



**Occupational Safety and
Health Administration**



OSHA Cranes & Derrick Review Subpart CC

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CSHO In-Service



Learning Objectives

- Review highlights of the new crane and derricks standard
- Identify crane operator qualification and certification requirements
- Identify types and frequency of inspections for overhead cranes
- Identify supplemental requirements for tower cranes

Topics to be Covered

- New Standard
- Scope
- Ground Conditions
- Assembly/Disassembly
- Power Line Safety
- Inspections
- Rigging
- Signals
- Operator Qualification/Certification
- Tower Cranes (supplemental requirements)

Cranes and Derricks



Important Dates

- Released – July 28, 2010
- Published – August 9, 2010
- Effective – November 8, 2010
 - Qualification of riggers
- Phased in over four years – August 9, 2014
 - Certification of operators phased in over four years (except for State and local licensing)

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

Subpart CC is Substantial

- 1075 pages (with preamble)
- 275,633 words
- 1,517,395 characters
- 14,478 paragraphs
- 36,405 lines

What is Covered?

- Functional Description
 - Can hoist
 - Lower
 - Horizontally move a suspended load
- 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, “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

- Backhoes and forklifts

Limited Requirements for:

- Capacity: 2000 pounds or less
- Dedicated pile drivers
- Overhead and gantry cranes
- Side-boom tractors

Supplemental Requirements for:

- Tower cranes
- Derricks
- Floating cranes & land cranes on barges



Ground Conditions



Ground Conditions (cont'd)

- **Controlling Entity:**
 - Provide adequate conditions
 - Firm, drained and graded
- **Sufficient to Support Crane (in conjunction with blocking, mats, etc.)**



Ground Conditions (cont'd)

- Inform User and Equipment Operator of Known Underground Hazards (voids, utilities, etc.)



Assembly/Disassembly



Assembly/Disassembly (cont'd)

- Two Options:
 - Manufacturer procedures *or*
 - Employer procedures (criteria requirements)



Assembly/Disassembly (cont'd)

- Assembly/Disassembly Supervisor
 - Must be a competent and qualified person
- Assembly/Disassembly Supervisor Must Understand Procedures and:
 - 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 extended *or* deployed per the load chart

Assembly/Disassembly (cont'd)

- Assembly/Disassembly Supervisor Addresses 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
 - Consider wind speed and weather

Assembly/Disassembly (cont'd)

- 12 Key Hazards (*continued*):
 - 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

Power Lines



Power Lines (cont'd)

- Step 1: Identify Work Zone
 - Work Zone = marking boundaries *OR*
 - 360 degrees around crane, up to maximum working radius



**Could you get
within 20 feet of a
power line?**

YES

NO

Option #1
Deenergize
& Ground

Option #2
20-foot
Clearance

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

**Encroachment
Prevention**

- Planning Meeting
- If Tag Lines are Used, They Must be Nonconductive
- Elevated Warning Lines, Barricades, *or* Line of Signs

PLUS (Choose One):

- Proximity Alarm, Spotter, Warning Device, Range Limiter, or Insulating Link

No Further
Action

Table A – Minimum Clearance Distances

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 1000	45
over 1000	(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)

Intentionally Working Closer Than Table A Zone

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 – Procedures
3. Dedicated Spotter
4. Elevated Warning Line or Barricade
5. Insulating Link/Device
6. Nonconductive Rigging
7. Range Limiter (if Equipped)
8. Nonconductive Tag Line (if used)
9. Barricades - 10 feet from Equipment
10. Limit Access to Essential Employees
11. Ground Crane
12. Deactivate Automatic Re-energizer



Operator Qualification/Certification



Operator Qualification and Certification - 4 Options

- **OPTION 1:**
Accredited Testing Organization
- **OPTION 2:**
Employer Qualification Program
- **OPTION 3:**
U.S. Military
- **OPTION 4:**
State/Local Government License

Option 1: Accredited Testing Organization

Nationally Recognized Accrediting Agency

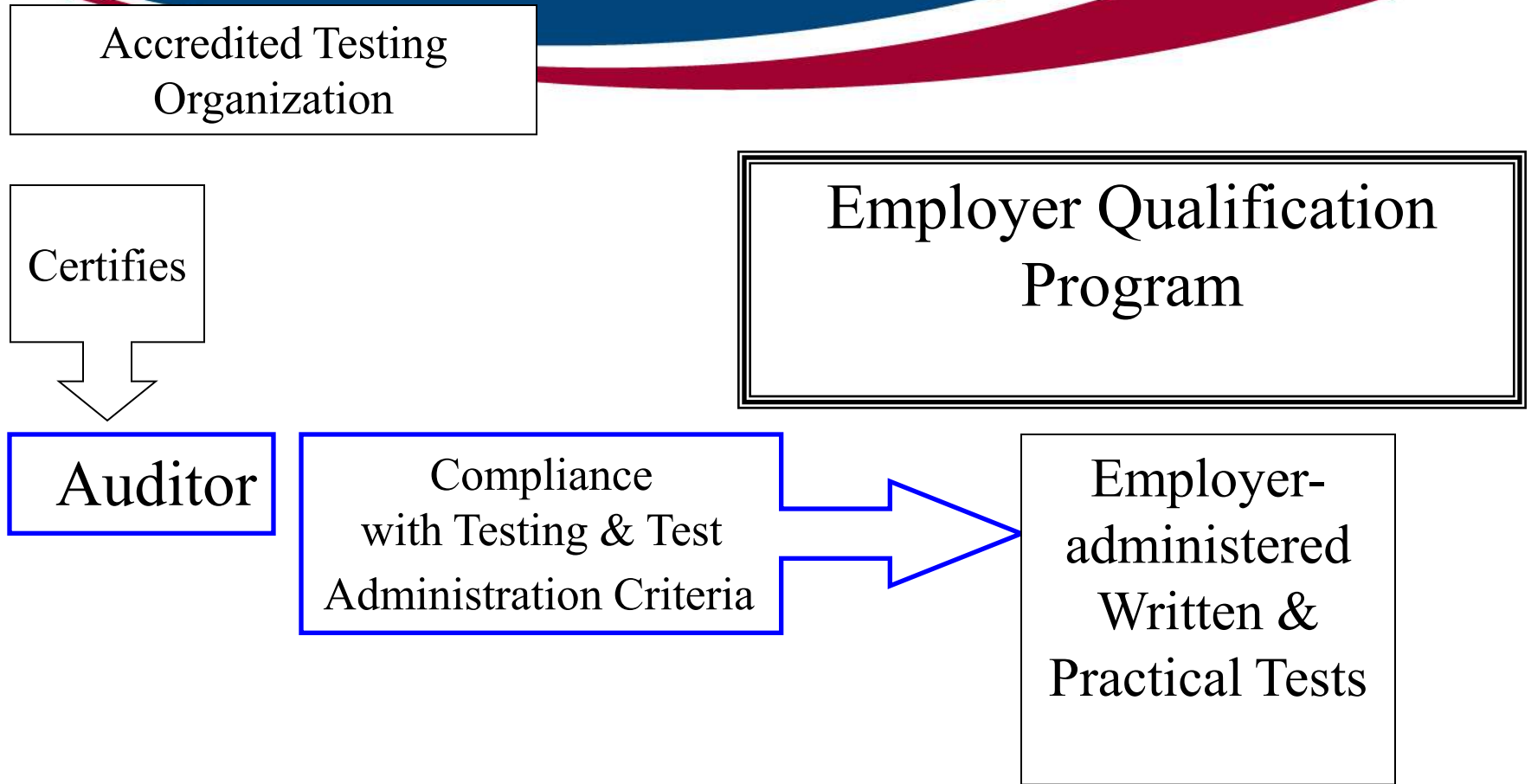
Determines
Compliance
with
Testing and Test
Administration
Criteria

Accredited Testing
Organization

Develops and
Administers the Tests
(Written and Practical) to
Certify Operators

Different Tests for
Different Capacity/
Type of Equipment

Option 2: Employer Qualification Program



Option 3: U.S. Military



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

Operator Qualification and Certification (cont'd)

Portable

Valid

Accredited Testing Organization	YES *	5 years
Employer Qualification Program	NO	5 years
US Military License	NO *	Set by issuing entity
State/Local License	NO * Valid only in entity's jurisdiction	Set by issuing entity, not > 5 years

* Subject to State & Local requirements and whether or not the military/state training meets accredited requirements.

Operator Qualification and Certification (cont'd)

Testing Criteria

- **OPTION 1:**
Accredited
Testing
Organization →
- **OPTION 2:**
Employer
Qualification
Program →
- **OPTION 3:**
U.S. Military →
- **OPTION 4:**
State/Local Gov
License →

- **Knowledge (Written Test):**
 - Controls/performance characteristics
 - Calculate capacity (with or without calculator)
 - Preventing power line contact
 - Ground support
 - Read and locate info in operating manual
 - Appendix C subjects
- **Practical Test**

Signaling



- **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 Types:**

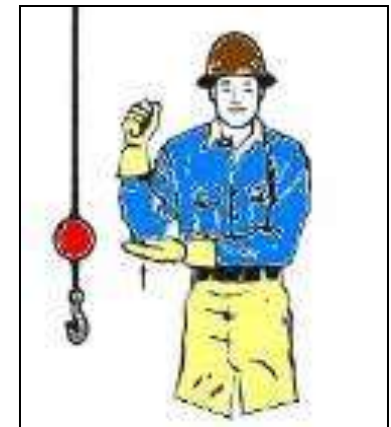
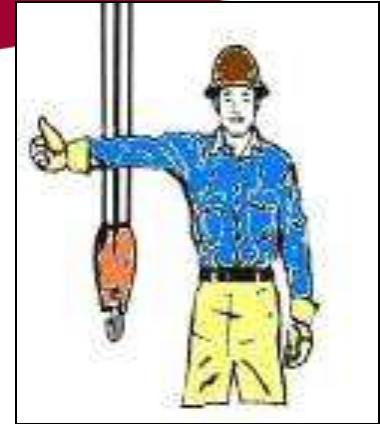
- Hand, voice, audible or “new”
- Only time an operator can use a cell phone while lifting

Signals (cont'd)

- Signal Person Qualifications**

Qualified How	Documentation	Portable
3 rd Party Qualified Evaluator	Yes	Yes
Employer Qualified Evaluator	Yes	No

- **Qualification Requirements:**
 - Know and understand signals
 - Competent in using signals
 - Basic understanding of crane operation
 - Verbal or written test and practical test



Inspections

Type of Inspection:

Who Inspects:

Modified or Repaired/ Adjusted	Qualified
Post-assembly	Qualified
Shift	Competent
Monthly	Competent
Annual	Qualified

Inspections (cont'd)

- **Shift** = Visual Inspection for Apparent Deficiencies
- **Monthly** = Documented Shift Inspection
- **Annual** = Comprehensive, Every 12 Months

Operations

- All loads that are to be received must be rigged by a qualified rigger
- Employer developed operations procedures, load charts, etc., MUST be in the cab of the crane and signed by RPE if manufacturer's manual is not available
- Distracted operator clause = no cell phone unless used for signaling
- New load weight criteria



Fall Protection

- Part CC has its Own Fall Protection Requirements
- Training Requirement Ties Back to Subpart M
- Subpart M Reference to Anchor Points



Wire Rope Inspections

- Daily – No Documentation
- Monthly – Documented
- Annual – Documented
- Category I, II or III Deficiencies



Safety Devices

- Safety Devices = Required + *Operational At All Times*
- Include:
 - Crane Level Indicator
 - Boom/Jib Stops (except Derricks)
 - Integral Holding Device/Check Valve for Outrigger Jacks

Operational Aids

- Operational Aids are Required *but* Temporary Alternative Measures are Allowed while Being Repaired
- Temporary Alternatives
 - Boom hoist limiting device, if not working:
 - Boom angle indicator or
 - Mark the boom hoist cable



Operational Aids (cont'd)

- Replacement of Parts:
 - Category I
 - Repaired within 7 days
 - Category II
 - Repaired within 30 days

Exception: unless employer has documented it ordered parts then repaired within 7 calendar days of receipt

- Category III

Tower Cranes



Tower Cranes (cont'd)

SUPPLEMENTAL REQUIREMENTS



Highlights of 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 and Annual Inspection Reports for:
 - Cranes
 - Wire rope
 - Signal person training
 - Tower crane foundation/support design

Summary

- ***Ground Conditions***
- ***Assembly/Disassembly***
- ***Power Line Safety***
- ***Inspections***
- ***Rigging***
- ***Signaling***
- ***Operator Qualification/Certification***
- ***Tower Cranes (Supplemental Requirements)***

Resources

Cranes and Derricks in Construction Final Rule

- <http://www.osha.gov/cranes-derricks/index.html>

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/>