

# Great Western Painting

## Cranes

### CRANES AND DERRICKS IN CONSTRUCTION

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**Note: Critical Power Line Safety Information found on Page 18, below.**

Subpart CC, Cranes and Derricks in Construction, applies to power-operated equipment, and their attachments, that can hoist, lower and horizontally move a suspended load.

Exclusions to this standard include, but are not limited to:

1. Power-operated equipment that has been converted or adapted for a non-hoisting/lifting use.
2. Power shovels, excavators, wheel loaders, backhoes, loader backhoes, track loaders.
3. Machinery originally designed as vehicle-mounted aerial devices (for lifting personnel) and self-propelled elevating work platforms.
4. Powered industrial trucks (forklifts), except when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load.
5. Articulating/knuckle-boom truck cranes that deliver material to a construction site when used to transfer materials from the truck crane to the ground, without arranging the materials in a particular sequence for hoisting.
6. Articulating/knuckle-boom truck cranes that deliver material to a construction site when the crane is used to transfer building supply sheet goods or building supply packaged materials from the truck crane onto a structure, using a fork/cradle at the end of the boom, but only when the truck crane is equipped with a properly functioning automatic overload prevention device. Such sheet goods or packaged materials include, but are not limited to: sheets of sheet rock, sheets of plywood, bags of cement, sheets or packages of roofing shingles, and rolls of roofing felt.

**Note: The above articulating/knuckle-boom crane exclusion does not apply when it is used to 1) hold, support or stabilize the material to facilitate a construction activity, such as holding material in place while it is attached to the structure; 2) when the material being handled is a prefabricated component such as precast concrete members or panels, roof trusses, prefabricated building sections such as, but not limited to: floor panels, wall panels, roof panels, roof structures, or similar items; and, 3) when the material being handled by the crane is a structural steel member (for example, steel joists, beams, columns, steel decking (bundled or unbundled) or a component of a systems-engineered metal building.**

### **Required Actions Prior to Assembly:**

Prior to assembly of a crane, care must be taken to ensure ground conditions are appropriate for the crane and other hazards, specifically, electrical hazards, are eliminated.

## Ground Conditions

**Note: Ground conditions means the ability of the ground to support the equipment (including slope, compaction, and firmness).**

Equipment must not assembled or used unless the ground conditions are firm drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met.

**Note: The requirement for the ground to be drained does not apply to marshes/wetlands.**

## Assembly/Disassembly

The assembly/disassembly of equipment must be directed by a competent and qualified person.

**Note: Competent Person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them.**

**Note: one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.**

As a matter of course, the manufacturer's procedures and prohibitions must be complied with when assembling and disassembling equipment.

## Hazard Assessments and Precautions Inside the Work Zone:

**See: Critical Power Line Safety Information found on Page 32, below.**

Before beginning equipment operations, the qualified person must **identify the work zone** by either:

1. Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or
2. Defining the work zone as the area 360 degrees around the equipment up to the equipment's maximum working radius.

The **hazard assessment must determine** if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line.

If so, the qualified person must meet the requirements in Option (1), Option (2), or Option (3) as follows:

### **Option (1) Deenergize and ground:**

Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the worksite.

### **Option (2) – 20 foot clearance:**

Ensure that no part of the equipment, load line or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures found in “preventing encroachment”, below.

### **Option (3) – Table A clearance:**

1. Determine the line’s voltage and the minimum clearance distance permitted under Table A.

**TABLE A—MINIMUM CLEARANCE DISTANCES**

| <b>Voltage<br/>(nominal, kV,<br/>alternating current)</b> | <b>Minimum clearance distance<br/>(feet)</b>   |
|---|--|
| up to 50  | 10   |
| over 50 to 200  | 15   |
| over 200 to 350   | 20   |
| over 350 to 500   | 25   |
| over 500 to 750   | 35   |
| over 750 to 1,000   | 45   |
| over 1,000  | (as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution). |

**Note:** The value that follows “to” is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

2. Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A .

If so, the qualified person must ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

**Note: Voltage information. Where Option (3) of is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of our request.**

### **Preventing encroachment/electrocution:**

Where encroachment precautions are required under Option (2), or Option (3), above, the following requirements must be met:

1. A planning meeting will be conducted with the operator other workers who will be in the area of the equipment or load to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.

2. If tag lines are used, they must be non-conductive.
3. We will erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option (2) of this section) or at the minimum approach distance under Table A (see §1926.1408) (if using Option (3) of this section). If the operator is unable to see the elevated warning line, a dedicated spotter must be used in addition to implementing **at least one of the one of the measures described below**.
  - 1) A proximity alarm set to give the operator sufficient warning to prevent encroachment.
  - 2) Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:
    - a. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: a clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of sight landmarks.
    - b. Be positioned to effectively gauge the clearance distance.
    - c. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
    - d. Give timely information to the operator so that the required clearance distance can be maintained.
  - 3) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
  - 4) A device that automatically limits range of movement, set to prevent encroachment.
  5. An insulating link/device [defined as “an insulating device listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7”] installed at a point between the end of the load line (or below) and the load.

### **Operations Below Power Lines:**

1. No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the qualified person has confirmed that the utility owner/ operator has deenergized and (at the worksite) visibly grounded the power line.
2. The qualified person must assume that all power lines are energized unless the utility owner/operator confirms that the power line has

been and continues to be deenergized and visibly grounded at the worksite.

3. There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

### **Post-assembly:**

Upon completion of assembly, the equipment must be inspected by a qualified person to assure that it is configured in accordance with manufacturer equipment criteria.

### **Rigging:**

In addition to following the requirements in 29 CFR 1926.251 and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, we must ensure that:

1. The rigging work is done by a qualified rigger.
2. Synthetic slings are protected from: abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression. NOTE: Requirements for the protection of wire rope slings are contained in 29 CFR 1926.251(c)(9).
3. When synthetic slings are used, the synthetic sling manufacturer's instructions, limitations, specifications and recommendations must be followed.

### **Inspections:**

**Note: Any part of a manufacturer's procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule of inspection than the requirements of 1926.1412 must be followed.**

**Note: All inspection documents must be available, during the applicable document retention period, to all persons who conduct inspections.**

### **Modified Equipment Inspection:**

Equipment that has had modifications or additions which affect the safe operation of the equipment (such as modifications or additions involving a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) or capacity must be inspected by a **qualified person** after such modifications/additions have been completed, prior to initial use. The inspection must meet all the requirements of 1926.1412(a).

### Repaired/adjusted Equipment Inspection:

Equipment that has had a repair or adjustment that relates to safe operation (such as: a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism), must be inspected by a **qualified person** after such a repair or adjustment has been completed, prior to initial use. The inspection must meet all the requirements of 1926.1412(b).

### Post-assembly Inspection:

Upon completion of assembly, the equipment must be inspected by a **qualified person** to assure that it is configured in accordance with manufacturer equipment criteria.

The inspection must meet all the requirements of 1926.1412(c).

### Each Shift Inspection:

A **competent person** must begin a visual inspection prior to each shift the equipment will be used, which must be completed before or during that shift. The inspection must consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed. Determinations made in conducting the inspection must be reassessed in light of observations made during operation. Some of the items include control mechanisms, pressurized lines, hooks and latches, wire rope, electrical apparatus, tires (when used), and ground conditions.

The inspection must meet all the requirements of 1926.1412(d).

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspection. Documentation of daily (each shift) inspections will be retained for 3 months.

### Monthly Inspection:

Per, 1926.1412(e) Each month the equipment is in service it must be inspected by **competent person**. The inspection must meet all the requirements of 1926.1412(d). See "Each Shift" inspection, above.

**Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented and records are retained for 3 months.**

### Annual/Comprehensive Inspection:

1. At least every 12 months the equipment must be inspected by a **qualified person** in accordance with paragraph (d) of this section (each shift) except that the corrective action set forth in paragraphs

(f)(4), (f)(5), and (f)(6) of this section must apply in place of the corrective action required by paragraphs (d)(2) and (d)(3) of this section. The inspection must meet all the requirements of 1926.1412(f).

2. In addition, at least every 12 months, the equipment must be inspected by a qualified person. Disassembly is required, as necessary, to complete the inspection. The inspection must meet all the requirements of 1926.1412(f).

**Documentation of Annual/Comprehensive Inspection:**

The following information must be documented, maintained, and retained for a minimum of 12 months:

1. The items checked and the results of the inspection.
2. The name and signature of the person who conducted the inspection and the date.

**Severe Service Inspection:**

Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the equipment will stop being used and a **qualified** person must inspect it. The inspection must meet all the requirements of 1926.1412(g).

**Equipment Not In Regular Use Inspection:**

Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with the requirements of the Monthly inspection, above.

**Wire Rope Inspection:**

**Wire Rope Shift Inspection:**

A competent person must begin a visual inspection prior to each shift the equipment is used, which must be completed before or during that shift. The inspection must consist of observation of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed in 1926.1413(a)(2). Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

Daily (each shift) inspections will be documented and include the following: items checked, results of the inspection, and name and signature of the inspection. Documentation of daily (each shift) inspections will be retained for 3 months.

### Wire Rope Monthly Inspection:

Each month an inspection must be conducted in accordance shift inspection, above, and 1926.1413(b).

**Note: Documented monthly inspection is not required if the daily (each shift) inspection is documented and records are retained for 3 months.**

### Wire Rope Annual/Comprehensive Inspection:

At least every 12 months, wire ropes in use on equipment must be inspected by a qualified person in accordance with shift inspection, above, and 1926.1413(c).

In addition, at least every 12 months, the wire ropes in use on equipment must be inspected by a qualified person in accordance with 1926.1413(c)

### Documentation of Annual/Comprehensive Wire Rope Inspection:

The following information must be documented, maintained, and retained for a minimum of 12 months:

1. The items checked and the results of the inspection.
2. The name and signature of the person who conducted the inspection and the date.

### Safety Devices:

Operations must not begin unless all of the devices listed below are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. If any of the devices listed in this section are not in proper working order, the equipment must be taken out of service and operations must not resume until the device is again working properly.

1. Crane level indicator.
  - a. The equipment must have a crane level indicator that is either built into the equipment or is available on the equipment.
  - b. If a built-in crane level indicator is not working properly, it must be tagged-out or removed. If a removable crane level indicator is not working properly, it must be removed.
  - c. This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.
2. Boom stops, except for derricks and hydraulic booms.
3. Jib stops (if a jib is attached), except for derricks.
4. Equipment with foot pedal brakes must have locks.
5. Hydraulic outrigger jacks and hydraulic stabilizer jacks must have an integral holding device/check valve.

6. Equipment on rails must have rail clamps and rail stops, except for portal cranes.
7. Horn
  - a. The equipment must have a horn that is either built into the equipment or is on the equipment and immediately available to the operator.
  - b. If a built-in horn is not working properly, it must be tagged-out or removed. If a removable horn is not working properly, it must be removed.

### **Equipment Operations:**

Operators must comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments.

Operators must have access to procedures applicable to the operation of the equipment and these items must be readily available in the cab at all times for use by the operator. These items include: rated capacities (load charts), recommended operating speeds, special hazard warnings instructions, and operator's manual.

**Note: Where rated capacities are available in the cab only in electronic form: in the event of a failure which makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.**

The operator must not engage in any practice or activity that diverts his/her attention while actually engaged in operating the equipment, such as the use of cellular phones (other than when used for signal communications).

The operator has the authority **and responsibility** to stop and refuse to handle loads whenever there is a safety concern. A qualified person, at this point, must determine that safety has been assured.

### **Signals:**

A signal person must be provided in each of the following situations:

1. The point of operation, meaning the load travel or the area near or at load placement, is not in full view of the operator.
2. When the equipment is traveling, the view in the direction of travel is obstructed.
3. Due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

## **Work Control Area:**

### **Swing radius hazards:**

The requirements below apply where there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

1. Striking and injuring an employee; or
2. Pinching/crushing an employee against another part of the equipment or another object.

To prevent employees from entering these hazard areas, the below procedures will be accomplished:

1. Train each employee assigned to work on or near the equipment ("authorized personnel") in how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure.
2. Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas. *Exception:* When we can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as "Danger – Swing/Crush Zone") and high visibility markings on the equipment that identify the hazard areas. In addition, we must train each employee to understand what these markings signify.

### **Protecting employees in the hazard area:**

Before one of our employees goes to a location in the hazard area that is out of view of the crane operator, that employee (or someone instructed by that employee) must ensure that the crane operator is informed that he/she is going to that location.

Where the crane operator knows that our employee went to a location within the swing area radius, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that our employee is in a safe position.

### **Equipment Modifications:**

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited except where below requirements are met.

1. Manufacturer review and approval.
  - a. The manufacturer approves the modifications/additions in writing.
  - b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

- c. The original safety factor of the equipment is not reduced.
2. *Manufacturer refusal to review request.* The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:
  - a. A registered professional engineer who is a qualified person with respect to the equipment involved:
    - 1) Approves the modification/addition and specifies the equipment configurations to which that approval applies, and
    - (B) Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/addition.
  - b. The original safety factor of the equipment is not reduced.
3. *Unavailable manufacturer.* The manufacturer is unavailable and the below is met.
  - a. The manufacturer approves the modifications/additions in writing.
  - b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
4. *Manufacturer does not complete the review within 120 days of the request.* The manufacturer is provided a detailed description of the proposed modification/addition, is asked to approve the modification/ addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the below is met.
  - a. The manufacturer approves the modifications/additions in writing.
  - b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.
5. *Multiple manufacturers of equipment designed for use on marine work sites.* The equipment is designed for marine work sites, contains major structural components from more than one manufacturer, and the below is met.
  - a. The manufacturer approves the modifications/additions in writing.
  - b. The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

Modifications or additions which affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response.

## **TRAINING:**

### **014 Operator Training, Qualification and Certification:**

**Note: A state or local license is required if:**

- 1. working within a state or locality that has licensing requirements, and**
- 2. the licensing program meets the licensing and certification criteria listed in subpart CC.**
- 3. A state or local license is valid for the period of time stipulated by the licensing office, but no longer than 5 years. It is portable only within the jurisdiction of the issuing agency.**

**Written tests may be administered in a language understood by the operator candidate. When an operator's testing is based on a language other than English, it must be noted on the certificate.**

All costs associated with training will be at no expense to the employee.

During the period November 8, 2010 through November 9, 2014, all operators must be competent to operate the equipment safely and are trained and evaluated on that training before operating the equipment.

**As of November 10, 2014, all operators must be certified or qualified.**

### **Accredited Crane Operator Testing Organization**

An operator will be deemed qualified to operate a particular piece of equipment if the operator is certified for that type and capacity of equipment or for higher-capacity equipment of that type. If no accredited testing agency offers certification examinations for a particular type and/or capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available.

The operator's certificate must state the type/capacity of equipment for which the operator is certified.

To achieve the above qualification, the operator must have received certification by an **accredited crane operator testing organization**.

Certification issued by an accredited crane operator testing organization is both portable and valid for 5 years.

### **Audited Employer Program:**

This is not an acceptable option for us because because: 1) it is not portable, 2) it is time and manpower consuming, and 3) it requires monitoring and outside approvals.

### **Licensing by tgeh Military or Other Government Entity**

This is acceptable.

### **Operator-in-training:**

An employee who is not qualified or certified is permitted to operate equipment only as an operator-in-training and only where the below requirements are met:

1. We must provide each operator-in-training with sufficient training prior to operating the equipment to enable the operator-in-training to operate the equipment safely under limitations established by this section (including continuous monitoring) and any additional limitations established by us.
2. The tasks performed by the operator-in-training while operating the equipment must be within the operator-in-training's ability.
3. While operating the equipment, the operator-in-training must be continuously monitored by an individual ("**operator's trainer**") who meets all of the following requirements:
  - a. The operator's trainer is our employee or agent.
  - b. The operator's trainer is either a certified operator under this section or has passed the written portion of a certification test, and is familiar with the proper use of the equipment's controls.
  - c. While monitoring the operator-in-training, the operator's trainer performs no tasks that detract from the trainer's ability to monitor the operator-in-training.
  - d. For equipment other than tower cranes: the operator's trainer and the operator-in-training must be in direct line of sight of each other. In addition, they must communicate verbally or by hand signals. For tower cranes: the operator's trainer and the operator-in-training must be in direct communication with each other.

### **Rigger Training, Qualification and Certification:**

All costs associated with training will be at no expense to the employee.

Riggers must be qualified. A qualified person means a person who, by possession of a recognized degree certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter, the work, or the project.

## **Signal Person Training, Qualification and Certification:**

All costs associated with training will be at no expense to the employee.

Signal persons must be qualified by either:

1. A third party evaluator                      Documentation is Portable, or
2. An employer qualified evaluator            Documentation is not Portable.

Upon completion of documented training which must include either a verbal or written test PLUS a practical test.

Training will include, but not be limited to:

### **Types of signals:**

#### Hand signals:

**Note: Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations. These charts will comply with the instructions found in Appendix A to Subpart CC of Part 1926–Standard Hand Signals.**

1. When using hand signals, the Standard Method must be used (see Note, above). Exception: Where use of the Standard Method for hand signals is infeasible, or where an operation or use of an attachment is not covered in the Standard Method, non-standard hand signals may be used in accordance with paragraph 2, below:
2. Non-standard hand signals. When using non-standard hand signals, the signal person, operator, and lift director (where there is one) must contact each other prior to the operation and agree on the non-standard hand signals that will be used.

#### Signals – radio, telephone or other electronic transmission of signals.

The device(s) used to transmit signals must be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

Signal transmission must be through a dedicated channel, except:

1. Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations.
2. Where a crane is being operated on or adjacent to railroad tracks, and the actions of the crane operator need to be coordinated with the movement of other equipment or trains on the same or adjacent tracks.

The operator's reception of signals must be by a hands-free system.

#### New signals:

Signals other than hand, voice, or audible signals may be used where it may be demonstrated that:

1. The new signals provide at least equally effective communication as voice audible, or Standard Method hand signals, or
2. The new signals comply with a national consensus standard that provides at least equally effective communication as voice, audible, or Standard Method hand signals.

### Voice Signals:

If voice signals are used, prior to beginning operations, the operator, signal person and lift director (if there is one), must contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is added or substituted, there is confusion about the voice signals or a voice signal is to be changed.

Each voice signal must contain the following three elements, given in the following order: function (such as hoist, boom, etc.), direction; distance and/or speed; function stop command.

The operator, signal person and lift director (if there is one), must be able to effectively communicate in the language used.

### **Additional signal information:**

1. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.) must be appropriate for the site conditions.
2. During operations requiring signals, the ability to transmit signals between the operator and signal person must be maintained. If that ability is interrupted at any time the operator must safely stop operations requiring signals until it is reestablished and a proper signal is given and understood.
3. If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations must not resume until the operator and signal person agree that the problem has been resolved.
4. Only one person may give signals to a crane/derrick at a time, except in circumstances covered by the below:
  - a. Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal. (NOTE: § 1926.1417(y) requires the operator to obey a stop or emergency stop signal).
5. All directions given to the operator by the signal person must be given from the operator's direction perspective.

Where a signal person(s) is in communication with more than one crane/derrick, a system must be used for identifying the crane/derrick each signal is for, as follows:

1. for each signal, prior to giving the function/direction, the signal person must identify the crane/derrick the signal is for, or
2. must use an equally effective method of identifying which crane/derrick the signal is for.

**Critical Power Line Safety Information:**

[75 FR 48135, Aug. 9, 2010, as amended at 79 FR 20743, Apr. 11, 2014]

**For clarity, instruction & use these NEW standards are included as written and or course include the terms "Employer" and "Employee:**

§1926.1407 Power line safety (up to 350 kV)—assembly and disassembly.

(a) Before assembling or disassembling equipment, the employer must determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get, in the direction or area of assembly/disassembly, closer than 20 feet to a power line during the assembly/disassembly process. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:

(1) *Option (1)—Deenergize and ground.* Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the worksite.

(2) *Option (2)—20 foot clearance.* Ensure that no part of the equipment, load line or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

(3) *Option (3)—Table A clearance.*

(i) Determine the line's voltage and the minimum clearance distance permitted under Table A (see §1926.1408).

(ii) Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A (see §1926.1408). If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

(b) *Preventing encroachment/electrocution.* Where encroachment precautions are required under Option (2), or Option (3) of this section, all of the following requirements must be met:

(1) Conduct a planning meeting with the Assembly/Disassembly director (A/D director), operator, assembly/disassembly crew and the other workers who will be in the assembly/disassembly area to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.

(2) If tag lines are used, they must be nonconductive.

(3) At least one of the following additional measures must be in place. The measure selected from this list must be effective in preventing encroachment.

The additional measures are:

(i) Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:

(A) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

(B) Be positioned to effectively gauge the clearance distance.

(C) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(D) Give timely information to the operator so that the required clearance distance can be maintained.

(ii) A proximity alarm set to give the operator sufficient warning to prevent encroachment.

(iii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

(iv) A device that automatically limits range of movement, set to prevent encroachment.

(v) An elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings.

(c) *Assembly/disassembly below power lines prohibited.* No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line.

(d) *Assembly/disassembly inside Table A clearance prohibited.* No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A (see §1926.1408) to a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line.

(e) *Voltage information.* Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

(f) *Power lines presumed energized.* The employer must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.

(g) *Posting of electrocution warnings.* There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

§1926.1408 Power line safety (up to 350 kV)—equipment operations.

(a) *Hazard assessments and precautions inside the work zone.* Before beginning equipment operations, the employer must:

(1) *Identify the work zone by either:*

(i) Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or

(ii) Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.

(2) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:

(i) *Option (1)—Deenergize and ground.* Confirm from the utility owner/operator that the power line has been deenergized and visibly grounded at the worksite.

(ii) *Option (2)—20 foot clearance.* Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.

(iii) *Option (3)—Table A clearance.*

(A) Determine the line's voltage and the minimum approach distance permitted under Table A (see §1926.1408).

(B) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Table A (see §1926.1408). If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance.

(b) *Preventing encroachment/electrocution.* Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

(1) Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.

(2) If tag lines are used, they must be non-conductive.

(3) Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option (2) of this section) or at the minimum approach distance under Table A (see §1926.1408) (if using Option (3) of this section). If the operator is unable to see the elevated warning line, a dedicated spotter must be used as described in §1926.1408(b)(4)(ii) in addition to implementing one of the measures described in §§1926.1408(b)(4)(i), (iii), (iv) and (v).

(4) Implement at least one of the following measures:

(i) A proximity alarm set to give the operator sufficient warning to prevent encroachment.

(ii) A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:

(A) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

(B) Be positioned to effectively gauge the clearance distance.

(C) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(D) Give timely information to the operator so that the required clearance distance can be maintained.

(iii) A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

(iv) A device that automatically limits range of movement, set to prevent encroachment.

(v) An insulating link/device, as defined in §1926.1401, installed at a point between the end of the load line (or below) and the load.

(5) The requirements of paragraph (b)(4) of this section do not apply to work covered by subpart V of this part.

(c) *Voltage information.* Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

(d) *Operations below power lines.*

(1) No part of the equipment, load line, or load (including rigging and lifting accessories) is allowed below a power line unless the employer has confirmed that the utility owner/operator has deenergized and (at the worksite) visibly grounded the power line, except where one of the exceptions in paragraph (d)(2) of this section applies.

(2) *Exceptions.* Paragraph (d)(1) of this section is inapplicable where the employer demonstrates that one of the following applies:

(i) The work is covered by subpart V of this part.

(ii) For equipment with non-extensible booms: The uppermost part of the equipment, with the boom at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance distance below the plane of the power line.

(iii) For equipment with articulating or extensible booms: The uppermost part of the equipment, with the boom in the fully extended position, at true vertical, would be more than 20 feet below the plane of the power line or more than the Table A of this section minimum clearance distance below the plane of the power line.

(iv) The employer demonstrates that compliance with paragraph (d)(1) of this section is infeasible and meets the requirements of §1926.1410.

(e) *Power lines presumed energized.* The employer must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.

(f) When working near transmitter/communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter must be deenergized or the following precautions must be taken:

(1) The equipment must be provided with an electrical ground.

(2) If tag lines are used, they must be non-conductive.

(g) *Training.*

(1) The employer must train each operator and crew member assigned to work with the equipment on all of the following:

(i) The procedures to be followed in the event of electrical contact with a power line. Such training must include:

(A) Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground.

(B) The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.

(C) The safest means of evacuating from equipment that may be energized.

(D) The danger of the potentially energized zone around the equipment (step potential).

(E) The need for crew in the area to avoid approaching or touching the equipment and the load.

(F) Safe clearance distance from power lines.

(ii) Power lines are presumed to be energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the worksite.

(iii) Power lines are presumed to be uninsulated unless the utility owner/operator or a registered engineer who is a qualified person with respect to electrical power transmission and distribution confirms that a line is insulated.

(iv) The limitations of an insulating link/device, proximity alarm, and range control (and similar) device, if used.

(v) The procedures to be followed to properly ground equipment and the limitations of grounding.

(2) Employees working as dedicated spotters must be trained to enable them to effectively perform their task, including training on the applicable requirements of this section.

(3) Training under this section must be administered in accordance with §1926.1430(g).

(h) Devices originally designed by the manufacturer for use as: A safety device (see §1926.1415), operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, must meet the manufacturer's procedures for use and conditions of use.

TABLE A—MINIMUM CLEARANCE DISTANCES

| Voltage<br>(nominal, kV,<br>alternating current) | Minimum clearance distance<br>(feet)   |
|--|--|
| up to 50   | 10   |
| over 50 to 200                                   | 15   |
| over 200 to 350                                  | 20   |
| over 350 to 500                                  | 25   |
| over 500 to 750                                  | 35   |
| over 750 to 1,000                                | 45   |
| over 1,000                                       | (as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution). |

Note: The value that follows “to” is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.

**§1926.1409 Power line safety (over 350 kV).**

The requirements of §1926.1407 and §1926.1408 apply to power lines over 350 kV except:

(a) For power lines at or below 1000 kV, wherever the distance “20 feet” is specified, the distance “50 feet” must be substituted; and

(b) For power lines over 1000 kV, the minimum clearance distance must be established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

**§1926.1410 Power line safety (all voltages)—equipment operations closer than the Table A zone.**

Equipment operations in which any part of the equipment, load line, or load (including rigging and lifting accessories) is closer than the minimum approach distance under Table A of §1926.1408 to an energized power line is prohibited, except where the employer demonstrates that all of the following requirements are met:

(a) The employer determines that it is infeasible to do the work without breaching the minimum approach distance under Table A of §1926.1408.

(b) The employer determines that, after consultation with the utility owner/operator, it is infeasible to deenergize and ground the power line or relocate the power line.

**(c) Minimum clearance distance.**

(1) The power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution determines the minimum clearance distance that must be maintained to prevent electrical contact in light of the on-site conditions. The factors that must be considered in making this determination include, but are not limited to: Conditions affecting atmospheric conductivity; time necessary to bring the equipment, load line, and load (including rigging and lifting accessories) to a complete stop; wind conditions; degree of sway in the power line; lighting conditions, and other conditions affecting the ability to prevent electrical contact.

(2) Paragraph (c)(1) of this section does not apply to work covered by subpart V of this part; instead, for such work, the minimum approach distances established by the employer under sect;1926.960(c)(1)(i) apply.

(d) A planning meeting with the employer and utility owner/operator (or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution) is held to determine the procedures that will be followed to prevent electrical contact and electrocution. At a minimum these procedures must include:

(1) If the power line is equipped with a device that automatically reenergizes the circuit in the event of a power line contact, before the work begins, the automatic reclosing feature of the circuit interrupting device must be made inoperative if the design of the device permits.

(2) A dedicated spotter who is in continuous contact with the operator. The dedicated spotter must:

(i) Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).

(ii) Be positioned to effectively gauge the clearance distance.

(iii) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(iv) Give timely information to the operator so that the required clearance distance can be maintained.

(3) An elevated warning line, or barricade (not attached to the crane), in view of the operator (either directly or through video equipment), equipped with flags or similar high-visibility markings, to prevent electrical contact. However, this provision does not apply to work covered by subpart V of this part.

(4) *Insulating link/device.* (i) An insulating link/device installed at a point between the end of the load line (or below) and the load.

(ii) Paragraph (d)(4)(i) of this section does not apply to work covered by subpart V of this part.

(iii) [Reserved]

(iv) Until November 8, 2011, the following procedure may be substituted for the requirement in paragraph (d)(4)(i) of this section: All employees, excluding equipment operators located on the equipment, who may come in contact with the equipment, the load line, or the load must be insulated or guarded from the equipment, the load line, and the load. Insulating gloves rated for the voltage involved are adequate insulation for the purposes of this paragraph.

(v) Until November 8, 2013, the following procedure may be substituted for the requirement in (d)(4)(i) of this section:

(A) The employer must use a link/device manufactured on or before November 8, 2011, that meets the definition of an insulating link/device, except that it has not been approved by a Nationally Recognized Testing Laboratory, and that is maintained and used in accordance with manufacturer requirements and recommendations, and is installed at a point between the end of the load line (or below) and the load; and

(B) All employees, excluding equipment operators located on the equipment, who may come in contact with the equipment, the load line, or the load must be insulated or guarded from the equipment, the load line, and the load through an additional means other than the device described in paragraph (d)(4)(v)(A) of this section. Insulating gloves rated for the voltage involved are adequate additional means of protection for the purposes of this paragraph.

(5) Nonconductive rigging if the rigging may be within the Table A of §1926.1408 distance during the operation.

(6) If the equipment is equipped with a device that automatically limits range of movement, it must be used and set to prevent any part of the equipment, load line, or load (including rigging and lifting accessories) from breaching the minimum approach distance established under paragraph (c) of this section.

(7) If a tag line is used, it must be of the nonconductive type.

(8) Barricades forming a perimeter at least 10 feet away from the equipment to prevent unauthorized personnel from entering the work area. In areas where obstacles prevent the barricade from being at least 10 feet away, the barricade must be as far from the equipment as feasible.

(9) Workers other than the operator must be prohibited from touching the load line above the insulating link/device and crane. Operators remotely operating the equipment from the ground must use either wireless controls that isolate the operator from the equipment or insulating mats that insulate the operator from the ground.

(10) Only personnel essential to the operation are permitted to be in the area of the crane and load.

(11) The equipment must be properly grounded.

(12) Insulating line hose or cover-up must be installed by the utility owner/operator except where such devices are unavailable for the line voltages involved.

(e) The procedures developed to comply with paragraph (d) of this section are documented and immediately available on-site.

(f) The equipment user and utility owner/operator (or registered professional engineer) meet with the equipment operator and the other workers who will be in the area of the equipment or load to review the procedures that will be implemented to prevent breaching the minimum approach distance established in paragraph (c) of this section and prevent electrocution.

(g) The procedures developed to comply with paragraph (d) of this section are implemented.

(h) The utility owner/operator (or registered professional engineer) and all employers of employees involved in the work must identify one person who will direct the implementation of the procedures. The person identified in accordance with this paragraph must direct the implementation of the procedures and must have the authority to stop work at any time to ensure safety.

(i) [Reserved]

(j) If a problem occurs implementing the procedures being used to comply with paragraph (d) of this section, or indicating that those procedures are inadequate to prevent electrocution, the employer must safely stop operations and either develop new procedures to comply with paragraph (d) of this section or have the utility owner/operator deenergize and visibly ground or relocate the power line before resuming work.

(k) Devices originally designed by the manufacturer for use as a safety device (see §1926.1415), operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, must comply with the manufacturer's procedures for use and conditions of use.

(l) [Reserved]

(m) The employer must train each operator and crew member assigned to work with the equipment in accordance with §1926.1408(g).

[75 FR 48135, Aug. 9, 2010, as amended at 79 FR 20743, Apr. 11, 2014]

§1926.1411 Power line safety—while traveling under or near power lines with no load.

(a) This section establishes procedures and criteria that must be met for equipment traveling under or near a power line on a construction site with no load. Equipment traveling on a construction site with a load is governed by §§1926.1408, 1926.1409 or 1926.1410, whichever is appropriate, and §1926.1417(u).

(b) The employer must ensure that:

(1) The boom/mast and boom/mast support system are lowered sufficiently to meet the requirements of this paragraph.

(2) The clearances specified in Table T of this section are maintained.

(3) The effects of speed and terrain on equipment movement (including movement of the boom/mast) are considered so that those effects do not cause the minimum clearance distances specified in Table T of this section to be breached.

(4) *Dedicated spotter.* If any part of the equipment while traveling will get closer than 20 feet to the power line, the employer must ensure that a dedicated spotter who is in continuous contact with the driver/operator is used. The dedicated spotter must:

(i) Be positioned to effectively gauge the clearance distance.

(ii) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.

(iii) Give timely information to the operator so that the required clearance distance can be maintained.

(5) *Additional precautions for traveling in poor visibility.* When traveling at night, or in conditions of poor visibility, in addition to the measures specified in paragraphs (b)(1) through (4) of this section, the employer must ensure that:

(i) The power lines are illuminated or another means of identifying the location of the lines is used.

(ii) A safe path of travel is identified and used.

TABLE T—MINIMUM CLEARANCE DISTANCES WHILE TRAVELING WITH NO LOAD

| Voltage<br>(nominal, kV,<br>alternating current) | While traveling—minimum clearance distance<br>(feet)   |
|--|--|
| up to 0.75                                       | 4  |
| over .75 to 50                                   | 6  |
| over 50 to 345                                   | 10   |
| over 345 to 750                                  | 16   |
| Over 750 to 1,000                                | 20   |
| Over 1,000                                       | (as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution). |