Cranes and Derricks in Construction
The New 2010 Standards
Presented by Rick Callor

URS Safety by Design Webcast

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Credits

This presentation was taken and derived from several OSHA presentations including one originally prepared by John Newquist of OSHA as a preliminary aid for the new standard, one from the OSHA Directorate of Construction, and one posted on the OSHA website dated 9-30-10.
Why a new standard?

- Cranes and Derricks in Construction NEW 29 CFR 1926 Subpart CC (29 CFR 1926.1400 et seq.)
- Crane accidents killed an average of 78 people per year between 2003 and 2005
- OSHA expects the final standard to prevent 22 fatalities and 175 non-fatal injuries each year.
Important dates

• Released – July 28, 2010
• Published – August 9, 2010
• Effective – November 8, 2010
  - Certification of riggers within 90 days after publication of rule
• Phased in over four years – August 9, 2014
  - Certification of operators phased in over four years
Highlights

- **Scope**
- Definitions
- **Ground Conditions**
- Assembly/Disassembly
- **Power Line Safety**
- Inspections
- Wire Rope
- Safety Devices
- Operational Aids
- Operation
- Authority To Stop
- **Signals**
- Fall Protection
- Work Area Control
- Keeping Clear Of The Load
- Free Fall/ Controlled Load Lowering
- **Operator Qualification and Certification**
- **Signal Person Qualifications**
- Qualifications of Maintenance and Repair Workers
- Training
- Hoisting Personnel
- Multiple Crane/Derrick Lifts
- Design, Construction and Testing
- Equipment Modification
- **Tower Cranes**
- Derricks
- Floating Cranes & Land Cranes on Barges
- Overhead and Gantry Cranes
- Dedicated Pile Drivers
- Sideboom Cranes
- Requirements for Equipment w/ Capacity of 2000 lbs and Less
What is covered?

• Functional description
  - Can hoist, lower, and horizontally move a suspended load
  and
• Long list of examples
Examples

- Articulating cranes (such as knuckle-boom cranes)
- Crawler cranes
- Floating cranes
- Cranes on barges
- Locomotive cranes
- Mobile cranes (such as wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted, and boom truck cranes)
- Multi-purpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load
- Industrial cranes (such as carry-deck cranes)
- Dedicated pile drivers
- Service/mechanic trucks with a hoisting device
- Crane on a monorail
- Tower cranes (such as fixed jib or “hammerhead boom,” luffing boom and self-erecting)
- Pedestal cranes
- Portal cranes
- Overhead and gantry cranes
- Straddle cranes
- Side-boom tractors
- Derricks
  …and variations of such equipment
Scope

• Specific exclusions (such as for power shovels, backhoes, excavators)
• Limited exclusions (such as for articulating/knuckle-boom truck cranes, digger derricks)
Ground Conditions
Ground conditions

- Controlling entity: Provide adequate conditions
  - Firm, drained and graded
  - Sufficient to support crane (in conjunction with blocking, mats, etc.)
Ground conditions

- Controlling entity must Inform equipment user and operator of **known** underground hazards (voids, utilities, etc.)
Change was made since proposed rule

- Information about ground conditions now includes **all information** known about ground conditions, including written information in possession of the controlling employer, whether on site or off site.
Assembly/Disassembly
Assembly/Disassembly

- Two options:
  - Manufacturer procedures or
  - Employer procedures (criteria requirements)
Assembly/Disassembly

General requirements include:

• Assembly/Disassembly Director
  - Must be a “competent and qualified person”

• Assembly/Disassembly Director must:
  - Understand procedures
  - Review procedures (unless they’ve used them before)
  - Check that crew members understand their tasks and hazards

• Follow manufacturer’s prohibitions
• All rigging work is by a Qualified Rigger
• When using outriggers, fully extend or deploy per the load chart
• Assembly/disassembly director must address 12 key hazards, including:
  - Adequate site and ground conditions
  - Sufficient blocking for load and stability
  - Suitable boom and jib pick points
  - Identify center of gravity
  - Stability for pin removal
  - Wind speed and weather
  - The suitability of blocking material
  - Verification of the loads for assist cranes
  - Snagging of cables or components
  - Struck by counterweights
  - Boom hoist brake failure
  - Loss of backwards stability
Changes made since the proposed rule

• Qualified Rigger – adds requirements that employers must use a qualified rigger for rigging operations during assembly/disassembly and other activities when workers must be in the fall zone to handle a load. (§1926.1404 and § 1926.1425)

• Synthetic Slings – adds requirements (i.e., padding) for use of synthetic slings in rigging. (§ 1926.1404(r))
• Step 1: Identify Work Zone
  - Work Zone =
    • Marking boundaries
    • 360 degrees around crane, up to maximum working radius
Decision Chart

Could you get within 20 feet of power line?

YES

Option #1
Deenergize & Ground

Option #2
20 foot clearance

Option #3
Ask Utility for Voltage and Use Table A (with minimum clearance distance)

NO

Encroachment Prevention Measures

• Planning meeting
• If tag lines used: Non-conductive
• Elevated warning lines, barricade or line of signs

• PLUS (Choose one):
  • Proximity alarm
  • Spotter,
  • Warning device,
  • Range limiter, or
  • Insulating link

No further action
<table>
<thead>
<tr>
<th>Voltage (nominal, kV, alternating current)</th>
<th>Minimum clearance distance (feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to 50</td>
<td>10</td>
</tr>
<tr>
<td>over 50 to 200</td>
<td>15</td>
</tr>
<tr>
<td>over 200 to 350</td>
<td>20</td>
</tr>
<tr>
<td>over 350 to 500</td>
<td>25</td>
</tr>
<tr>
<td>over 500 to 750</td>
<td>35</td>
</tr>
<tr>
<td>over 750 to 1000</td>
<td>45</td>
</tr>
<tr>
<td>over 1000</td>
<td>(as established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)</td>
</tr>
</tbody>
</table>
**Must show:**
- Staying outside zone is infeasible
- Infeasible to deenergize and ground

All of the following are required:

1. Power line owner – **sets minimum approach distance**
2. Planning meeting – minimum procedures
   - Dedicated spotter
   - Elevated warning line or barricade
   - Insulating link/device
   - Nonconductive rigging
   - Range limiter (if equipped)
   - Nonconductive tag line (if used)
   - Barricades - 10 feet from equipment
   - Limit access to essential workers
   - Prohibit non-operator workers from touching above insulating link
   - Properly ground crane
   - Deactivate automatic re-energizer
   - Insulating line cover-up installed
Electric Utilities – employers whose employees are qualified to perform power distribution and transmission work are considered to be in compliance with §§ 1926.1407-1926.1411 of subpart CC (power lines sections) when performing subpart V work in accordance with §1910.269. (§ 1926.1400(g))
Operator Certification
Worker participation

- Training
  - Workers must be trained to recognize and avoid hazards.
  - Workers must **understand** this training
    - Provided in a manner they understand
      - Oral/written training
    - Provided in a language they understand
      - Some Spanish language materials are already available through OSHA
Operator Qualification/Certification

- **OPTION 1:** Accredited testing organization
- **OPTION 2:** Audited employer program
- **OPTION 3:** U.S. military
- **OPTION 4:** State/local government license
The final rule now requires that employers must comply with local and state licensing regulations that meet requirements of §1926.1427(e) and (j). (§1926.1427(a))
Operator Qualification/Certification

- **OPTION 1:** Accredited testing organization
- **OPTION 2:** Audited employer program
- **OPTION 3:** U.S. military
- **OPTION 4:** State/local license

Testing Criteria

- **Knowledge** (written test):
  - Controls/performance characteristics
  - Calculate capacity
  - Preventing power line contact
  - Ground conditions & equipment support
  - Use and locate info in operating manual
  - Appendix C subjects

- **Practical test**
Option 1: Accredited Testing Organization

Nationally Recognized Accrediting Agency

Determine compliance with testing & test administration criteria

Accredited Testing Organization

Develops and administers the tests (written & practical) to certify operators

Different tests for different capacity/type of equipment
Option 2: Audited Employer Program

Accredited testing organization

Certifies

Auditor

Compliance with testing & test administration criteria

Audited Employer Program

Employer-administered written & practical tests
Option 3: U.S. Military

Issues Operator Qualification
**Option 4: State/local government license**

State/local government authority that oversees licensing office

Determines license office complies with testing/test administration criteria

State/local government license office

Issues operator license
Changes made since proposed rule

- Certification Costs for Operators – employers must pay for certification or qualification of their currently uncertified or unqualified operators. (§ 1926.1427(a)(4))

- Audited Employer Program – now specifies that the audit must be conducted in accordance with nationally recognized auditing standards. (§ 1926.1427(c))
• Test Administration and Language Requirements – written tests may be administered in a language understood by the operator candidate. (§ 1926.1427(h))

• Certification – clarifies that when the operator’s testing is based on a language other than English it must be noted on the certificate. (§1926.1427(h))
Operator qualification and certification

<table>
<thead>
<tr>
<th></th>
<th>Portable</th>
<th>Valid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accredited testing organization</td>
<td>YES *</td>
<td>5 years</td>
</tr>
<tr>
<td>Audited Employer Program</td>
<td>NO</td>
<td>5 years</td>
</tr>
<tr>
<td>U.S. Military license</td>
<td>NO *</td>
<td>Set by issuing entity</td>
</tr>
<tr>
<td>State/local license</td>
<td>NO *</td>
<td>Set by issuing entity, not &gt; 5 years</td>
</tr>
</tbody>
</table>

* Subject to State & Local requirements and whether or not the military/state training meets accredited requirements
November 8, 2010: State or local license 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.

November 8, 2010 - November 10, 2014: Employer must ensure that all operators are competent to operate the equipment safely and are trained and evaluated on that training before operating the equipment.

November 10, 2014: All operators must be certified or qualified.
Signaling
Signals

Signal Types:
- Hand, voice, audible or “new”
- Only time an operator can use a cell phone while lifting (but must be hands free)

Signal person -- *when required*:
- Point of operation not in full view of operator
- View of direction of travel is obstructed
- Site-specific safety concerns
Signal person

- Qualification requirements:
  - Know & understand signals
  - Competent in using signals
  - Basic understanding of crane operation
  - Verbal or written test plus practical test
## Signal person qualifications

<table>
<thead>
<tr>
<th>Qualified How</th>
<th>Documentation</th>
<th>Portable</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Party Qualified Evaluator</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Employer Qualified Evaluator</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Inspections
### 29 CFR 1926.1412: Inspections

<table>
<thead>
<tr>
<th>Type of Inspection:</th>
<th>Who Inspects:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modified or Repaired/Adjusted</td>
<td>Qualified</td>
</tr>
<tr>
<td>Post-assembly</td>
<td>Qualified</td>
</tr>
<tr>
<td>Shift</td>
<td>Competent</td>
</tr>
<tr>
<td>Monthly</td>
<td>Competent</td>
</tr>
<tr>
<td>Annual</td>
<td>Qualified</td>
</tr>
</tbody>
</table>
Changes made since proposed rule

• Inspections – all documentation required by the inspection provisions must be available to all inspectors performing required inspections (including wire rope inspections). (§§1926.1412 & 1926.1413)

• Pre-Erection Inspection for Tower Cranes – adds a requirement to include inspection of crane components after transportation to the work site and prior to erection of the crane. (§1926.1435)
Operations

- Operations procedures must be developed by a qualified person when the manufacturer’s procedures are unavailable.
- Procedures related to the capacity of the equipment must be developed by a registered professional engineer (familiar with the equipment) when the manufacturer’s procedures are unavailable.
- This information must be readily available in the cab of the crane.
Operations

• Operators cannot be engaged in activities that distract her or his attention while operating the equipment (for example, no cellular phone use unless used for signaling).

• When workers must be in the fall zone to handle a load, the load must be rigged by a qualified rigger.
Fall protection

- Part CC has its own fall protection requirements.
- Training is required regarding the criteria and use of fall protection systems that is consistent with 29 CFR 1926 subpart M.
- Anchor points for fall protection systems must meet subpart M requirements and criteria.
Safety Devices and Operational Aids
Safety devices

• Safety devices are required and must be operational at all times

• Include:
  - Crane level indicator
  - Boom/jib stops (except derricks)
  - Integral holding device/check valve for outrigger and stabilizer jacks
Operational aids

- Operational aids are required *but* temporary alternative measures are allowed while operational aids are being repaired.

- Category I operational aids and alternative measures
  - Boom hoist limiting device, if not working:
    - Boom angle indicator or
    - Mark the boom hoist cable
  - Luffing jib limiting device
  - Anti two-blocking device.

- Replacement of parts: Must be repaired within 7 days of discovery of deficiency
Operational aids

• Category II devices
  - Boom angle or radius indicator
  - Jib angle indicator
  - Boom length indicator
  - Load weighing devices
  - Outrigger/stabilizer position sensor/monitor
  - Hoist drum rotation indicator.

• Replacement of parts: Must be repaired within 30 days of discovery of deficiency.

• Exception: employer has documented that it ordered the part and then repaired the equipment within 7 days of receipt of the replacement part.
Change made since proposed rule

- When any necessary repairs or adjustments are needed for the equipment and alternative methods are being implemented, the employer must communicate this information to all affected employees at the beginning of each shift. (§ 1926.1417(j))
Tower Cranes: 
*Supplemental Requirements*
Some *supplemental* tower crane requirements

- Foundations & structural supports
  - Design & inspection
- Plumb tolerance
  - Specification & verification
- Climbing procedures
  - Host structure strength verification
  - Wind
- Post-erection load test
- Monthly inspection: tower mast bolts, upper-most tie-in, braces, floor supports, floor wedges
Required documentation

• Monthly & annual inspection reports for the equipment and wire rope
• Modifications that affect the safe use of the equipment
• Operator and signal person qualifications
• Tower crane foundation/support design
• When repairs or adjustments of the equipment are needed
• Employer-developed procedures (i.e., assembly/disassembly, operational, and other procedures related to the safe operation of the equipment)
• Power line encroachment procedures/plan
State Plan States

- Federal OSHA
- Comprehensive State Plan
- State Plan Public Sector Only

Federal:
- District of Columbia
- Guam
- American Samoa
- Trust territories

Puerto Rico:
- Comprehensive

Virgin Islands:
- Public Sector Only
State Plan States

• States must set job safety and health standards that are “at least as effective as” comparable federal standards.
• Although most states adopt standards identical to federal ones, there is some flexibility. Therefore, cranes and derricks standards may differ in states operating their own plans.
• Some states already have their own cranes and derricks standards in place. Their regulations must be “at least as effective as” the federal standard.
• Go to www.osha.gov/dcsp/osp for more information on state plan states.
Worker Participation

• The participation of workers is a vital component of any workplace injury and illness prevention program; workers are the best eyes and ears for identifying hazards. Workers must be trained on the hazards they face and ways to prevent the hazards.
• Workers have a right to a safe and healthy workplace
• Workers have a right to report safety issues without fear of retaliation
• Workers may report safety concerns to OSHA at 1-800-321-OSHA
Resources

- Cranes and Derricks in Construction Final Rule
- Associated Training Service Network
  - http://www.operator-school.com/
- National Commission for the Certification of Crane Operators
  - http://www.nccco.org/
- National Association of Heavy Equipment Training Schools
  - http://www.heavy-equipment-school.com/
- North American Crane Bureau Group
  - http://www.cranesafe.com/history.htm
- California Crane School
  - http://www.californiacraneschool.com/
• Attendance must be recorded on GSMART by the GSMART Site Administrator. Make sure your Site Administrator knows you attended.

• If you don’t know your Site Administrator, contact your GSMART Group Administrator, listed on the ES&H page.
Entering Participants into GSMART

In GSMART, open Training Module, Select “Add/Edit Classes”

Then, find the class called “Cranes and Derricks: The New Rule” for the date viewed, click “Edit,” and add the participants who completed the class.

Important: ensure the “Location” is “Webcast”

Note: Right after the class the system might run slowly if many Administrators are entering participants. If so, please return to the GSMART later to enter participants.

We are working to ensure you can find all participants even if they work in a location you don’t have access to. For assistance, contact your Group Administrator.
Tentative Class Schedule

Classes start promptly at 11:00 am ET, 10:00 CT, 9:00 MT, 8:00 PT

- November 9: Cranes and Derricks: The New Rule, by Rick Callor
- November 11: Repeat of Cranes and Derricks: The New Rule, by Rick Callor
- December 7: Neil Gunter: URS Behavior Based Safety Program Overview, Part 1
- December 9: Repeat of Neil Gunter: URS Behavior Based Safety Program Overview, Part 1
- December 16: Repeat of Neil Gunter: URS Behavior Based Safety Program Overview, Part 2
- January 4: Safety Trained Supervisor Test and Recertification Review Part 1 by Rick Callor
- January 6: Repeat of Safety Trained Supervisor Test and Recertification Review Part 1 by Rick Callor
- January 11: Safety Trained Supervisor Test and Recertification Review Part 2 by Rick Callor
- January 13: Repeat of Safety Trained Supervisor Test and Recertification Review Part 2 by Rick Callor
URS Energy & Construction
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