended.)

_____ 28. Describe the proper installation procedures for wire-rope clips. (The saddle of the clip must always rest on the part of the wire that will hold the load and take the stress. The U-bolt part of the clip must rest against the dead end of the rope. The nuts must be tightened with a torque wrench to the clip manufacturer's settings.)

_____ 29. What effect will a kink in a wire rope cause? (A kink weakens the wire considerably. Any wire rope with a kink must be cut up and discarded to prevent reuse.)

Licensed Crane and Hoist Operator: _____

Supervisor: _____

Common Hand Signals

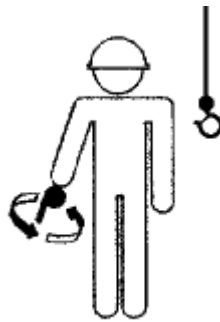
Hoist: With forearm vertical, forefinger pointing up, move the hand in a small horizontal circle.

Lower: With an arm extended downward, forefinger pointing down, move the hand in small horizontal circles.

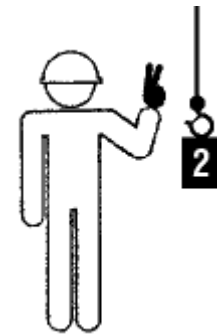
Multiple Trolleys: Hold up one finger for block marked "1" and two fingers for a block marked "2." Regular signals follow.



Hoist



Lower

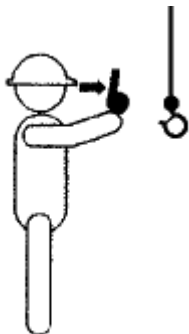


Multiple Trolleys

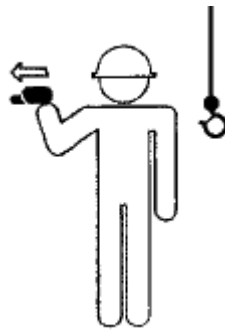
Bridge Travel: Arm extended forward, hand open and slightly raised, make a pushing motion in direction of travel.

Trolley Travel: Palm up, fingers closed, thumb pointing in direction of motion, jerk the hand horizontally.

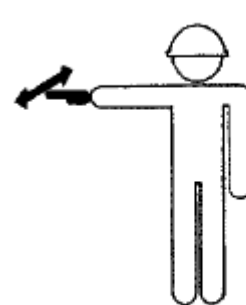
Stop: Arm extended, palm down, crossing chest, back and forth.



Bridge Travel



Trolley Travel

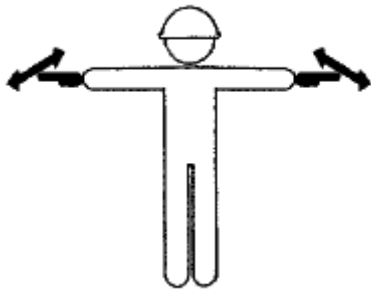


Stop

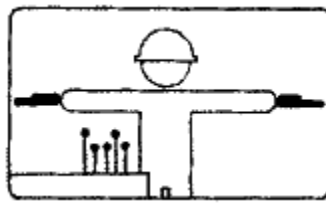
Emergency Stop: Arms extended, palm down, move the hands rapidly crossing chest, back and forth.

Magnet Is Disconnected! : Crane operator spreads both hands apart, palms up.

Dog Everything: Clasp hands in front of the body. Means **PAUSE**. This signal can be used on potentially risky occasions such as when it has started raining, when the load doesn't fit the space for which it was planned, or when a bystander gets too close to the action.



Emergency Stop



Magnet is Disconnected!



Dog Everything

What are some common hand signals for crawler, truck and locomotive cranes?

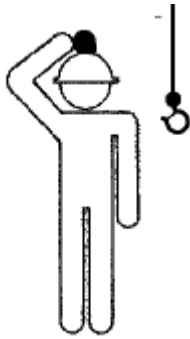
Use Main Hoist: Tap fists on head; then use regular signals.

Use Whip Line (Auxiliary Hoist): Tap elbows with one hand; then use regular signals.

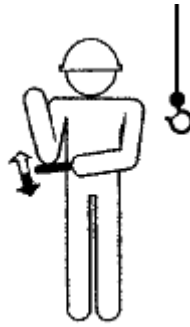
Raise Boom: Arm extended, fingers closed, thumb pointing upward.

Lower Boom: Arm extended, fingers closed, thumb pointing downward.

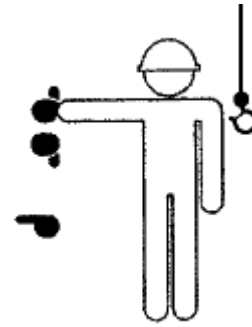
Swing: Point with a finger in direction of swing of a boom.



Use Main Hoist



Use Whip Line

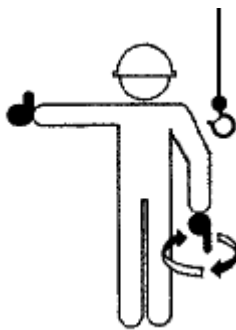


Raise Boom; Lower Boom;
Swing

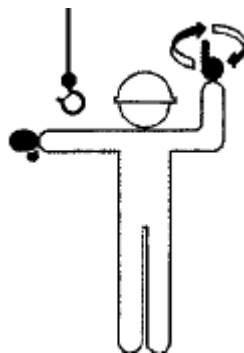
Raise the Boom and Lower the Load: Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.

Lower the Boom and Raise the Load: Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate the hand in horizontal circles.

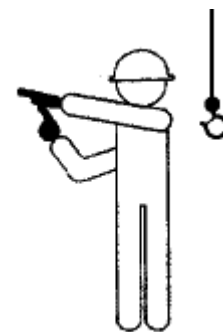
Move Slowly: Use one hand to give any motion signal and place the other hand motionless in front of the hand giving the motion signal. (Hoist Slowly shown as example.)



Raise the Boom and Lower the Load



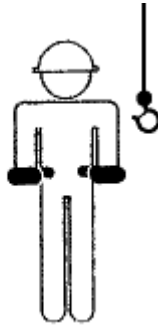
Lower the Boom and Raise the Load



Move Slowly

Retract Boom (Telescoping Booms): Both fists in front of body with thumbs pointing toward each other.

Extend Boom (Telescoping Booms): Both fists in front of body with thumbs pointing outward.



Retract Boom



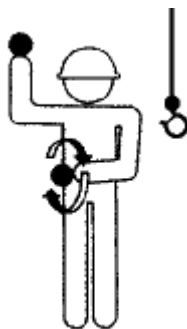
Extend Boom

What are some signals for crawler cranes only?

Lock Track: this side as indicated by raised fist.

Turn Travel Track: this side in direction shown by revolving fist.

Travel Both Tracks: forward or backward by revolving fists.



Lock Track
Turn Travel Track



Travel Both Tracks

References

OSHA Qualified Rigger Fact Sheet: <https://www.osha.gov/Publications/cranes-qualified-rigger-factsheet.pdf>

OSHA Signal Person Fact Sheet: <https://www.osha.gov/Publications/cranes-signal-person-factsheet.pdf>

ASME/ANSI B30.2, "Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)."

ASME/ANSI B30.9, "Slings."

ASME/ANSI B30.10, "Hooks."

ASME/ANSI B30.11, "Monorails and Underhung Cranes."

ASME/ANSI B30.16, "Overhead Hoists (Underhung)."

ASME/ANSI B30.17, "Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)."

ASME/ANSI B30.20, "Below-the-Hook Lifting Devices."

ASME/ANSI B30.21, "Manually Lever Operated Hoists."

Code of Federal Regulation, Title 29, Part 1910.179, "Overhead and Gantry Cranes."

Code of Federal Regulation, Title 29, Part 1910.184, "Slings."

Code of Federal Regulation, Title 29, Part 1926.550, "Cranes and Derricks."

Mechanical Engineering Department Design Safety Standards, Chapter 2.2, "Lifting equipment."

CMAA Specification No. 70, Specifications for Electric Overhead Traveling Cranes.

CMAA Specification No. 74, Specifications for Top-Running and Under-Running Single-Girder Electric Overhead Traveling Cranes Utilizing Under Running Trolley Hoist.

NFPA 70, Article 610, Cranes and Hoists.