

Convenient Pocket Cards

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Safety Devices

The following safety devices are required on all equipment:

1. Crane level indicator.
 - Must be either built into the equipment or is available on the equipment.
 - A built-in crane level indicator not working properly must be tagged-out or removed; a removable crane level indicator not working properly must be removed.
 - 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
 - Must be either built into the equipment or is available on the equipment.
 - A horn not working properly must be tagged-out or removed; a removable horn not working properly must be removed.

Proper operation required. Operations must not begin unless all of the devices listed above 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 above 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.

Please consult 29 CFR 1926 Subpart CC for further detail.

Power Line Safety Training

Each operator and crew member assigned to work with the equipment must be trained on the following:

1. Procedures to be followed in the event of electrical contact with a power line.
 - Information on the danger of electrocution resulting from the operator touching both the equipment and the ground.
 - The importance to operator safety of remaining in the cab *except* where there is imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
 - The safest means of evacuating equipment that may be energized.
 - The danger of the potentially energized zone around the equipment (step potential).
 - Crew avoidance of approaching or touching the equipment or load.
 - Safe clearance distance from power lines.
2. Power lines are presumed energized unless confirmed deenergized by the utility owner/operator and visibly grounded at the work site.
3. Power lines are presumed uninsulated unless confirmed to be insulated by the utility owner/operator or an engineer qualified in electrical power.
4. The limitations of an insulating link/device, proximity alarm and range control (and similar) device, if used.
5. The procedures to be followed to properly ground equipment and the limitations of grounding.

Dedicated spotters must be trained to enable them to effectively perform their task.

Training must be administered as outlined in section 1926.1430.

Please consult 29 CFR 1926 Subpart CC for further detail.

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Operational Aids

The devices listed ("listed operational aids") are required on all equipment, unless otherwise specified.

Category I operational aids and alternative measures.

Boom hoist limiting device.

- *Temporary alternative measures* (use at least one)
 - Use a boom angle indicator.
 - Clearly mark the boom hoist cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius.
 - Clearly mark the boom hoist cable (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.

Luffing jib limiting device

- See above for *Temporary Alternative Measures* except to limit the movement of the luffing jib rather than the boom hoist.

Anti two-blocking device

- *Temporary alternative measures:* (For both telescopic and lattice boom cranes) Clearly mark the cable at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

Any deficiency must be repaired no later than 7 calendar days after the deficiency occurs. *Exception:* If documentation shows the necessary parts were ordered within 7 calendar days of the occurrence of the deficiency, the repair must be completed within 7 calendar days of receipt of the parts.

Please consult 29 CFR 1926 Subpart CC for further detail.

Operational Aids (cont'd)

Category II operational aids and alternative measures.

Boom angle or radius indicator.

- *Temporary alternative measure:* Radii/boom angle must be determined with the use of a measuring device.

Jib angle indicator, if the equipment has a luffing jib.

- *Temporary alternative measure:* Radii/jib angle must be determined by ascertaining the main boom angle and then with the use of a measuring device.

Boom length indicator, if the equipment has a telescopic boom, except where the rated capacity is independent of the boom length.

- *Temporary alternative measures.*
 1. Mark the boom with measured marks to calculate boom length,
 2. Calculate boom length from boom angle and radius measurements,
 3. Measure the boom with a measuring device.

Load weighing and similar devices.

1. Equipment with a rated capacity over 6,000 pounds **and** articulating cranes must have one of the following: load weighing device, load moment (or rated capacity) indicator, or load moment (or rated capacity) limiter.
 - *Articulating cranes* may also have an automatic overload prevention device
 - *Temporary alternative measures:* The weight must be determined from a source recognized by the industry or by a calculation method recognized by the industry.

Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the equipment has outriggers or stabilizers.

- *Temporary alternative measures:* The operator must verify the outrigger/stabilizer position is correct before beginning operation.

Hoist drum rotation indicator if the equipment's hoist drum not visible from the operator's station.

- *Temporary alternative measure:* Mark the drum to indicate the rotation of the drum.

Any deficiency must be repaired no later than 30 calendar days after the deficiency occurs. *Exception:* If documentation shows the necessary parts were ordered within 7 calendar days of the occurrence of the deficiency, and the part is not received within the 30 calendar day timeframe, the repair must be completed within 7 calendar days of receipt of the parts.

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Operator Qualification Criteria

The employer must ensure that the person is operating the equipment is qualified or certified to operate the equipment prior to operating any equipment.

An operator's certifications must be based, at a minimum, on the following:

- A determination through a **written test** that:
 - The information necessary for safe operation of the specific type of equipment is known. This includes:
 - The controls.
 - The ability to calculate (manually or with a calculator), load/capacity information on a variety of configurations of the equipment.
 - Procedures for preventing/responding to power line contact.
 - Technical knowledge applicable to the specific type of equipment the individual will operate.
 - Technical knowledge applicable to:
 - The suitability of the supporting ground and surface to handle expected loads.
 - Site hazards.
 - Site access.
- A determination through a **practical test** for the skills necessary, including the following:
 - Ability to recognize, from visual and auditory observation, the items as sited for shift inspection.
 - Operational and maneuvering skills.
 - Application of load chart information.
 - Application of safe shut-down and securing procedures.

Please consult 29 CFR 1926 Subpart CC for further detail.

Signal Person Qualification Criteria

The employer of the signal person must ensure that each signal person meets the Qualification Requirements as described below prior to giving any signals.

This requirement must be met by using one of the following:

- *Option (1) – Third party qualified evaluator.* The signal person has documentation from a third party qualified evaluator showing that the signal person meets the Qualification Requirements
- *Option (2) – Employer's qualified evaluator.* The employer's qualified evaluator assesses the individual and determines that the individual meets the Qualification Requirements and provides documentation of that determination.
- The employer must make the documentation for whichever option is used available at the site while the signal person is employed by the employer. The documentation must specify each type of signaling (e.g. hand signals, radio signals, etc.) for which the signal person meets the requirements.

Each signal person must:

- Know and understand the type of signals used. If hand signals are used, the signal person must know and understand the Standard Method for hand signals.
- Be competent in the application of the type of signals used.
- Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.
- Know and understand the relevant requirements of § 1926.1419 through § 1926.1422 and § 1926.1428 of Subpart CC of the standard.
- Demonstrate that he/she meets the above requirements through an oral or written test, and through a practical test.

Please consult 29 CFR 1926 Subpart CC for further detail.

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Assembly/Disassembly

Crew Instructions

- Before assembly/disassembly operations start, crew members must understand:
 1. Their tasks.
 2. The hazards associated with their tasks.
 3. The hazardous locations they need to avoid.
- Should a crew member take on a different task, or when adding new personnel during operations, the above requirements must be met.

Addressing specific hazards.

The assembly/disassembly director supervising the operation must address the following hazards associated with the operation:

1. *Site and ground bearing conditions* must be adequate for safe operation and to support the equipment.
2. *Blocking material* must be sufficient in size, amount, condition and method of stacking to sustain loads and maintain stability.
3. *Proper location of blocking.* When used to support lattice booms or components, blocking must be appropriately placed to:
 - Protect the structural integrity of the equipment, and
 - Prevent dangerous movement and collapse.
4. *Verifying assist crane loads.* Loads that will be imposed on the assist crane at each phase must be verified before operations begin.
5. *Boom and jib pack points.* The attachment points of rigging to a boom/boom sections, or jib/jib sections, must be suitable for preventing structural damage and facilitating safe handling of the components.
6. *Center of gravity* must be identified, if necessary, for the method used for maintaining stability.
 - Measures designed to prevent unintended dangerous movement must be used where there is insufficient information.

Please consult 29 CFR 1926 Subpart CC for further detail.

Assembly/Disassembly (cont'd.)

Addressing specific hazards. (cont'd)

7. *Stability upon pin removal.* Boom sections, boom suspension systems and components must be rigged or supported to maintain stability upon the removal of the pins.
8. *Snagging.* Suspension ropes and pendants must not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).
9. *Struck by counterweights.* The potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.
10. *Boom hoist brake failure.* The brake must be tested prior to each time reliance is to be placed on the boom hoist brake to prevent boom movement. If found to be insufficient, a boom hoist pawl, other locking/back-up braking device, or another method of preventing dangerous boom movement (such as blocking or using an assist crane) from a boom hoist failure must be used.
11. *Loss of backward stability.* Backward stability before swinging upwards, travel and when attaching or removing equipment components.
12. *Wind speed and weather.* The effect of wind speed and weather on the equipment.

Please consult 29 CFR 1926 Subpart CC for further detail.

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Power line safety (up to 350 kV) during assembly and disassembly

Option (1) - Deenergize and ground. Confirm the power line has been deenergized and visibly grounded at the work site from the utility owner/operator.

Option (2) - 20 foot clearance. Ensure that no part of the equipment, load line or load gets closer than 20 feet to the power line.

Option (3) - Table A clearance.

- Determine the line's voltage and minimum clearance distance permitted under table A.
- Determine if any part of the equipment, load line or load could get closer than the minimum clearance distance. If so, the requirements below must be followed to ensure no part of the equipment, load line or load gets closer than the minimum clearance distance.

Preventing encroachment/electrocution. Where encroachment precautions are required, the following requirements must be met:

1. Conduct a planning meeting with the assembly/disassembly director, operator, crew and other workers who will be in the area to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution.
2. Tag lines must be nonconductive if used.
3. At least one of the following additional measures must be in place:
 - Use of a dedicated spotter in continuous contact with the operator who must:
 1. Be equipped with a visual aid to assist in identifying the minimum clearance distance.
 2. Be positioned to gauge the clearance distance.
 3. Use equipment that enable direct communication with the operator where necessary.
 4. Give timely information to the operator so the required clearance distance can be maintained.

Please consult 29 CFR 1926 Subpart CC for further detail.

Power line safety (up to 350 kV) during assembly and disassembly (cont'd)

- A proximity alarm set to give sufficient warning to prevent encroachment.
- A device that automatically warns the operator when to stop movement and be set as noted above.
- A device that automatically limits range of movement.
- An elevated warning line or barricade equipped with high-visibility markings visible to the operator.

Assembly/disassembly below power lines prohibited. No part of a crane, load line or load (including rigging and lifting accessories), partially or fully assembled, is allowed below a power line unless the utility owner/operator has confirmed it has been deenergized and visibly grounded at the work site.

Assembly/disassembly inside Table A clearance prohibited. No part of a crane, load line or load (including rigging and lifting accessories), partially or fully assembled, is allowed closer than the minimum approach distance to a power line under Table A unless the utility owner/operator has confirmed it has been deenergized and visibly grounded at the work site.

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

Power lines presumed energized. All power lines are assumed energized unless the utility owner/operator confirms that the power line has been and continues to be deenergized and visibly grounded at the work site.

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

Please consult 29 CFR 1926 Subpart CC for further detail.

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Power Line Safety

The “**12-Step Rule**” when working closer than the minimum approach distance under Table A to an energized power line.

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 in continuous contact with the operator.
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.
4. Insulating link/device.
 - Installed at a point between the end of the load line (or below) and the load.
5. Nonconductive rigging if the rigging may be within Table A distances during the operation.
6. If equipped with a device that automatically limits range of movement, this device must be used.
7. If a tag line is used, it must be of the nonconductive type.
8. Barricades forming a perimeter around the equipment at least 10 feet away or 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.
10. Only personnel essential to the operation are permitted to be in the area.
11. The equipment must be properly grounded.
12. Insulating line hose or cover-up must be installed except where such devices are unavailable for the line voltages involved.

Please consult 29 CFR 1926 Subpart CC for further detail.

Table A

Minimum Clearances Regardless of Voltage

Voltage (nominal, kV, alternating current)	Minimum clearance distance (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

(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.

Table T

Minimum Clearance Distances While Traveling With No Load

Voltage (nominal, kV, alternating current)	While Traveling – Minimum clearance distance (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

(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

Power Line Safety Training

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 - The importance to operator safety of remaining in the cab *except* where there is imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
 - The safest means of evacuating equipment that may be energized.
 - The danger of the potentially energized zone around the equipment (step potential).
 - Crew avoidance of approaching or touching the equipment or load.
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4. The limitations of an insulating link/device, proximity alarm and range control (and similar device, if used).
5. The procedures to be followed to properly ground equipment and the limitations of grounding.

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