



**Division of Occupational Safety and Health
POLICY AND PROCEDURES MANUAL**

**Compliance Directive for the Cranes and Derricks
in Construction Standard**

TABLE OF CONTENTS

Purpose.....1

Scope.....1

References.....1

A. Action.....1

B Key Elements of an Abbreviated Compliance Inspection of a Construction Worksite on Which There is a Crane.....1

C. Inspection Guidelines and Citation Policy.....3

D. Article 15.....8

E. Material Delivery.....11

F. Section 1611.1, 1611.1 – 1611.4 Assembly/Disassembly.....17

G. Section 1611.5, 1612.1 – 1612.4 Power Line Safety.....28

H. Section 1613.1 Inspections.....44

I. Section 1613.10 Wire Rope Inspections.....56

J. Section 1613.1(a) Wire Rope – Shift Inspections.....58

K. Section 1613.10(b) Wire Rope – Monthly Inspections.....60

L. Section 1613.10 (c) Wire Rope – Annual Inspections.....61

M. Section 1613.10(d) Rope Lubrication.....63

N. Section 1613.10(e) Availability of Wire Rope Inspection Documentation.....63

O. Section 1614 Wire Rope Selection and Installation Criteria.....64

P. Section 1615.1 and 1615.2 Safety Devices and Operational Aids.....68

Q. Section 1616.1 Operation and Section 1616.2 Authority to Stop.....	74
R. Section 1617.1 Signals - General Requirements.....	81
S. Section 1617.2 Radio, Telephone, or Other Electronic Transmission of Signals.....	86
T. Section 1617.3 Voice Signals – Additional Requirements.....	87
U. Section 1617.1(d) Signals – Hand Signals.....	88
V. Section 1610.7 Fall Protection.....	88
W. Section 1616.3 Work Area Control.....	94
X. Section 1616.4 Keeping Clear of the Load.....	97
Y. Section 1616.5 Boon Free Fall and Controlled Load Lowering.....	100
Z. Section 1618.1 Operator – Qualification and Certification.....	104
AA. Section 1618.2 Signal Person Qualifications.....	107
BB. Section 1618.3 Qualifications of Maintenance and Repair Employees.....	111
CC. Section 1618.4 Training.....	112
DD. Section 1616.6 Hoisting Personnel.....	121
EE. Section 1616.7 Multiple Crane/Derrick Lifts – Supplemental Requirements.....	126
FF. Section 1610.4 Design, Construction, and Testing.....	129
GG. Section 1610.6 Equipment Modifications.....	131
HH. Section 1619.1 Tower Cranes – Supplemental Requirements.....	135
II. Section 1610.8 Derricks - Supplemental Requirements.....	148
JJ. Section 1619.3 Floating Cranes/Derricks and Land Cranes/Derricks on Barges – Supplemental Requirements.....	154
KK. Section 1619.4 Overhead and Gantry Cranes.....	162
LL. Section 1619.5 Dedicated Pile Drivers – Supplemental Requirements.....	164
MM. Sideboom Cranes – Supplemental Requirements.....	166



NN. Section 1610.8 Equipment with a Rated Hoisting/Lifting Capacity of 2,000 Pounds or Less.....168

Appendix A. Reference Documents.....178

Appendix B. Sample Crane Inspection Questionnaire.....179





Compliance Directive for the Cranes and Derricks in Construction Standard

Issue Date: 6/29/2015

Revised:

Purpose: This compliance directive is intended to serve as a standard-specific reference for Cal-OSHA Compliance Officers regarding the application of Article 15 of Title 8 CCR Subchapter 4 Article 15, providing supplemental compliance inspection guidance and recommended citation policies for complex requirements.

Scope: This instruction applies Cal-OSHA-wide.

References:

- a. Title 8 CCR Subchapter 4, Article 3 – General
 - b. Title 8 CCR Subchapter 4, Article 7 - Bins, Bunkers, Hoppers, and Material Storage
 - c. Title 8 CCR Subchapter 4, Article 7 Group 1 Article 3—Special Design Requirements
 - d. Title 8 CFR Subchapter 7, Group 4, Article 25—General Mobile Equipment and Auxiliaries
 - e. Title 8 CFR Subchapter 7, Group 13, Article 92—Overhead and Gantry Cranes
 - f. Title 8 CCR Subchapter 4, Article 15, Title 8 CCR Subchapter 4 Article 15— Cranes and Derricks in Construction
- A. Action:** Regional Managers and District Managers shall ensure that Compliance Officers who must inspect worksites on which there are cranes are familiar with and follow the inspection guidance provided in this compliance directive.
- B. Key Elements of an Abbreviated Compliance Inspection of a Construction Worksite on which there is a Crane**
1. Overview.

At a minimum, the following items should be considered for any abbreviated compliance inspection of a worksite on which there is a crane. This information can serve as the basis for development of related inspection checklists. However, whenever a fatality investigation, complaint/referral inspection is conducted, or when hazardous conditions on the worksite warrant, the Compliance Officer maintains the discretion to expand the scope of the inspection to include all other applicable requirements of the crane standard. In addition, the

Inspection Guidance and Citation Policy section of this compliance directive must be referenced for more requirement-specific guidance.

2. Abbreviated Inspection Checklist.

- a. Determine the adequacy of ground conditions beneath the equipment set-up area such as the support/foundation, matting, cribbing, blocking, etc.
- b. Check for visible indications of repairs of the equipment.
- c. When overhead power lines are on the construction site, ask if the utility owner/operator was contacted and if the lines are energized. Obtain the voltage of the power lines (if known). Verify whether a work zone around the crane was demarcated and what encroachment prevention steps are being used.
- d. When a signal person is used on the worksite, verify the individual's qualifications/documentation. Acceptable documents include both physical and electronic records.
- e. Verify that the communication system being used by the crane operator and the signal person is the one specified on the signal person's qualification documentation.
- f. If lift plans are being used, verify that they are being followed.
- g. When equipment is used to hoist personnel, identify who determined that it is infeasible to use another way to reach the work area and that it is necessary to use the crane for this task. This does not apply to steel erection activities under Section 1710.
- h. Verify whether employers are holding required meetings, such as planning meetings necessary for working near overhead power lines, conducting Assembly/Disassembly (A/D), or hoisting.
- i. Inspect all rigging equipment that is available for workers to use (slings, chokers, shackles, etc.) for damage, wear, safe working load tags, capacity, and safety factor.
- j. Verify that load chart and operations' manuals are available, written in a language that the operator understands (specified on the operator's certification), and that the information is applicable to the particular crane. Ask the operator or employer where the documents are kept. For example, see if the serial number on the load chart matches that of the crane. Typically, the serial number is found on the nameplate in the cab and on the front cover of the manual.
- k. Verify operator qualifications and training. Observe crane operations and interview both the employer and the operator to determine whether the operator is competent to operate the equipment safely.

- l. Verify that the equipment and wire rope inspection requirements have been met and that the documentation is available for all inspections of the equipment. Identify who did the inspection and verify that inspector's qualifications.
- m. Determine, through interview and observation, if safety devices and operational aids are functioning through interview or observation. For example, it is possible that employees can be doing other things to compensate for aids and devices that are not functioning properly. For operational aids that are not functioning and have not been repaired, determine whether parts are on order. If parts have been received, document the date of order and/or receipt.
- n. Visually inspect the hoisting equipment, components, and load line for visible deficiencies. If needed, use binoculars to examine ropes that cannot be inspected closely from a safe position.
- o. Ask what loads have been lifted and how the operator and/or rigger are determining the weight of the load. For example, are they using a bill of lading or marked weight, the load moment indicator, or crane scale? Verify that qualified riggers are being used:
 - (1) For assembly and disassembly work, as per §1611.1 through 1611.3.
 - (2) Whenever workers are within the fall zone and hooking, unhooking, guiding a load, or making the initial connection of a load to a component or structure, as per §1616.4(c).
- p. When A/D is being performed, ask who the A/D director is and verify whether this person is at the worksite. This could be one person or a competent person who is assisted by one or more qualified persons.
- q. If there are mechanics and/or oilers working on or near the equipment:
 - (1) By observation and interview, verify their qualifications regarding the work being performed.
 - (2) Ask how they are communicating with the operator when the equipment is being operated.
 - (3) Verify that they are being protected in hazard areas in accord with §1611.21616.3.
- r. If fall protection is being used, inspect personal fall arrest systems for compliance with at § 1670(b). Note that the anchorage requirements at § 1670(b)(10) do not apply; the applicable anchorage requirements are at § 1610.7(g). The requirements for boom walkways, handrails, steps, ladders, and railings, etc., are in §§ 1610.7(b) and (c).

C. Inspection Guidance and Citation Policies

1. Introduction: This section provides compliance inspection guidance, and discussions of citation policies for requirements and regulatory text which sample citations provided in

the Field Operations Manual may not adequately address. The compliance inspection guidance often includes recommended subject matter that should be covered during interviews of individuals who work in construction.

2. Employee/Employer Interviews.

This directive's Inspection Guidance supplements information provided in the Field Operations Manual regarding interviews of individuals at the site such as the controlling employer, employer of the operator and lift crew, operator, equipment inspector, maintenance personnel, lift and A/D directors, crew members, riggers, and signal person.

3. Qualified Individuals

Often the crane standard refers to key individuals, such as an Assembly/Disassembly (A/D) director, lift director, equipment inspector, operator, registered professional engineer, or qualified rigger to make determinations related to the capacity and safe use of the equipment. Such individuals must meet the definition of qualified or competent persons, and interviews should be conducted to document the relevant credentials and level of experience of these individuals as support for a potential citation. For example, the individual should be asked to describe:

- his or her relevant experience with the equipment at the site or similar sites,
- his or her qualifications to perform the activity or make the required determination,
- the extent and duration of his or her crane-related experience, and
- any certificates, degrees, or other supporting documents related to the subject matter.

4. Tasks Required to be Performed by an Individual

In addition, several sections of the crane standard specify that safety-related tasks be performed by particular individuals, like a signal person, A/D director, lift director, equipment inspector, operator, registered professional engineer, or qualified rigger. Some of these provisions work in tandem with § 1610.1(f) to mandate that the employer ensure that required tasks are performed by these specific individuals.

5. Requesting Documentation

As a general practice, make note of any documentation provided by the employer during the inspection, such as inspection records, equipment operation manuals, employee certifications, employer-developed procedures, and modification approvals. If possible, obtain copies of such information.

a. Article 15: §1610.1. Scope

Article 15 applies to power-operated equipment, when used in construction that can hoist, lower, and horizontally move a suspended load. In addition to the general functional description of what the standard covers, the scope section lists examples of the types of equipment covered by the standard. This dual approach (functional description plus non-exclusive list of examples) is designed to accommodate anticipated changes in technology for power-operated hoisting equipment.

[Reminder: “crane” in this directive refers to cranes, derricks, and all other equipment covered by the standard.]

b. § 1610.1(a): List of Included Equipment

Such equipment includes, but is not limited to: 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 hoisting devices; cranes on monorails; tower cranes such as fixed-jib (e.g., “hammerhead boom”) cranes, luffing boom cranes, and self-erecting cranes; pedestal cranes; portal cranes; overhead and gantry cranes; straddle cranes; sideboom cranes; derricks; and variations of such equipment.

Inspection Guidance

Equipment covered by this standard can be generally identified through inspection/observation of hoisting operations when they are used at the worksite. Review of the equipment’s operations manual is often useful in determining whether it is covered under Article 15. Of particular interest are references to design in accordance with a consensus standard, items to be inspected, and frequency of inspection. In addition to the records reviews and observation of hoisting operations described above, interviews of individuals like the operator, employer, lift director and lift crew can be conducted to confirm that the equipment was used with attachments.

c. § 1610.1(b): Attachments

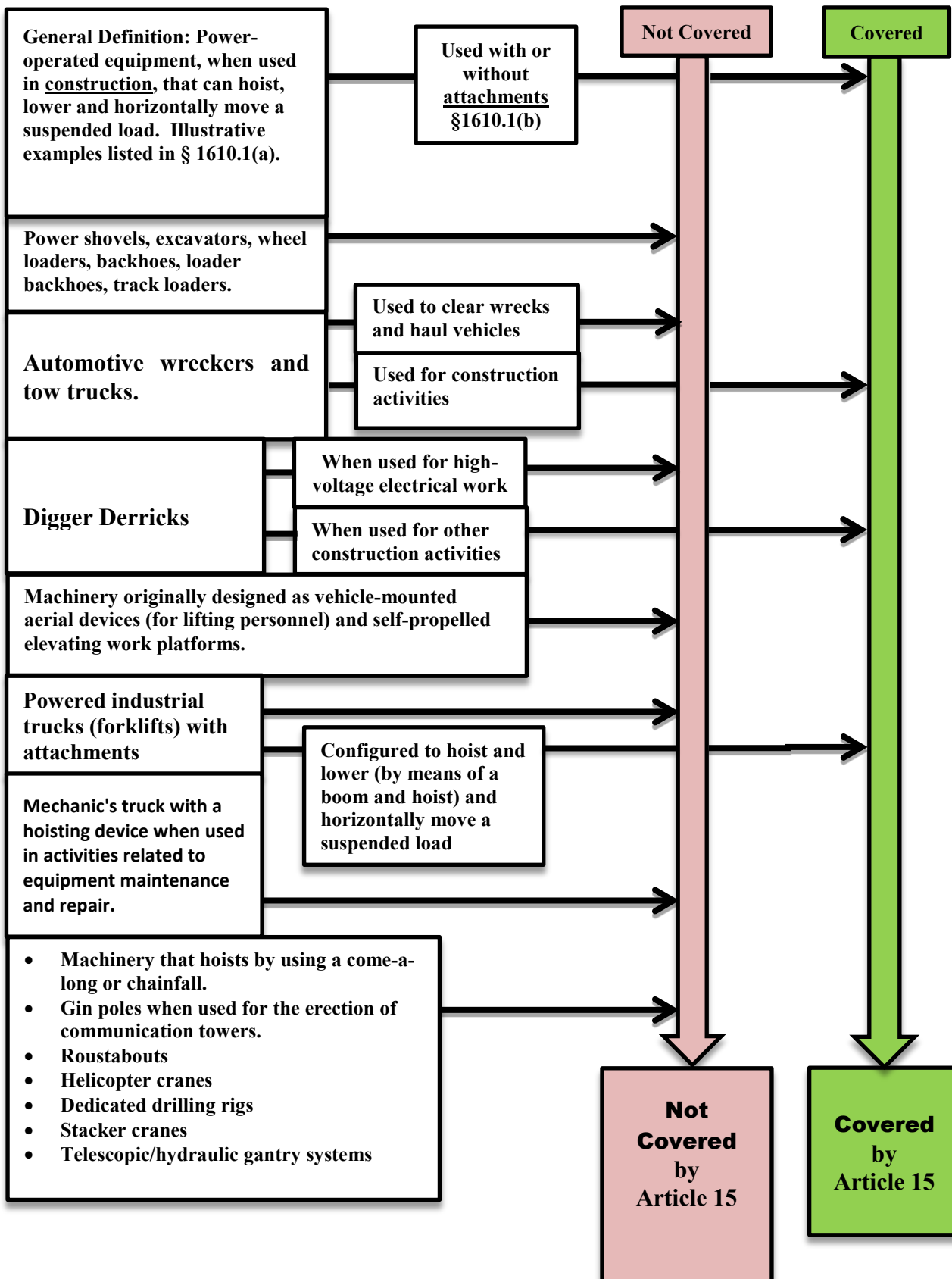
Equipment is also covered by this standard when used with the attachments listed in § 1610.1(b) regardless of whether they are crane-attached or suspended. Such attachments include, but are not limited to, hooks, magnets, grapples, clamshell buckets, orange peel buckets, concrete buckets, drag lines, personnel platforms, augers, or drills and pile driving equipment.

d. § 1610.1(c): Exclusions

Equipment Excluded from Article 15 Based on its Configuration or End Use			
Section	Equipment	Configuration and Use	Applicable standard when Not Covered by Article 15:
§ 1610.1(c)(1)	Equipment listed in 1610.1(a)	When converted or adapted for non-hoisting or lifting use. (i.e., becomes a power shovel, excavator, concrete pump, etc.)	Subchapter 4 Article 10 Haulage and Earth Moving & Article 11 Vehicles, Traffic Control, Flaggers, Barricades and Warning Signs, Subchapter 7 Group 3 Article 14 Marine Terminal Operations § 3475, Subchapter 7 Group 4 Article 25 Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment,
§ 1610.1(c)(3)	Automotive Wreckers and Tow Trucks	When used to clear wrecks and haul vehicles.	Not covered by Title 8 CCR Subchapter 4 Title 8 CCR Subchapter 4
§ 1610.1(c)(4)	Digger Derricks	When used in electric power generation, transmission, and distribution work.	Title 8 CCR Subchapter 5 Group 2 Article 36 § 2940.7
§ 1610.1(c)(8)	Powered Industrial Trucks (Forklifts)	When not equipped with a boom and hoist. (see guidance available on the OSHA Cranes and Derricks page of www.OSHA.gov/cranes-derricks/faq.html)	Subchapter 4 Article 10 Haulage and Earth Moving & Article 11 Vehicles, Traffic Control, Flaggers, Barricades and Warning Signs, Subchapter 7 Group 3 Article 14 Marine Terminal Operations § 3475, Subchapter 7 Group 4 Article 25 Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment,

§ 1610.1(c)(9)	Mechanic's truck with a hoisting device	When used in activities related to equipment maintenance and repair.	Not covered by Title 8 CCR Subchapter 4
§ 1610.1(c)(12)	Gin Poles	When used for erection of communication towers	Subchapter 5 Group 2 Article 36 § 2940.7(c) & 2944(d)[ANSI TIA-1019-A]
§ 1610.1(c)(13)	Equipment meeting the functional description or equipment listed	When used in tree trimming and removal work	Not covered by Title 8 CCR Subchapter 4 Title 8 CCR Subchapter 4
§ 1610.1(c)(14)	A vessel or barge using an affixed A-frame.	When used for anchor handling or dredge-related operations	Subchapter 4 Article 10 & 11, Subchapter 7 Group 3 Article 14 Marine Terminal Operations § 3475, Subchapter 7 Group 4 Article 25 Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment
§ 1610.1(c)(17)	Articulating/knuckle-boom truck cranes	When used to deliver building supply sheet goods and packaged materials, the fork/cradle is used; and the crane is equipped with a functioning automatic, overload-prevention device; to qualify for this exclusion, the goods or materials cannot be a prefabricated piece or arranged in a particular sequence	Subchapter 4 Article 10 Haulage and Earth Moving & Article 11 Vehicles, Traffic Control, Flaggers, Barricades and Warning Signs, Subchapter 7 Group 3 Article 14 Marine Terminal Operations § 3475, Subchapter 7 Group 4 Article 25 Industrial Trucks, Tractors, Haulage Vehicles, and Earthmoving Equipment,,

D. Article 15: Scope



1. § 1610.1(c)(4): Digger Derricks.

A digger derrick is a type of hoisting equipment that is equipped with both a boom and an auger. It is used primarily to install utility poles and perform related work in the electric utility and telecommunication industries.

In the 2011 Final Rule for Article 15, digger derricks were exempted when used for augering holes for poles carrying electric or telecommunication lines, placing and removing the poles, and handling associated materials to be installed or removed from the poles. In a subsequent rulemaking, this exemption was expanded to also include digger derricks when used for any work subject Subchapter 5 of Title 8 CCR. Any citations considered under these circumstances must be issued under Subchapter V and not under Article 15.

2. § 1610.1(c)(8): Powered Industrial Trucks (Forklifts)

- a. Partial Forklift Inclusion – Forklifts are covered by Article 15 when configured with a “winch or hook” and used like a crane. Under the scope of Article 15, however, forklifts used to suspend a load below the forks are excluded from the standard. Federal OSHA received numerous compliance inquiries requesting more guidance about the coverage of forklifts configured with booms/jibs and hoists. In response, OSHA intends to revise their standard to provide more clarity regarding forklift coverage.

The proposed change would exclude forklifts from coverage under the standard unless they are equipped with a boom and a hoist and used like a crane. OSHA believes that this amendment would ensure that the forklift exclusion aligns with OSHA’s original intent when it issued the standard. Therefore, any forklift that lifts with a boom (including the boom of the forklift itself) and a hoist would be covered by requirements of the cranes and derricks standard. For example, a variable-reach forklift would also be covered by the cranes standard if it is configured with a hoist and used like a crane. Otherwise, this forklift would continue to be covered by CCR Title 8 Articles 14 and 24 of the General Industry Safety Orders.

When GISO Articles 14 and 24 and Article 15 both address a particular hazard associated with forklifts equipped with a boom and hoist, in most cases Subchapter 4 Articles 14 and 24 would only apply as that standard directly addresses hazards associated with operation and design characteristics specific to forklifts. Article 15, on the other hand, addresses hazards unique to cranes.

- b. For more enforcement guidance regarding the use of forklifts with attachments for hoisting suspended loads, review information accessible from the OSHA Cranes and Derricks webpage of www.osha.gov/cranes-derricks/faq.html or consult your Regional Senior Safety Engineer.

3. § 1610.1(c)(11): Dedicated Pile Drivers

As specifically indicated in § 1610.1(a), the crane standard covers equipment when it is being used exclusively as a pile-driver. Cal/OSHA considers such equipment to include

pile-drivers that are used to drive posts/columns/beams into and/or extract them from the ground, either with or without the use of a load line. The standard has no limit on the size of the equipment used, the size of the posts driven or extracted, or the action of the powered hammer.

Regarding the coverage of dedicated pile drivers by the crane standard, the preamble from the proposed Federal OSHA rule explains:

- [Pile driver manufacturers] emphasized certain mechanical similarities [with cranes] and the need for timely regulation. However, they requested that the standard be adjusted to address the equipment's unique characteristics.
- The [pile driver] users on the [advisory committee] panel were particularly concerned about the need to establish required inspections for dedicated pile drivers in view of the stress placed on this type of equipment.
- The manufacturer representatives pointed out that while these machines are designed to hoist within a very limited range and capacity, it is inappropriate to use them for hoisting beyond those restricted limits.
- As a result, proposed Sec. 1619.5 Dedicated pile drivers, provides that most provisions of the standard apply to dedicated pile drivers but excludes some that the Committee believed were inappropriate for such equipment.

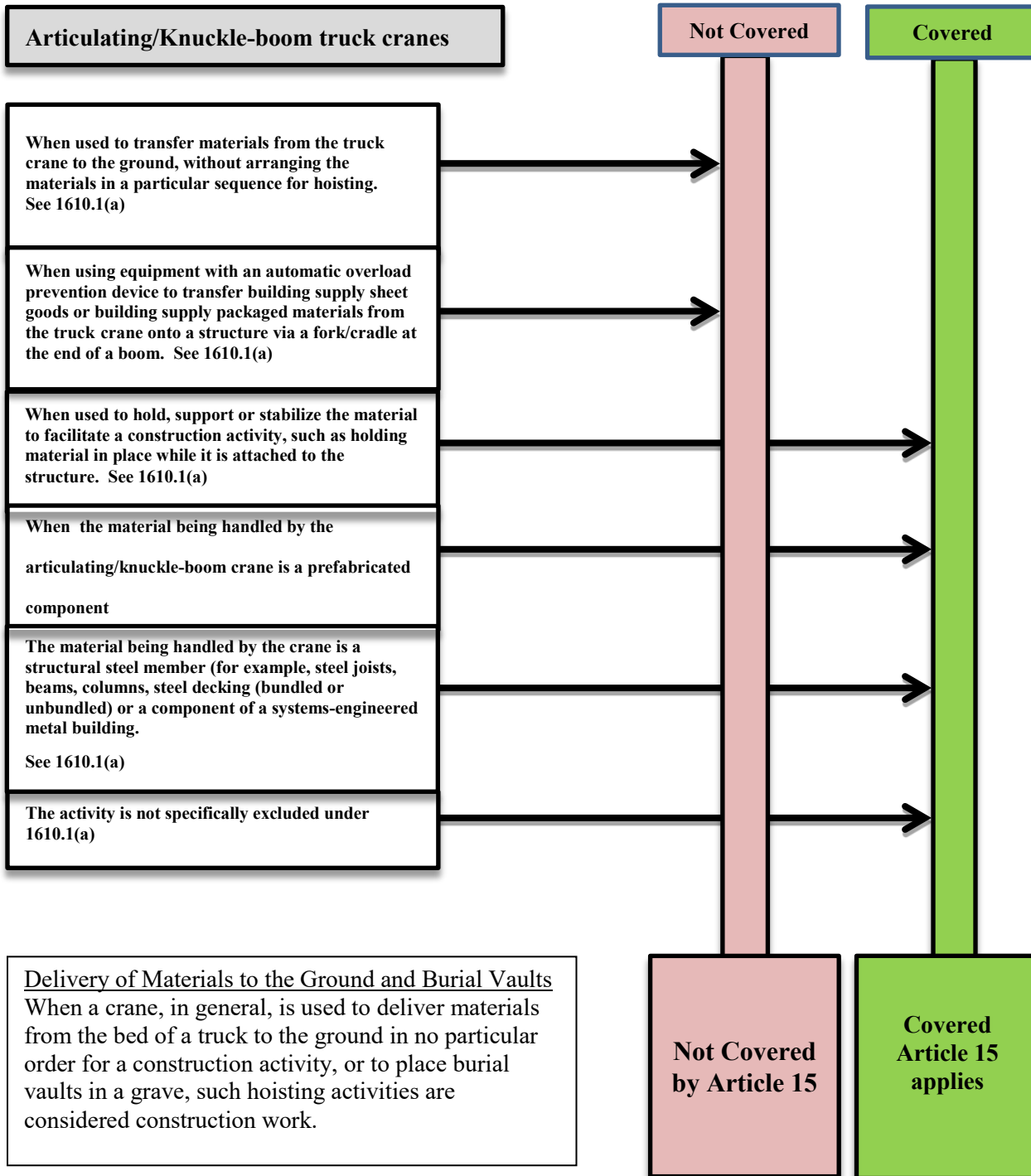
Thus, all equipment designed to function exclusively as a pile-driver is covered by Article 15. For example, a machine designed to drive and extract small posts that support guardrail systems is covered by the requirements of Article 15. It is covered even though the machine does not use a hoist, irrespective of the size of the pile or the material of which the pile is made.

Citation Policy

- a. Dedicated Pile Drivers. When equipment is being used exclusively as a pile driver, consider citations under Article 15.
 - b. Pile-Driving Attachments. In addition to citations under Article 15, which involve deficiencies with respect to the crane, in cases where a pile driving attachment is used, hazards associated with the attachment itself are covered by § 1600, Pile Driving Equipment. In those circumstances, CHSOs should consider citations for violations of applicable requirements of both Article 15 and Subchapter 4 Article 12.
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E. Material Delivery

Material Delivery



1. § 1610.5(c): Controlling Entities

Controlling entity requirements were included in Article 15 to emphasize that, in addition to any other safety obligations the controlling entity has at its worksite(s) as the result of other

requirements of Title 8 CCR Subchapter 4 Subchapter 4, the employer has two more under §§1610.51610.51616.31610.5(c).

Citation Policy

2. 1509(a)/3203(a)(3): Injury and Illness Prevention Program

This section requires the employer to ensure, via effective communication and enforcement of work rules, that an operator, crew member, or other employee performs the tasks specified for her or him by Article 15. Section 1509(a) requires that, even when other provisions of Article 15 do not explicitly include language like “the employer must” or “the employer shall ensure,” the employer is still responsible for ensuring that the requirements of Article 15 are met.

Citation Policy

§ 1509(a) is applicable to all construction activities including those required by Article 15.

3. §1610.1(e) High Voltage Electrical Work.

When an employer performs power distribution and transmission work that is Title 8 CCR Subchapter 4 is compliance with Title 8 CCR Subchapter 5 Group 2 High-Voltage Safety Orders, the employer will be considered in compliance with the requirements of § 1611.5, 1612.4, 1611.5 and §§ 1612.1 through 1612.4.

Inspection Guidance

- a. Observe the hoisting operation and document when work is being done on power lines, transformers, or related equipment. High-voltage electrical work typically involves work performed on equipment that is owned and operated by a utility. Under these conditions, the equipment must be operated by or under the direction of (for operator in training) individuals who are qualified to perform such work.
- b. Through interviews, verify the following information:
 - Who is the qualified person with respect to high-voltage electrical work?
 - What is the construction activity being performed?
 - Was the utility owner/operator contacted and when?
 - Are there any representatives from the utility owner/operator available on site?
 - Is the work being performed on energized equipment and for what purpose?
 - Is the employer opting to comply with § Title 8 CCR Subchapter 5 Group 2 High-Voltage Safety Orders instead of Article 15?

Citation Policy

c. § 1610.1(e):

Section 1610.1(e) shall not be cited because it only serves as notice to the employer that compliance with § Title 8 CCR Subchapter 5 Group 2 High-Voltage Safety Orders is acceptable instead of § 1612.4, § 1611.5 and § 1612.1 through 1612.4.

When power distribution and transmission work has been performed and the employer opted to implement the requirements of § 2940.7 of the High-Voltage Safety Orders but was not in compliance with the requirements of § 2940.7, consider a citation of applicable provisions of § 1611.5, § 1612.4, § 1611.5 and § 1612.1 through 1612.4 and identify in the Alleged Violation Description (AVD) the provisions of § 2940.7 with which the employer did not comply.

4. § 1610.1(f): Railroad Exclusion

The requirements of Article 15 do not apply to equipment designed for use on railroad tracks that are regulated by the Federal Railroad Administration (FRA).

Inspection Guidance

- a. When the equipment is used to perform construction activities on or adjacent to the “means of way” of a rail system that is regulated by the FRA, observe and document the construction activities that are being supported by the use of the equipment and where in proximity to the rails the activities are being performed.
- b. Interview the controlling employer (if any), operator, lift director (if any), and employer to determine if it was complying with FRA or Cal/OSHA regulations to perform the work.
- c. When there are doubts about the applicability of Title 8 CCR Subchapter 4 to the observed work activities, it is recommended that the Regional Office be contacted for enforcement guidance.

Citation Policy

- d. § 1610.1(f): When the tracks beneath the equipment are not regulated by the FRA, consider citations for violations of applicable requirements of § 1610.5(c). (See discussion of citation policy for § 1610.5(c). Ground Conditions, of this compliance directive for applicable requirements).

5. § 1610.5: Ground Conditions

Paragraph (c) requires the controlling entity to provide for ground conditions that meet the requirements of § 1610.5(b). Paragraph (c) also requires the controlling entity to inform the equipment operator of potential hazards beneath the equipment set-up area if said

hazards are identified by information in the controlling entity's possession. In the absence of a controlling entity, under paragraph (d), the obligation to provide adequate ground conditions falls on the employer that has authority at the site to make or arrange for ground preparations.

- a. § 1610.5(b): Establishes minimum criteria for ground conditions that must be met prior to the assembly and use of the equipment

Inspection Guidance

- b. Visually inspect the area around the equipment and note any conditions that could contribute to an unstable foundation, such as:
 - ground that appears soft, such as loose fill that has not been compacted;
 - signs of utilities buried beneath the equipment, which may indicate voids underneath the equipment;
 - excessive liquid or leaking hydraulic lines that could soften the foundation beneath outriggers/stabilizers or other equipment supports;
 - lack of drainage from the set-up area so that rain may compromise the equipment's support.
- c. Determine the degree of level of the equipment. The degree of level should be measured as close to the turntable as possible. If out of level, ground conditions may be inadequate to support the weight of the equipment.
- d. Interview the operator, lift director, or competent person who inspected the equipment to determine:
 - how the degree of level was verified,
 - what method was used, and
 - where on the equipment the degree of level was measured.

Use this information to determine if the equipment's degree of level has changed due to inadequate ground support.

- e. Photograph and record the degree of level on measuring devices and computers in the equipment cab. For example, if the degree of level is indicated on electronic gear in the cab, photograph the reading. If a device is used to measure the degree of level, photograph the device and its reading.
- f. Obtain the weight of the equipment and the dimensions of the outriggers to compare the load of the equipment at the outrigger pads to the bearing capacity of the soil, when available.

Citation Policy

- g. § 1610.5(b): When the equipment has been assembled and used before the requirements of § 1610.5(b) have been met, consider a citation of this standard.
6. § 1610.5(c): When there is a controlling entity on the project, this entity must arrange for preparations to ensure adequate ground conditions beneath the A/D or set-up area underneath the equipment.

Inspection Guidance

- a. Interview the controlling entity, the employer, operator, and lift director to determine which one:
 - has the authority to make decisions and implement changes for ground preparations before the equipment is assembled and used;
 - has any applicable site drawings, as-built drawings, soil analyses or compaction tests that may identify underground hazards;
 - is responsible for informing the operator of worksite soil conditions and known ground condition hazards.

Use this information to identify the controlling entity on the job.

- b. During interviews, also determine:
 - What ground condition hazards were observed on the site?
 - What ground preparations have been made to provide adequate ground support for the equipment set-up?
 - What information was provided to the controlling entity?
 - Who provided the information to the controlling entity?
 - What information was received from the controlling entity?
 - How was information about the ground conditions communicated?
 - Did the equipment user receive any information regarding underground hazards beneath the equipment A/D or set-up area from the controlling entity?

Citation Policy

- c. §1610.5(c): When there is a controlling entity for the project and the requirements of § 1610.5(b) have not been met, consider citations for violations of the applicable
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requirements of § 1610.5(c). If a citation is issued, it should be to the controlling entity and grouped with a citation of § 1610.5(b).

For application of § 1610.5(c), the controlling entity only needs to share information regarding underground hazards that it actually possesses. The controlling entity does not need to seek out information not in its possession to comply with this requirement. Note that a homeowner who hires a contractor is not subject to the information sharing requirement, but the controlling entity must ensure adequate ground conditions regardless of any information exchange.

7. § 1610.5(d): When there is no controlling entity on a project, the employer that has authority to make or arrange for ground preparations to meet the requirements of § 1610.5(b) is responsible for ensuring that those preparations are made.

Inspection Guidance

- a. Use facts from interviews to determine which employer has the authority to arrange for ground preparations and if that employer has made those arrangements.

Citation Policy

- b. §1610.5(d): When there is no controlling employer for the project (such as a jobsite where all of the employers are prime contractors of the owner) and the requirements of § 1610.5(b) have not been met, consider a citation of § 1610.5(d) grouped with a citation of § 1610.5(b). If a citation is issued, it must be issued to the employer that has the authority at the site to make or arrange for ground preparations needed to meet the requirements of § 1610.5(b).

Controlling employer: an employer that is a prime contractor, general contractor, construction manager, or any other legal entity which has the overall responsibility for the construction project—its planning, quality, and completion. See Title 8 section 336.10

8. § 1610.5(e): If the A/D director or operator determines that ground conditions are inadequate under § 1610.5(b), that person's employer must have a discussion with the controlling entity regarding ensuring necessary ground preparations.

Inspection Guidance

- a. Determine if the required discussion took place.
- b. The inability of the operator, employer, A/D director, or the competent person who inspected the equipment to describe how he or she determined that the equipment was

level may indicate that determinations regarding ground conditions may not have been made at all. It may also indicate that no discussion with the controlling entity occurred.

Citation Policy

- c. § 1610.5(e): Consider a citation of § 1610.5(e) grouped with a citation of § 1610.5(b) when the controlling entity was not informed of inadequate ground conditions beneath the equipment A/D or set-up area, or

If a citation is issued, it must be issued to the company operating the crane. Citing the operating company under § 1610.5(e) does not preclude appropriate citations of the controlling entity or the employer with authority to make or arrange for ground preparations for a violation of §§ 1610.5(c) or (d).

Assembly/disassembly (A/D): the assembly and/or disassembly of equipment covered under this standard. With regard to tower cranes, “erecting and climbing” replaces “assembly” and “dismantling” replaces “disassembly.” Regardless of whether the crane is initially erected to its full height or is climbed in stages, the process of increasing the height of the crane is an erection process. All assembly and disassembly operations must comply with either the procedures specified by the manufacturer or procedures developed by the employer that meet the criteria listed in Section 1406. Under either alternative, they must comply with all manufacturer prohibitions.

9. § 1610.5(f): The ground condition requirements of § 1610.5 do not apply to cranes designed for and used on railroad tracks regulated by the Federal Railway Administration (FRA).

Inspection Guidance

- a. Contact the appropriate Area or Regional Office for more enforcement guidance when there are doubts about the applicability of Title 8 CCR Subchapter 4 to the observed construction activities.

Citation Policy

- b. § 1610.5(f): Do not cite Section 1610.5(f). This section only specifies an exemption from the requirements of Title 8 CCR Subchapter 4.

F. §1611.1 – 1611.4: Assembly/Disassembly

These sections of Article 15 set forth the requirements that must be met when the equipment is being assembled or disassembled (A/D). A/D work that occurs in the vicinity of power lines are discussed in the section covering § 1611.5 in this compliance directive because it more closely relates to the provisions that address hazards related to power lines.

Equipment Set-up

The provisions of §1611.1 – 1611.4 do not apply to equipment set-up. Set-up consists of procedures conducted to deploy an assembled crane. For example, if the equipment operator merely unfolds and pins the boom of a fully assembled truck crane, it would be inappropriate to apply A/D requirements. Another example of typical set-up operations is the deploying of outriggers and leveling the equipment. Note that Article 15 does have some requirements for set-up, such as § 1610.5(c)(2), requiring that the user be informed of hazards beneath the set-up area, and § 1616.6(c), requiring level ground conditions and use of any outriggers and/or stabilizers.

1. § 1611.1(a): Manufacturer's A/D Procedures

The employer must either comply with the manufacturer's procedures or procedures developed by the employer in accord with § 1611.4.

Inspection Guidance

- a. If employer procedures are used, verify that a qualified person developed them and that those procedures cover all A/D operations. Conduct interviews to obtain and document information including:
 - the name of the qualified person who developed the employer procedures;
 - who determined that this person was qualified; and
 - what qualifications of that individual were relevant to developing employer A/D procedures.
- b. Obtain copies of any available manufacturer's prohibitions (such as hazardous information bulletins, make and model-specific warnings, or any relevant prohibitions that may appear in any operations/repair manuals), as this information may be relevant in determining whether the employer's procedures, prohibitions, and specifications are consistent with those of the manufacturer.

Procedures: include, but are not limited to: instructions, diagrams, recommendations, warnings, specifications, protocols, and limitations.

Citation Policy

- c. § 1611.1(a): When an employer implements the manufacturer's procedures for A/D but not in compliance with those procedures and all applicable manufacturer prohibitions, consider a citation for § 1611.1(a). Also, cite this requirement when the employer does not follow the manufacturer instructions or develop instructions under (b).

2. § 1611.1(b): Employer-Developed A/D Procedures

The employer has the option to develop procedures for A/D of the equipment only when it can demonstrate that the procedures meet the requirements of § 1611.4.

Inspection Guidance

- a. If employer-developed A/D written procedures were used, obtain and review any available copies to verify compliance with § 1611.1(b).
- b. Employer-developed A/D procedures are not required to be written. In cases where the procedures are not documented, interview individuals to obtain responses to questions, including:
 - Are the A/D procedures implemented at the site from the manufacturer or employer-developed?
 - How did she or he learn of the procedures?
 - What are the hazards addressed by the A/D procedures?
 - Based on the criteria listed under § 1611.4, how are hazards specified addressed by the employer-developed A/D procedures?
 - Are there any A/D hazards that are particular to the equipment being assembled or disassembled?
 - During the A/D operation, have there been any changes in A/D procedures or site conditions?
 - If the A/D procedures were revised, how were the changes communicated?

The information obtained from these interviews can also be used to verify whether employer-developed A/D procedures meet the requirements of §1611.4.

Citation Policy

- c. § 1611.1(b): Consider a citation of § 1611.1(b) when employer-developed procedures for A/D were implemented, but:
 - the employer could not demonstrate that the procedures were in compliance with the requirements of § 1611.4, or
 - the employer was not in compliance with all applicable manufacturer prohibitions.

The Alleged Violation Description (AVD) of the citation should state the specific provision(s) of § 1611.4 violated.

3. § 1611.2(a): Supervision

A/D must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (A/D director).

Inspection Guidance

- a. In addition to the facts obtained to determine application of § 1611.1, ask the employer for the following information regarding the A/D director:
 - The name or names of the A/D directors, depending on how many people are designated to perform required A/D tasks.
 - Is this individual on site?
 - If more than one individual has been assigned A/D roles, who is the competent and/or qualified person?
 - Who determined that the A/D director(s) were qualified and/or competent to be the A/D director(s)?
 - What qualifications of that individual(s) are relevant to A/D work?
 - If the A/D director is not on site, how is she or he effectively ensuring compliance with Article 15 of Title 8 CCR Subchapter 4?
 - If more than one individual has A/D responsibilities on the site, verify how their duties are divided or shared to ensure that the requirements of Article 15 are met?

Citation Policy

- b. When A/D was not supervised by an A/D director in accord with the requirements of § 1611.2(a), consider a citation of § 1611.2(a)(1) or (a)(2).
4. § 1611.2(b): The A/D Director's Knowledge of Procedures.

The A/D director must understand the applicable assembly/disassembly procedures.

Inspection Guidance

- a. In addition to the facts obtained for the application of §§ 1611.1 and 1611.2(a), verify the A/D director's knowledge of the A/D procedures by asking her or him to describe information such as:
 - When must employees be under the boom to remove or install pins and why?
 - How is adequate support provided for all parts of the equipment?

- How is dangerous movement of the equipment prevented?
- Are there movements of the equipment and why do they occur?

Citation Policy

- b. § 1611.2(b): When A/D was directed by an A/D director who did not understand or did not know the applicable A/D procedures, consider a citation for of § 1611.2(b).

Note: An A/D director may be qualified/competent but still not meet the requirements of § 1611.2(b) for a particular piece of equipment. Similarly, the individual may not be qualified/competent but still may be knowledgeable of the applicable A/D procedures. Therefore, non-compliance with § 1611.2(a) or (b) can occur independently of one another and should be considered and cited as such.

5. § 1611.2(c): A/D Director's Review of A/D Procedures

The A/D director must review the applicable procedures immediately before A/D, unless the A/D director understands the procedures and has applied them previously to the type and configuration of equipment (including accessories, if any).

Inspection Guidance

- a. In instances when the A/D director fails to demonstrate his or her knowledge of A/D procedures, use facts obtained from interviews and collection of information discussed above for the application of §§ 1611.1 and 1611.2(b) to determine when an A/D director should have reviewed procedures and if that review was in fact conducted. See Inspection Guidance above for the application of § 1611.2(b).

Citation Policy

- b. § 1611.2(c): When it has been determined that the A/D director did not understand the A/D procedures and a review of the procedures was not done by the A/D director prior to the commencement of A/D work, consider a citation of § 1611.2(c).

6. § 1611.2(d): Crew Instructions

Before the commencement of A/D work, the A/D director must ensure that crew members are trained to understand all of the information specified by § 1611.2(d).

Inspection Guidance

- a. When possible, observe the crew members' performance of the A/D operation to determine whether employees understand their roles and perform the work safely.
- b. Ask the A/D crew members to describe:

- The hazard that was addressed by the communication with the operator and/or signal person if he or she were to move to a hazardous location on or around the equipment that was out of the view of the operator.
 - Whether employees should be underneath the boom when it is being moved or its pins removed.
- c. The depth of the knowledge needed to perform the A/D job safely depends upon what tasks individuals are assigned to perform. The A/D director and employer should be interviewed to determine when and what training was provided to the crew members.
- d. Interview the A/D supervisor and ask them to describe how they verified that the crew members understood their responsibilities and the hazards associated with A/D work.

Citation Policy

- e. § 1611.2(d): When crew members did not understand their duties prior to commencing A/D operations, consider a citation of § 1611.2(d).

7. § 1611.2(e): A/D Crew Member Out of View of Operator

The employer must ensure that crew members comply with the requirements of § 1611.2(e) when they are in hazardous areas on or around the equipment that are out of view of the operator.

Inspection Guidance

- a. When observing A/D operations and if exposures are mentioned during interviews, document instances when it appears employees have been in hazardous areas of the equipment not in the view of the operator. Document information such as:
- What hazardous area was the crew member in?
 - Did the operator know the crew member was in the hazardous area?
 - Why did the crew member have to go to the hazardous area?
 - Were the operator and the crew member in voice contact with each other when the crew member went out of view of the operator?
 - How was communication maintained?
 - Was the equipment moved while the crew member was in a hazardous area?
 - Were there any other protective measures implemented to protect the crew member from being harmed while in hazardous areas and out of view of the operator?

Citation Policy

- b. § 1611.2(e)(1): If an employee goes to a location that is out of view of the operator where they may be hit by the equipment, without telling the operator, consider a citation of § 1611.2(e)(1). Group this citation with § 1610.1(f).
- c. § 1611.2(e)(2): If the operator, after being informed that an employee was moving into a location where they could be hit by the equipment, subsequently moved the equipment, consider a citation of § 1611.2(e)(2).

8. § 1611.2(f): Working Under the Boom Jib or Other Components

Inspection Guidance

- a. Visually observe the A/D operation and document/photograph any instances when A/D crew members were in/under the boom when assembly pins were being placed or removed. Note that if the pins were installed incorrectly, crew members may have to be in/under the boom to remove them. When A/D crew members are observed under the boom, jib, or other components when pins are being placed or removed:
 - Ask the A/D director to describe the procedures implemented to minimize employee exposure to unintended dangerous movement of the equipment.
 - Document why and when employees are required to be under the boom while pins are being placed or removed.

Use this information to determine the employer's compliance with the requirements of § 1611.2(f) (working under the boom, jib or other components).

Citation Policy

- b. § 1611.2(f): When the requirements for the exception in § 1611.2(f)(2) have not been met, consider a citation of § 1611.2(f)(1). Note: Section 1611.2(f)(2) shall not be cited as it only specifies the exception to the requirements of § 1611.2(f).

9. § 1611.2(g) through (q): Capacity of the Equipment/Assist Crane and Stability of the Equipment/Assist Crane and the Load

During the performance of A/D work, the employer must ensure that the requirements of § 1611.2(g) through (q) are met.

These paragraphs include requirements for: stability of the equipment, capacity limits (including assist crane), blocking materials and location, boom pick points, center of gravity of the load, pin installation/removal, boom stability and cantilevering, unintended movement of counterweights, snagging of suspension ropes and pendants, the use of outriggers, and components and configuration.

Inspection Guidance

- a. In many cases, indications that the maximum capacity of the equipment or rigging could have been exceeded can be established from:
 - information obtained from interviews,
 - the observed hoisting of unusually heavy loads where it is obvious that the load exceeds the rated capacity of the equipment or rigging,
 - damage to the equipment and rigging, such as cracks, elongations of chain links, holes, and eyes of latches, twists, irregular bends, or
 - failure of the equipment or rigging.
- b. If there are questions regarding whether or not the rated capacity of the equipment or rigging was exceeded, ask the operator, rigger, A/D director, and employer to describe how the weight of the load was determined, and whether the load exceeded the rated capacity of the equipment and rigging.
- c. When stability of the equipment or safe hoisting of the load is in question, document the rated capacities of the equipment and rigging, the weight of the load, any determinations made regarding the center of gravity of the equipment, and review operating procedures to identify any manufacturer's limitations. This information may be obtained from any available hoisting record/calculations and asking individuals such as the operator, maintenance personnel, and the qualified rigger.
- d. If present during A/D operation and through visual inspection of the equipment, verify that there were no violations of the requirements of § 1611.2(g) through (q).
- e. For example, hazardous conditions like improper blocking/supporting of the boom, use of outriggers, pin installation/removal, and snagging of suspension ropes can be identified through visual inspection of the equipment. This information should be used to support citations for violations of § 1611.2(g) through (q).
- f. When assist cranes are used to perform A/D jobs, verify from the operator and rigger and document the loads imposed on those assist cranes. For example, document how it was determined that the rated capacity of the assist crane, as indicated by its load charts for its configuration, was sufficient for hoisting counterweights.

Citation Policy

- g. § 1611.2(g) through (q): Unless specified otherwise below, when applicable requirements of §1611.2(g) through (q) have not be met, consider a citation of the specific provisions violated.
- h. § 1611.2(h): When issuing a citation for failure to address one of the hazards listed in § 1611.2(h)(1) through § 1611.2(h)(12), group each item with § 1610.1(f).

- i. § 1611.2(h)(4): When the loads imposed on an assist crane were not verified in accord with §1616.1(n) before A/D work began, consider a citation of § 1611.2(h)(4), grouped with a citation for the specific provision(s) of § 1616.1(n) violated.
- j. § 1611.2(m)(1)(B): Section 1611.2(m)(1)(B) shall not be cited because it addresses only requirements of §1610.6 that must be met during A/D work. When modifications of the equipment have been identified during a Cal/OSHA compliance inspection that occurs during the performance of A/D work, refer to the discussion of the citation policy for § 1610.6, Equipment Modification, of this compliance directive.
- k. § 1611.2(q)(5): When the requirements of § 1611.2(h)(2) and (h)(3) have not been met, consider a citation of § 1611.2(q)(5) grouped with each citation for the specific provision(s) of §1611.2(q)(5), (h)(2) or (h)(3) violated. The citation of § 1611.2(q)(5) identifies that the inadequate blocking was particular to the support of outriggers during A/D work.

10. § 1611.2(r): Rigging

During the performance of A/D work, employers must ensure that the requirements of § 1611.2(r) are met regarding rigging of loads.

Inspection Guidance

- a. All rigging required during the performance of A/D work must be performed by a qualified rigger. Ask the employer to describe how the determination was made that the rigger was qualified to perform the rigging necessary for the particular A/D job.
- b. Interview the rigger to verify her or his qualifications. Information obtained from the rigger's responses to the following questions may be relevant to their qualifications and knowledge of rigging:
 - How long have you been rigging loads?
 - What is the nature of your training? When and where were you trained?
 - Have you received any certifications for rigging?
 - Describe your prior work experiences with the type of rigging job being performed, as well as any related training.
 - How do you calculate the weight of the load and verify that it is within the crane's maximum capacity in the configuration that the crane will be used?
 - How do you determine the safe working capacity of the rigging, including all components?

- How do you determine that rigging equipment, such as slings and shackles are compatible?
- Describe an inspection of the rigging equipment?
- How do you ensure that the load will stay in control and that it is rigged to prevent displacement or unintended movement?
- Describe potential hazards of the rigging methods used under that worksite's conditions, such as weather, and how those hazards have been addressed?
- Were any synthetic slings used for rigging on this job and if so, for what applications?
- When do you determine when measures must be taken to prevent any potential damage to the rigging during the lift? For example, when softeners are needed for nylons slings or when padding is needed on edges of load?

Employers must determine whether a person is qualified to perform specific rigging tasks. Each **qualified rigger** may have different credentials or experience. A qualified rigger is a person that:

- possesses a recognized degree, certificate, or professional standing, or
- has extensive knowledge, training, and experience, and
- can successfully demonstrate the ability to solve problems related to rigging loads.

The person designated as the qualified rigger must have the ability to properly rig the load for a particular job. It does not mean that a rigger must be qualified to do every type of rigging job. Each load that requires rigging has unique properties that can range from the simple to the complex. For example, a rigger may have extensive experience in rigging structural components and other equipment to support specific construction activities. Such experience may have been gained over many years. However, this experience does not automatically qualify the rigger to rig unstable, unusually heavy, or eccentric loads that may require a tandem lift, multiple-lifts, or use of custom rigging equipment. In essence, employers must make sure that the person has the qualifications needed for the exact types of loads and lifts for a particular job and with the equipment and rigging that will be used for that job.

- c. Review any available instructions on site from the manufacturer of any synthetic slings used, observe hoisting operations, and visually inspect any synthetic slings on site to ensure that they are being used properly, are in good condition, and have not been distorted, cut, or damaged by abrasive materials during hoisting operations.

Use this information and interview evidence as described above for § 1611.1 and 1611.2(a) through (q) to identify who the qualified rigger is, her or his qualifications, and to verify that synthetic slings were used in accord with the manufacturer's recommendations, instructions, specifications, and limitations.

Citation Policy

- d. § 1611.2(r): When the requirements of § 1611.2(r) have not been met, consider a citation for the specific provision of § 1611.2(r) violated. Multiple violations of this paragraph may be grouped. For violations of Subchapter 7 Group 13 Article 101, consider a citation for §1611.2(r) and referring to the specific provision(s) of Subchapter 7 Group 13 Article 101 violated in the AVD.

11. §1611.3: Additional Requirements for Dismantling Booms and Jibs

In addition to meeting the requirements of § 1611.2, the employer must also comply with supplemental requirements for disassembly of booms and jibs.

Inspection Guidance

- a. When possible, observe the A/D operation and visually inspect the boom and jib being assembled to verify that the requirements of § 1611.3 have been met.

Citation Policy

- b. § 1611.3: (Assembly/Disassembly - Additional Requirements for Booms and Jibs) When the requirements of § 1611.3 have not been met, consider citations for violations of applicable provisions of § 1611.3.

12. § 1611.4: Criteria for Employer-Developed A/D Procedures

- a. For the employer to develop its own A/D procedures in accordance with § 1611.1(b), it must demonstrate that the plan developed meets the criteria specified in § 1611.4.

Inspection Guidance

- b. Use facts from interviews and collection of information discussed above for § 1611.1(b) to verify that the employer's A/D plan meets the criteria in §1611.4.
- c. To determine if the employer can demonstrate that its A/D plan meets the requirements of §1611.4, the employer and A/D director should be asked to describe how unintended dangerous movement of the equipment and potential collapse of parts have been addressed by requirements of the employer's A/D plan. Also, the employer should be asked to demonstrate where protective measures have been implemented and/or what work practices are used to address the hazards identified in § 1611.4.

Citation Policy

- d. § 1611.4: A violation of § 1611.4 would essentially be a violation of § 1611.1(b) as well. Therefore, when the A/D plan developed by the employer does not meet the requirements of §1611.4, consider a citation of §1611.1(b) and the AVD of the citation should state the specific provisions of § 1611.4 that were violated.

G. § 1611.5-, 1612.1-1612.4: Power Line Safety

The purpose of the power line safety provisions are to keep cranes (including cab, boom, and wires and cables, and load) away from power lines. Distance from the power lines is the primary source of safety, since many lines are not insulated. Cranes must be kept farther away from power lines with higher voltages, since the higher the voltage, the longer the distance a power source can arc to ground (here, via the crane).

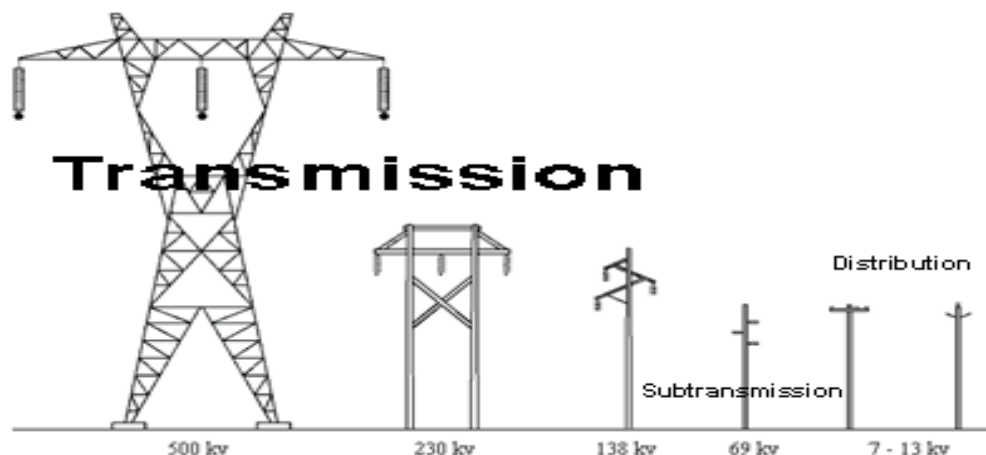
Table A in the standard, found in 1612.1, lists safe distances across several ranges of voltages. Most residential power lines are below 50 kV (kilovolts); so, the closest a crane can get to a neighborhood power line is normally 10 feet, either for assembly/disassembly (A/D) or operations. However, operations closer than Table A are not permitted.

None of the provisions of work near power lines apply to work performed under The High-Voltage Safety Orders, which is work on power lines.

Each power line must be assumed to be energized. Article 15 gives employers several options to address hazards associated with energized power lines.

If a crane does contact the power line or become energized, employers should consult any applicable manufacturer's recommendations prior to returning the crane to service. Such an event may require additional inspections if the manufacturer so recommends, and such inspections would be mandatory under § 1613.9(a).

As a reference, the picture below is from Federal OSHA's Power Transmission and Distribution e-tool and it illustrates several types of poles/structures and the typical voltages of the power lines they support.



1. §§ 1612.1-1612.4: Training

Sections 1612.1(g), 1612.2, and 1612.3 all require that the employer meet the operator and crew member training requirements of § 1612.1(g). However, these training requirements are not duplicated or referenced for the application of §§ 1611.5 and 1612.4.

In accord with § 1611.5(b)(1), a planning meeting must be conducted with the A/D director, operator, and crew members and other workers who will be in the A/D area to review the location of power lines and the steps that will be implemented to prevent encroachment/electrocution. In addition, § 1611.2(d) requires the A/D director to ensure that crew members understand the hazards associated with their tasks. The employer's compliance with these two provisions would be sufficient to ensure that workers can perform their duties safely when A/D operations must be performed closer to power lines than required clearance distances.

The equipment operator, a dedicated spotter (if needed), and any other competent person needed to make determinations required by § 1612.4 must be trained as required by other sections of Article 15. In addition to other applicable requirements of Article 15, the employer's compliance with operator certification/qualification requirements of § 1618.1, the dedicated spotter training requirements of § 1618.4(b), and for competent persons, the definition in § 1610.3, would be sufficient when the equipment is driven under a power line with no load.

Below is a discussion of training requirements that are common to § 1612.1(g), 1612.2, and 1612.3

Inspection Guidance

- a. Observe equipment operations for indications that employees may not have been trained to perform their duties safely and interview individuals including the employer, operator, and crew members to verify that they have been trained in accordance with § 1612.1(g) (all of the training requirements of § 1612.1(g) also apply to §§ 1612.2 and 1612.3).
- b. To verify training through interviews, the operator and/or crew member can be quoted elements of § 1612.1(g)'s training requirements and asked to discuss those elements and any training they received.

For example, the operator can be asked to describe the safest means for evacuating equipment that has been energized from contact with a power line. The crew members can be asked to describe how contact with the power lines is being prevented on the worksite. Both can be asked to describe the hazards that most affect crew members around the equipment or those who handle the load in the event the equipment contacts a power line. These types of questions can help determine if the individuals interviewed have been trained on the topics specified by § 1612.1(g).

- c. Also, if available, request and review copies of training materials and any records of training conducted by the employer.

Citation Policy

- d. § 1611.5: When an operator or crew member was not trained to, but was performing, A/D work closer to a power line than required clearance distances allow, consider citations for violations of applicable training provisions in other sections of Article 15 based on the

role performed by the employee. For example, consider citing § 1611.2(d)(2) for crew members who were not trained to understand the hazard of removing or not doing an encroachment protection measure required by § 1611.5(b). In such a case the AVD of the citation should describe the hazard and provision of § 1611.5(b) that the person was not trained to understand.

A citation of § 1618.4(d) could also be considered for an A/D director (a competent person) not being trained to recognize the hazards associated with performing A/D work closer to a power line than required clearance distances allow. In such a case the AVD of the citation should describe the hazard and provision of § 1611.5 that the competent person was not trained to understand.

- e. When an operator or crew member assigned to work with the equipment was not provided training or training that included all of the subject matter specified in § 1612.1(g):
- § 1612.1(g): If the equipment was operated in proximity to a power line of up to 350 kV, consider a citation for the specific provision of § 1612.1(g) on which the employee was not properly trained.
 - § 1612.2: If the equipment was operated within 50 feet of a power line of over 350 kV, consider a citation of § 1612.2. The AVD of the citation should describe the specific provision of § 1612.1(g) on which the employee was not properly trained.
 - §1612.3: Title 8 does allow equipment to be operated closer to energized power lines than the distances in Table A.1612.1
- f. § 1612.4: When an operator or crew member was not provided training that covered the hazards associated with their tasks related to the equipment traveling underneath an energized power line with no load, consider citations for violations of applicable training provisions in other sections of Article 15 based on the role performed by the employee.

A citation of § 1618.4(d) could also be considered for the operator (a competent person), or (if used) another individual who was the competent person assigned to make determinations required by § 1612.4, not being trained to recognize the hazards associated with the equipment traveling under or near a power line on the construction site with no load. In such a case the AVD of the citation should describe the hazard and provision of § 1612.4 on which the competent person was not trained.

A citation can also be considered for a violation of § 1618.4(b) when the dedicated spotter was not trained as a signal person as the definition of dedicated spotter specifies.

2. § 1611.5(c): Power Line Safety – assembly and disassembly (A/D) below power lines up to 350 kV, § 1611.5

A/D is prohibited below power lines unless the power lines have been de-energized, visibly grounded at the work site, and the employer has confirmed de-energization with the local utility. “At the worksite” means that the ground lines are within view of some part of the construction site. If it is technologically impossible for the utility to ground the power line at the worksite, the employer may station an employee at the grounding site with means to communicate with the A/D director.

When de-energization and grounding are used to make crane A/D safe, the employer is required to confirm with the electric utility that the line(s) continues to be de-energized and visibly grounded. Ideally, the utility owner/operator could confirm a time frame during which the power lines would remain de-energized and the employer should verify this information at least at the beginning of each work shift or, if changes in site conditions warrant, every four hours thereafter would be sufficient.

Inspection Guidance

- a. Interview employees and the employer and observe to determine whether a crane under a power line is being assembled or disassembled, operated, or traveling.
- b. Ask the employer if the power line has been de-energized and if there is any available documentation from the utility operator/owner confirming that the power lines have been de-energized and grounded. Use this interview and documentation to determine when the utility/owner operator was contacted and, if possible, when the utility last confirmed that the power lines remained de-energized and grounded.

Citation Policy

- c. § 1611.5(c): If an employer is performing A/D directly below an energized power line, consider citing § 1611.5(c).
 - d. § 1611.5(f): Consider citing § 1611.5(f) if the employer followed Option 1 and confirmed that the line was de-energized, but the line subsequently become energized while A/D was ongoing.
3. § 1611.5(a): A/D near power lines

Before A/D begins, the employer must make a determination whether the crane could come within 20 feet of a power line during A/D. The employer may request the electric utility to provide voltage information, and the electric utility has two working days to provide the voltage of the lines. If the crane could not come within 20 feet of the power line, the employer does not have any more obligations under §§ 1611.5(a) through (f), unless changes in the A/D plan would require a reassessment

Inspection Guidance

- a. Ask the employer if he or she determined whether the crane could come within 20 feet of any power lines.

- b. Ask the employer how they determined the line voltage.

Citation Policy

- c. § 1611.5(a): There is no requirement that the 20-foot determination in § 1611.5(a) be written or kept as a record. Thus, this provision will likely only be cited if the employer acknowledges, in response to a question from a Compliance Officer, that he or she did not make an assessment of how close the crane or its parts could come to power lines at the work site.
 - d. § 1611.5(e): If the electric utility does not provide the requested voltage of the power line within two working days, consider a citation to the utility of § 1611.5(e). See text box below on citing utilities in the Operations section § 1612.1(c).
4. § 1611.5(a)(1) through (a)(3): Assembly/disassembly (A/D) up to 350 kV that could come within 20 feet of power lines
 - a. If A/D could bring the crane closer than 20 feet to power lines, the employer must follow one of the following options:
 - Option 1: de-energize and visibly ground the line at the worksite; confirm conditions with the utility.
 - Option 2: implement the requirements in paragraph (b) of § 1611.5 to keep the crane 20 feet away; or
 - Option 3: the employer must determine the voltage and the corresponding Table A distance. The employer must then follow the requirements in paragraph (b) of § 1611.5 to keep the crane Table A distance away from the line.
 - b. Encroachment precautions for A/D under paragraph (b)

When the employer chooses to follow Option 2 (keeping the crane 20 feet away during A/D) or Option 3 (keeping the crane at least Table A distance away from the power line), the employer and operator must follow the following precautions from paragraph (b) of § 1611.5:

- Conduct a planning meeting with the A/D director, operator, A/D crew, and other workers in the area [(b)(1)];
- Use only non-conductive tag lines [(b)(2)]; and
- At least one of following measures [(b)(3)]:
 - Spotter;
 - An elevated warning line

Elevated Warning Line

"Elevated" means visible to the operator such that he or she can accurately gauge whether the load and equipment is an appropriate distance from the power line. Typically, this will mean at least 2/3 the height of the power line.

- Range limit device
- Range control device; or
- Proximity alarm

Note: The standard requires that proximity alarms be "NRTL approved."

Temporary Enforcement Policy for the use of Proximity Alarms

When used to meet the requirements of § 1611.5(b)(3), a proximity alarm must have been approved by a Nationally Recognized Testing Lab (NRTL). To date, no proximity alarm meets the NRTL requirements. Additionally, at this time, no NRTL is recognized by the Agency to perform the required testing to list, label or accept either type device. Proximity alarms which do not meet the NRTL requirements continue to be available, as they have for decades. These versions have not been "...listed, labeled or accepted by a Nationally Recognized Testing Laboratory." Cal/OSHA does not anticipate proximity alarms which meet the NRTL requirements to be available in the near future.

Because no current proximity alarms meet the NRTL requirements, employers may not rely solely on proximity alarms to comply with the requirements of the cranes standard. However, an employer may use a crane/derrick in construction with a proximity alarm in conjunction with another appropriate "measure" from §§ 1611.5(b)(3) such as a "dedicated spotter" or "range control warning device." This includes situations where voltages are over 350kV as referenced in § 1612.2.

Inspection Guidance

- c. See the Inspection Guidance section in Operations Near Power Lines § 1612.1(a)(2).

Citation policy

- d. § 1611.5(a)(2): If A/D work was performed closer than 20 feet (following Option 2) to an energized power line of up to 350 kV, or if a requirement of § 1611.5(b) was not met, consider citations for a violation of § 1611.5(a)(2). If a particular provision of (b) was violated, include a description of it in the AVD.
- e. § 1611.5(a)(3): If a requirement of § 1611.5(b) was not met (for Option 3), consider citations for a violation of § 1611.5(a)(3). If a particular provision of (b) was violated, include a description of it in the AVD. Also consider citing this paragraph if the employer did not determine the voltage of the line.

- f. § 1611.5 (d): If A/D was performed closer to a power line than table A distance, consider a citation of § 1611.5(d). Also consider citing (d) if the crane was reported to have contacted a power line or become energized, and evaluate whether the provisions of (b) were followed.
 - g. § 1611.5 (g): One electrocution hazard warning must be posted inside the crane cab within view of the operator and at least two posted on the outside of the crane (equipment). If any of these signs are not posted, consider a citation for § 1611.5(g).
5. § 1612.1: Operations of Equipment Near Power Lines Up to 350 kV

Work zone: the entire area in which the equipment will be operated. If the equipment is moved or its configuration changed, the employer must re-assess the work zone and the proximity of power lines. If the equipment will be located in more than one location, the work zone will need to include a maximum-working-radius circle at each location.

Maximum working radius: the maximum possible length of the boom (and attached jib, if applicable) that can be extended (post-assembly) during equipment operations. In other words, it is the maximum distance the boom could be extended for a fully assembled crane/derrick with or without a load. At a minimum, demarcated boundaries are required if a power line is located anywhere within 20 feet of the maximum working radius of the crane.

In general, the working radius of the equipment is calculated based on the boom angle and the length of the boom. However, when a load is suspended from the boom, the distance from the load line to the edge of the load must be included as well.

Before beginning crane operations, the employer must define the boundaries of the work zone. There are two alternatives to defining a work zone: (1) with flags, a device such as a range limiting device, a range control warning device, or other method of signaling the work zone to the crane operator; or (2) the work zone may also be defined as the entire maximum working radius of the crane, all around the crane (360 degree swing).

If the work zone is defined as in the first alternative above, the employer must prohibit the operator from operating the equipment past the boundaries. However, if the boom is kept within the work zone at less than its maximum radius, the employer does not have to follow the (b) encroachment precautions (see diagram and example excerpted from an interpretation letter to Walter B. Tucker [3/29/2012], below).

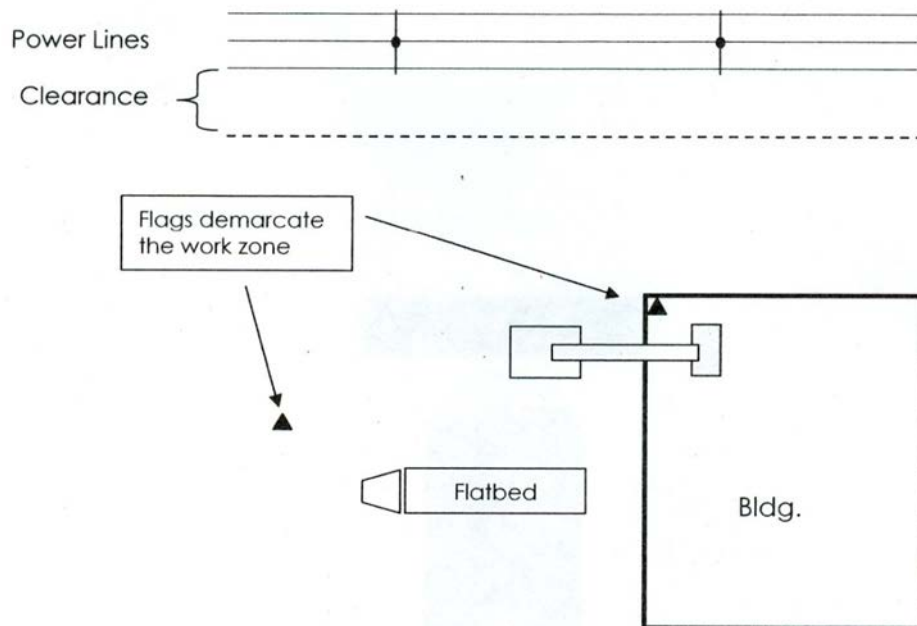
Once a work zone is defined, the employer must determine whether any part of the equipment or load, while working within the work zone up to the crane's maximum working radius, could come within 20 feet of power lines. If it could, then the employer must implement Option 1, Option 2, or Option 3 under § 1612.1(a)(2). The options are described below.

Work Zone Interpretation (Tucker March 29, 2012)

If the demarcated boundary line is located at least the minimum clearance distance from the power line, the operator must be aware that no part of the equipment or load may go past the demarcated boundary line of flags, and can judge the position of the equipment with respect to the demarcated boundary line, then §1408(a)(2) is satisfied and no further precautions are needed.

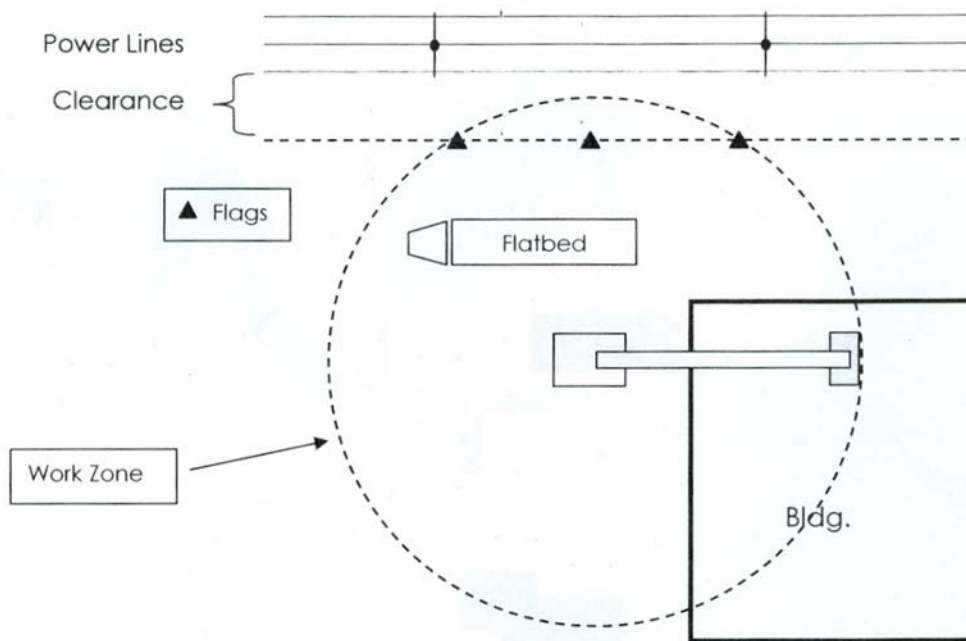
Below is an example of an ideal work zone

Example 1: Flags demarcate work zone. Within the work zone, the crane cannot reach within 20 feet of the power lines.



However, based on the interpretation of work zones, the following scenario and similar scenarios are also considered to be in compliance with the crane standard.

Example 2: Here the crane is capable of reaching within 20 feet of the power lines, yet the flags define a smaller work zone. Where the operator can see the boundary and understands not to extend beyond the work zone, the employer is in compliance with the standard and need not implement one of the three options.



Inspection Guidance

- a. The employer's compliance with many of the power line requirements can be confirmed by observing the operation of the equipment during hoisting or A/D operations. Videos and/or photos (video is recommended) should be taken of the equipment in operation next to the power lines to confirm the boom angle, boom length, and section extensions of a hydraulic boom. Also document:
 - How and where loads are suspended by the equipment--both when in operation and when left unattended, and
 - Where barriers, elevated warning lines, flags, warning signs and any other markers have been erected.
- b. Established demarcations, or landmarks like buildings, roadways, trees, etc., as reference points, should be used by the Compliance Officer to document how close to a power line the equipment was operated in order to: (1) determine if work zones and encroachment prevention methods are implemented properly, and (2) to estimate and document the boom angle and length and the distance from the equipment to the power line. If there are no visible demarcations indicating otherwise, it is likely that the employer has either defined the work zone as 360 degrees around the equipment at the maximum working radius of the equipment or has not defined a work zone at all. Use information collected from interviews and review relevant, available documentation to confirm the option chosen by the employer, if any.

Citation Policy

- c. § 1612.1(a)(1): There is no requirement that the employer's identification of the work zone be written or kept as a record. Thus, this provision will likely only be cited if the

employer acknowledges, in response to a question from a Compliance Officer, that he or she did not identify a work zone. If that is the case, consider citing § 1612.1(a)(1).

- d. § 1612.1(a)(2): There is no requirement that the 20-foot determination in § 1612.1(a)(2) be written or kept as a record. Thus, this provision will likely only be cited if the crane comes within 20 feet and the employer acknowledges, in response to a question from a Compliance Officer, that he or she did not make an assessment of how close the crane or its parts could come to power lines at the work site. If that is the case, consider citing § 1612.1(a)(2).

6. § 1612.1(a)(2): Operations that could come within 20 feet of power lines

Power lines: electric transmission and distribution lines, including “drops,” or service lines, to houses or businesses.

Only an individual who is qualified with regard to power distribution and transmission equipment can determine when a line is de-energized and, especially, properly

If the crane, when used at its maximum working radius in the work zone, may come within 20 feet of a power line, then the employer must implement Option 1, Option 2, or Option 3 under §161.1(a)(2).

- Option 1: de-energize and visibly ground the line at the worksite; confirm conditions with the utility.
- Option 2: follow the requirements in paragraph (b) of a § 1612.1 to keep the crane 20 feet away; or
- Option 3: the employer must determine the voltage and then the corresponding Table A distance. Then, the employer must follow the requirements in paragraph (b) of § 1611.5 to keep the crane Table A distance away from the line.

Differences between paragraph (b) precautions for A/D and Operations

The encroachment precautions for A/D and operations are almost identical. Both require a planning meeting, prohibit the use of conductive tag lines, and require the implementation of at least one of 5 listed precautions. They only differ in that:

- Employers engaged in A/D may use an elevated warning line as one of the 5 listed precautions under § 1611.5(b)(3)(D). An elevated warning line is always required for operations under 1612.11612.1(b)(3).
- 1612.1 Insulating links not allowed under Article 15

Encroachment precautions for operations under paragraph (b)

When the employer chooses to follow Option 2 (keeping the crane 20 feet away during A/D) or Option 3 (when the crane could approach near the distances in Table A), the employer or operator must comply with the following precautions from paragraph (b) of § 1612.1:

Conduct a planning meeting with the A/D director, operator, A/D crew, and other workers in the area;

- Use only non-conductive tag lines;
- Put up an elevated warning line, barricade, or line of signs. If the operator cannot see the lines, a spotter must be used. "Elevated" means visible to the operator such that he or she can accurately gauge whether the load and equipment is an appropriate distance from the power line; typically, this will mean at least 2/3 the height of the power line.; and

At least one of following measures:

- Proximity alarm;
- Spotter;
- Range control device;
- Range limit device; or

Note: The standard requires that insulating links/devices and proximity alarms be "NRTL approved," see following text box for explanation of temporary enforcement policy.

Temporary Enforcement Policy for the use of Insulating Links and Proximity Alarms

Because no current insulating links/devices or proximity alarms meet the NRTL requirements, employers may not rely solely on an insulating link/device or proximity alarm to comply with requirements of the cranes standard. However, an employer may use a crane/derrick in construction with an insulating link and/or proximity alarm in conjunction with another appropriate "measure" from § 1612.1(b)(4), such as a "dedicated spotter" or "range control warning device." This includes situations where voltages are over 350kV as referenced in § 1612.2

Subparagraphs (b)(4)(A) 1-4 list several performance criteria for spotters. He or she must: be equipped with a visual aid; be properly positioned; use equipment for direct communication to the operator, when necessary; and give timely information to the operator.

Dedicated Spotter

To be considered a dedicated spotter, the requirements of §1618.2 (Signal Person Qualifications) must be met. His/her responsibility is to watch the separation between the power line and equipment, load line and load (including rigging and lifting accessories), and ensure through communication with the operator that the applicable minimum approach distance is not breached.

Inspection Guidance [for A/D also]

- a. Interview the employer, operator, and signal person (if any). Ask the employer or operator:
 - Whether Option 1, Option 2, or Option 3 was chosen.
 - For Option 1, ask the employer if the power line has been de-energized and if there is any available documentation from the utility operator/owner confirming that the power lines have been de-energized and grounded. Use this interview and documentation to determine when the utility/owner operator was contacted and, if possible, when the utility last confirmed that the power lines remain de-energized and grounded.
 - For Option 1, ask the employer if the utility is operated by a local government authority. This information may be needed in scenarios where power line voltages were not provided by the utility owner/operator as the employer requested.
 - Ask if there are disconnects or reclosers on the power line and document where they are located. This information may be important in determining if the employer is operating the equipment closer than a required clearance distance to an area of the power line where unintended re-energization of the power line could occur. This information could also be used to confirm that the employer continued to ensure that the power line was de-energized when conditions of the power lines are subject to change, such as those equipped with automatic reclosers.
 - For Option 3, ask when the utility/owner operator was contacted to get the voltage of the power line and the identity of the employee of the utility owner/operator who provided that information. If necessary, contact the local utility to verify. The voltage information is necessary to determine which of the power line sections apply and will also be useful in verifying the employer's compliance with minimum approach distances established in Table A.
 - If possible, verify the height of the power line and T-arms of its support structure. Obtain any available specifications of the utility lines, T-arms, etc. This information can be used

to estimate the distance from the equipment to the power line and to obtain any related recommendations/prohibitions from the utility owner/operator.

- For Option 3, ask whether any determinations were made by the employer or a qualified person, such as the operator or lift director, regarding the ability to keep the equipment at Table A distances away from the power line. When determinations were made, identify the person who made them and ask that individual or the employer to describe their qualifications.
- If possible, interview the person who made the determination regarding work performed in proximity to the power line.
- Confirm the dates, times, persons present, and content of any meetings conducted to exchange information needed to work safely in proximity to the power lines. Planning meetings are required under the encroachment prevention methods to ensure that employees understand their assignments, the hazards of working in the vicinity of the power lines, and the protective methods being implemented.
- Verify that, if used, the dedicated spotter(s) had no other duties to distract from spotting duties.
- Obtain copies of any precautionary plans that could be used to determine if and how the employer planned to address the power line hazard. If the plans are not written, individuals can be asked to describe any precautions discussed and/or implemented on the worksite.
- Document any visible information (name of the utility operator/owner, contact number, pole identification number, voltage of lines, height of pole, etc.) posted on the power line poles in case the utility must be contacted later to get information about the power lines and support structures.

Citation policy

- b. § 1612.1(a)(2): If the work zone allows for encroachment within 20 feet and no option is implemented, consider issuing a citation for § 1612.1(a)(2).
- c. § 1612.1(a)(2): If the employer (following Option 1) does not confirm with the electric utility that the line has been de-energized and continues to be de-energized, consider citing § 1612.1(a)(2)(i) and (e). See guidance provided about the phrase “continues to be de-energized” in the discussion of § 1611.5(c).
- d. § 1612.1(c): If the electric utility does not provide the requested voltage of the power line within two working days, consider a citation to the utility for § 1612.1(c). Note that a unit of a local government may not be cited, however.
- e. § 1612.1(a)(2)(B): If crane operations were performed closer than 20 feet (following Option 2) to an energized power line of up to 350 kV, consider a violation of § 1612.1(a)(2)(B). If a

- requirement of § 1612.1(b) was not met, consider a citation of § 1611.5(a)(2)(B). If a particular provision of (b) was violated, include a description of it in the AVD.
- f. § 1612.1(a)(2)(C)(1): If the employer was following Option 3 and did not check the voltage, consider a citation for § 1611.5(a)(2)(C)1.
 - g. § 1612.1(a)(2)(C)2.: If operations were performed closer to a power line than table A distance (employer following Option 3), consider a citation of § 1612.1(a)(2)(C)2., unless the employer followed the greater safety precautions in § 1612.3 (discussed below). Also consider citing (a)(2)(C)2. if the crane was reported to have contacted a power line or to have become energized.
 - h. § 1612.1(a)(2)(C)2.: If the employer did not implement the (b) encroachment precautions (for Option 3), consider a citation of § 1611.5(a)(2) (C)2. If a particular provision of (b) was violated, include a description of it in the AVD.
 - i. § 1612.1(c): If the electric utility does not provide the requested voltage of the power line within two working days, consider a citation of the utility for § 1612.1(c).
 - j. § 1612.1(e): Consider citing § 1612.1(e) if the employer followed Option 1 and confirmed that the line was de-energized, but the line subsequently became energized while operations were ongoing. See guidance provided about the phrase “continues to be de-energized” in the discussion of § 1611.5(c).

Violation by a Utility

A utility may be cited for a violation of Title 8 CCR 1611.5(e) much like a Controlling, Creating or Correcting Employer that has no employees exposed on the job site. The utility has two working days to provide voltage information to an employer working near power lines who uses Option (3). The utility is under no obligation to de-energize a power line for an employer pursuing Option (1). If the utility will not de-energize the line, Option (1) is not available to the employer. For procedural guidance regarding such a citation please refer to the Division’s Policies and Procedures Manual Section C-1C for Multi-Employer Worksite Inspections.

7. § 1612.1(d): Crane operations below power lines.

During crane operations, no part of the crane is permitted below a power line unless the employer has confirmed with the electric utility that the line is de-energized and visibly grounded, with the following exceptions: the boom extended at maximum vertical is 20 feet (or Table A distance) below the line(s) or the employer demonstrates that de-energization is infeasible and § 1612.3 is followed.

Inspection Guidance

- a. Ask the employer how he or she made the determination that the boom, when extended completely vertically below the line, could not come within 20 feet of the power line.

Citation Policy

- b. § 1612.1(d)(1): When the work or conditions at the site did not meet one of the exceptions in § 1612.1(d)(2) and a part of the equipment, load line, or load (including rigging and lifting accessories) was below an energized power line, consider a citation of § 1612.1(d)(1).

8. § 1612.1(f): Working near transmitters or communication towers

When a crane is close enough to a transmitter or communication tower for the equipment to induce a current or electrical potential in the crane, the transmitter must be de-energized or the crane grounded and non-conductive tag lines used.

Inspection Guidance

- a. Observe the operation of the equipment and photograph and/or video the presence of any transmitters/communications towers in the vicinity of the equipment or jobsite. This information would be relevant to a violation of § 1612.1(f), discussed in the citation policy section below.
- b. Observe the area around the crane and visibly determine if there is a transmission/communication tower in sight. If there is, ask the employer or crane operator if he or she is aware that the tower is there. If the employer or operator is aware, document any determinations that have been made about the potential hazard of the crane being energized by radiation from the tower. When there is a concern that a transmission/communication tower is too close to the crane, do not approach the crane as there may not be any obvious signs that the crane may be energized. Under such conditions, verify from a reliable source, such as the owner/operator of the tower or a qualified person, that the crane is a safe distance from the transmission/communication tower or that the tower is not transmitting.
- c. When the employer determined that a transmission/communication tower creates a hazard, verify and document the qualifications of the employees who grounded the crane. Ask the employer, lift director, or operator to indicate where the crane's grounding points are. In addition, if tag lines were used, verify that they were non-conductive.

Citation policy

- d. § 1612.1(f): When crane operations are proximate to a transmitter and there may be a potential electric hazard on the crane, and the requirements of § 1612.1(f) have not been met, consider citations of the applicable provisions of § 1612.1(f) and group them when appropriate.

9. § 1612.2: Power line safety for A/D and operations over 350 kV

Over 350 to 1000 kV: For this voltage range, substitute all clearance requirements of 20 feet (in § 1611.5 A/D and § 1612.1 Operations) with 50 feet. This has the following implications:

- The employer must determine whether any equipment could come within 50 feet during A/D or while working within the work zone, thus triggering the requirement to complete one of Option 1, Option 2, or Option 3 under .1407(a) or .1408(a).
- Employers pursuing Option 2 for A/D or operations must implement precautions outlined under § 1611.5(b) or § 1612.1(b), respectively, to prevent encroachment within 50 feet.
- Operations under power lines must be 50 feet or Table A distance away when at true vertical for non-extensible booms, or fully extended and truly vertical for extensible booms.

Over 1000 kV: Safe clearance distances over this range must be established by the utility owner/operator or registered professional engineer qualified in electrical transmission and distribution. Note that 1000 kV not only means that 20 or 50 feet is insufficient clearance, but that the voltage is so high that Table A is inadequate as well. Therefore, any safe distance determination under this section would affect all distance requirements under § 1611.5 and § 1612.1, not merely those for 20 feet.

Inspection Guidance

- a. Use the Inspection Guidance provided for provisions of §§ 1611.5 and 1612.1 that are referenced by this section, § 1612.2.

Citation Policy

- b. § 1612.2(a): In general, consider a citation of § 1612.2 and the AVD of this citation should describe violations of applicable provisions of §§ 1611.5 or 1612.1, when:
 - the equipment was operated in proximity to power lines of over 350 kV through 1000 kV; and
 - the employer did not meet applicable requirements of §§ 1611.5 and 1612.1, with a minimum clearance distance of 50 feet, rather than the 20 feet for lines of 350 kV and less.
 - The citation must contain language of the violated provision of § 1611.5 or § 1612.1 as amended by § 1612.2.
- c. § 1612.2(b): When the equipment is being assembled or operated in proximity to an energized power line of over 1,000 kV and the minimum clearance distance was not determined by either the utility owner/operator or a registered professional engineer (RPE) who is a qualified person for electrical power transmission and distribution work, consider a citation of § 1612.2(b).

10. § 1612.4: Power Line Safety While Traveling Under or Near Power Lines with No Load

When traveling under or near power lines with no load, the employer must ensure that the boom or mast (and support system) is secured so that it will not contact the power line; maintain applicable clearance distances based on the voltage of the power line set forth in Table T; provide a dedicated spotter if the equipment will get closer than 20 feet to the power line; and ensure that safety concerns are addressed regarding visibility and the equipment's path of travel.

Inspection Guidance

- a. Observe the operation of the equipment and document (time, location, route taken, piece of equipment used, configuration of the equipment, part of the equipment nearest power line, etc.) when it has traveled under or near a power line with no load.
- b. Use information from this observation and any relevant facts obtained from interviews and collection of information discussed above for sections 1611.5 and 1611.7 to verify the employer's compliance with § 1612.4.
- c. When dedicated spotters are required, interview them regarding the performance of their duties, their knowledge of power line hazards, and the employer's overall compliance with requirements of § 1612.4.
- d. The operator and/or employer can be asked to describe the work practices implemented to prevent contact with the power line.

Citation Policy

- e. § 1612.4(a): This provision should not be cited because it only reminds the employer that compliance with §§ 1612.1- 1612.3 and/or § 1616.1(t) is required when the equipment travels with a load under or near a power line. In that scenario, consider citations for violations of applicable provisions of § 1612.1-1612.3.
- f. § 1612.4(b): When the equipment traveled without a load under or near a power line and the employer did not meet the all of the applicable requirements of § 1612.4(b), consider citations for violations of the specific provisions of § 1612.4(b), grouping them when appropriate.

H. § 1613.1: Inspections

Below is a summary table of inspections required under § 1613.1.

Type of Inspection	Who Conducts Inspection	Documentation Required?
Modified equipment (§ 1613.1(a))	Qualified person	No (but must comply with § 1610.6)
Repaired/adjusted equipment (§ 1613.2)	Qualified person	No
Post-assembly (§1613.3)	Qualified person	No
Each Shift (§ 1613.4)	Qualified person	No
Periodic Inspections (§1613.5)	Qualified person	Yes; keep at least three months
Annual (§ 1613.6)	Qualified person	Yes; keep at least 12 months
Severe service (§ 1613.7)	Qualified person	No
Equipment not in regular use (idle three months or more) (§ 1613.8)	Qualified person	Yes; keep at least three months
Manufacturer specifications for more thorough or frequent inspection (§ 1613.9)	Depends on when the specified items must be inspected, such as each shift, monthly, annually, etc.	No

1. §1613.1: Modifications Inspection

Equipment that has had modifications or additions affecting the equipment's safe operation or capacity must be inspected by a qualified person before initial use.

Inspection Guidance

- a. Interview the employer and/or the operator to identify who performed the modification and required inspection.
- b. Verify compliance with the inspection requirements of § 1613.1 through interviews and a review of required, available inspection and modification approval documentation.

Ask the inspector to describe what modifications were made, have them point to where they are on the equipment and how she or he determined that the modification was completed in accord with the modification approval.

- c. Obtain and review a copy of the modification approval and any available inspection records to ensure that the modification was completed and the equipment has been operating properly.

Citation Policy

- d. § 1613.1(a): If the equipment has been used and the required inspection was not conducted by a qualified person or no inspection was completed, consider a citation of § 1613.1(a).
- e. § 1613.1(a)(1) and (a)(2): If there is a violation of a requirement of §§ 1613.1(a)(1) and (a)(2), consider a citation of the specific requirement of § 1613.1(a). Multiple violations of § 1613.1(a) shall be described in the AVD of the citation.
- f. § 1613.2b: If the equipment was used even though the results of the required inspection or functional testing indicated that the modification was not done in accord with the modification approval or the equipment failed the functional test, consider a citation of § 1613.1(a)(2).

2. § 1613.2: Repairs and Adjustments Inspection

Before the equipment is used, a qualified person must inspect equipment that has undergone repairs or adjustments that are related to its safe operation.

Inspection Guidance

- a. Interview the operator, employer, and individual who conducted the required inspection to obtain the information in support of the citation policy for § 1613.2 as discussed above.
- b. When conducting a visual inspection of the equipment and its structural components, look at reasonably accessible areas of the equipment for evidence of repairs, replacement parts, and fresh welds. Look for apparent deficiencies in welds at sections of the boom such as fractures in the weld, unusual discoloration from oxidation, separation of the weld from bonding surfaces, and humps in excessively welded areas. These may be physical indications of an inadequate weld, or that it may fail if not assessed by a qualified person. 1613.2 requires adjustment/repair inspections by qualified person.
- c. When available, obtain and review manufacturer equipment criteria and any required inspection documentation for any information that would be helpful in determining if the repair/adjustment was done properly.
- d. If the manufacturer equipment criteria was not available and the employer had criteria developed by a qualified person or registered professional engineer, request this information.

Citation Policy

- e. § 1613.2(a): If the equipment has been used and the required inspection was not conducted by a qualified person or the inspection was not done at all, consider a citation of § 1613.1(a).
- f. § 1613.2(a)(1) and (a)(3): If there is a violation of the requirements of both § 1613.2(a)(1) and (a)(2), consider a citation of the specific requirement of § 1613.2(a). Multiple violations of § 1613.2(a) may also be grouped under one citation of § 1613.2(a).

For example, if a qualified person or registered professional engineer did not develop equipment criteria when the criteria was not available from the manufacturer and the

inspection was completed, but not by a qualified person, citations for violations of §§ 1613.2(a) and (a)(2)(A) may be grouped.

- g. § 1613.2(c): Consider a citation of § 1613.2(c) if the equipment was used even though:
- the results of the required inspection or functional testing indicated that the repair/adjustment was not done in accord with available equipment criteria;
 - the equipment criteria was not developed under the conditions specified in § 1613.2(b)(2); or
 - the equipment failed the functional test.

3. §1613.3: Post-Assembly Inspection

A qualified person must inspect equipment after it is assembled to ensure that it is configured in accordance with the manufacturer's equipment criteria.

Inspection Guidance

- a. Interview the operator, employer, and individual who conducted the inspection to obtain information regarding the inspector's qualifications.
- b. When available, obtain and review any documentation from the manufacturer that may be relevant to an apparently deficient assembly of the equipment.
- c. If information was not available from the manufacturer regarding the assembly of the equipment, and the employer had criteria developed by a qualified person or registered professional engineer, obtain this information.

Citation Policy

- d. §1613.3(a): If the equipment has been used and the required inspection was not conducted by a qualified person or the inspection was not done at all, consider a citation of § 1613.3b)(1).
- e. § 1613.3(b)(1) and (b)(2): If there is a violation of a requirement of § 1613.3(b)(1) and (b)(2), consider a citation of the specific requirement of § 1613.3(b). Multiple violations of § 1613.3(b) may be grouped with a citation of § 1613.3(a).
- f. § 1613.1(c): Consider a citation of § 1613.1(c) when the required inspection was conducted by a qualified person and the equipment was used even though the results of inspection concluded that:
 - the assembly of the equipment was not done in accord with available equipment criteria; or

- the assembly of the equipment did not meet the equipment criteria developed under the conditions specified in § 1613.1(b)(2)) when equipment criteria was not available from the manufacturer.

4. § 613.4: Each Shift Inspection

Before each shift, a competent person must begin an inspection of the equipment that will be used. The inspection must be completed before or during that shift, and must include observation for apparent deficiencies. Taking apart equipment components and booming down is not required unless the visual inspection or trial operation indicates that these actions may be necessary. Determinations made during the inspection must be reassessed based on observations made during operation.

Inspection Guidance

- a. Observe the operation of the equipment (if being operated), and visually inspect the equipment for any apparent deficiencies, such as signs of excessive wear, rusting, damage, misalignment, leakage, missing components, etc., in the items specified under §§ 1613.4(a)(1)-(14).
- b. Since documentation of this inspection is not required by Article 15, the competent person can be asked to describe what parts of the equipment he or she inspected. If any apparent deficiencies are observed during the Compliance Officer's visual inspection of the equipment, interview the inspector/competent person to determine:
 - if the inspection has been completed or how much has been done. This is relevant because the inspector or the employer may try to argue that the inspection has not been completed only after a deficiency is found during the compliance inspection by the Compliance Officer.
 - if the competent person/inspector made any determinations regarding the safety of any apparent deficiencies.
 - if an apparent deficiency found during the Compliance Officer's compliance inspection exists on an item that was already inspected by the competent person or existed during the shift before. This is relevant because if the competent person/inspector did find the deficiency (that is determined to be a hazardous condition) during his or her inspection, this would be an indication that the Compliance Officer needs to investigate why the equipment has not been taken out of service.
 - how the competent person determined that an apparent deficiency was not a safety hazard. Especially since the equipment may be operated while a shift inspection is in the processes of being conducted, evidence regarding knowledge of the hazard should be documented. Consult the Area Office or Regional Construction Coordinator if there still are questions regarding the safety of any apparent deficiency.

The information collected above can be compared to the 14 items specified in §§ 1613.4(a)(1) through (14) and used to gauge the level of experience of the inspector and whether the inspection was conducted. In addition, an employer's use of equipment for several months without retaining monthly inspection records may indicate that inspections were not conducted during each shift.

Citation Policy

- c. § 1613.4(a): When a competent person did not complete the required inspection before or during that shift, consider a citation of § 1613.1(a).
- d. § 1613.1(d)(2): When a safety hazard exists in an item required to be inspected under §§ 1613.4(a)(1) through (a)(14) and the equipment has not been taken out of service after a competent person determined that the deficiency is a safety hazard or because the deficiency was not evaluated, consider a citation of § 1613.4(b). The AVD should state the provisions of §§ 1613.4(a)(1) through (a)(14) that describes the deficiencies.
- e. § 1613.4(b): Section 1613.4(b) shall not be cited alone because it only serves to remind the employer that compliance with §§1615.1(b) and 1615.2(b) are required and that the equipment must be taken out of service when safety devices and operational aids are not functioning properly unless alternative measures for operational aids have been implemented. If those provisions are violated, consider grouping each violated provision with a citation for § 1613.4(b).

5. § 1613.5: Periodic Inspections

A competent person must complete a monthly inspection of the equipment in accordance with the requirements of § 1613.4.

Inspection Guidance

- a. The same information obtained from the visual inspection and interviews with employees described above for Each Shift Inspection can be used to verify that a monthly inspection has been conducted.
- b. Request and review the documentation from the last three months of monthly inspections (Article 15 requires the documents to be maintained for that period.) Although the unavailability of required inspection records can be an indication that the Monthly inspection was not conducted, the competent person can be asked to describe what parts of the equipment he or she inspected. This information can then be compared to the 14 items specified in§ 1613.4(a)(1) through (a)(14) and used to determine whether the inspection was conducted but not documented. Also, the lack of monthly inspection documentation can also be an indication that Each Shift Inspections have not been conducted.
- c. Review the required monthly inspection documentation to determine if it meets the requirements of § 1613.5(a)(3).

- d. If any items requiring repair or further observation are noted on the monthly inspection records, document any information obtained from interviews regarding how the safety of the equipment was ensured until the equipment could be repaired.
- e. Review prior inspection records for any further information that could be used to gauge the duration and condition of an apparent deficiency.

Citation Policy

- f. § 1613.5(a)(1): Consider a citation of § 1613.5(a)(1) if the equipment was in service for at least a month:
 - without a monthly inspection being completed or being completed by a competent person,
 - or if the monthly inspection was completed by a competent person but the inspections were not conducted in accord with the requirements of § 1613.5(a). Consider grouping the citation of § 1613.5(a)(1) with each specific requirement of § 1613.4(a) violated. Multiple citations for violations of § 1613.4(a) shall be described in the AVD of the citation.
- g. § 1613.5(a)(2): Section 1613.5(a)(2) only serves to remind the employer that compliance with §§1615.1(b) and 1615.2(b) are required for monthly inspections, and that the equipment must be taken out of service when safety devices or operational aids are not functioning properly unless alternative measures for operational aids have been implemented.

Consider a citation of § 1613.4(b) if the equipment was used when the most recent monthly inspection documentation or information from interviews (when the first monthly inspection is being conducted) indicates that hazardous conditions were identified in at least one of the items required to be inspected under § 1613.4(a). In this situation, § 1613.1(b) would be cited instead of § 1613.5(a)(2) because § 1613.4(b) already prohibits the equipment from being used until identified safety hazards are corrected. Consider grouping citations for multiple violations of § 1613.4(a). Refer to citation policy above for the application of § 1613.4(a).

Also consider a citation of §§ 1615.1 or 1615.2 if the equipment has been operated with a safety device or operational aid not properly functioning and the actions specified in §§ 1615.1(b) and 1615.2(b) were not taken.

- h. § 1613.5(a)(3): If there is violation of a requirement of § 1613.5(a)(3), consider a citation of the specific requirement of §§ 1613.5(a)(3) .

6. § 1613.6: Annual Inspection

At least every 12 months, a qualified person must inspect the equipment in accord with § 1613.4(d) (each shift inspection) and the additional inspection criteria specified under §§ 1613.6(b)(1) through (23).

The employer must also ensure that:

- the inspection included functional testing to determine whether the equipment is functioning properly as configured. In general, functional testing means that the equipment must be operated to ensure that it can travel as necessary, brake, steer, hoist, and move loads as configured and with the use of properly operating safety devices and operational aids.
- any deficiency that a qualified person has determined is not a safety hazard is monitored in monthly inspections.
- equipment with a safety hazard is taken out of service until the deficiency is corrected, except when an alternative measure allowed by Article 15 has been implemented.
- the employer that conducted the annual inspection documented and retained the inspection records for a minimum of 12 months.

Inspection Guidance

- a. Observe the operation of the equipment (if being operated), and visually inspect the equipment for any apparent deficiencies, such as signs of excessive wear, rusting, damage, misalignment, leakage, missing components, etc., in the items specified under §§ 1613.4(a) and 1613.5(b).
- b. Conduct interviews to verify whether an annual inspection has been completed. Request and review the required annual inspection documentation to verify that the employer has met the requirements of § 1613.5.

Citation Policy

- c. § 1613.5(a): Consider a citation of § 1613.5(a) if the equipment was not inspected:
 - by a qualified person,
 - in accord with § 1613.4 (each shift inspection), and
 - in over 12 months and has been kept in service.

If the annual inspection was completed by a qualified person but the inspection was not conducted in accord with the requirements of § 1613.4(a), consider a citation of § 1613.6(a). The AVD for this citation should describe the provisions of § 1613.1(d) which the employer did not meet.

- d. § 1613.6(b): Consider a citation of § 1613.6(b)(2) if the equipment was not inspected:
 - by a qualified person,
 - in over 12 months and has been kept in service, and

- in accordance with the additional inspection criteria specified under § 1613.6(b)(1)(i) through (b)(20).

If the annual inspection was completed by a qualified person but the inspection was not conducted in accordance with the requirements of § 1613.6(f), consider a citation of § 1613.6(b) grouped with each citation of the most specific provision or provisions of §§ 1613.6(b)(1) through (b)(20).

- e. § 1613.6(c): If the annual inspection was conducted by a qualified person but functional testing was not performed to determine whether the equipment was functioning properly as configured during the inspection, consider a citation of § 1613.6(c).
- f. § 1613.6(d): If a qualified person identified an apparent deficiency during the annual inspection but did not immediately make a determination as to whether the deficiency was a safety hazard, consider a citation of § 1613.5(d). If an annual inspection is in progress while the equipment is still in service, a determination must be made regarding the safety of any new apparent deficiencies identified by the Compliance Officer during the compliance inspection. In addition, the equipment must be taken out of service or appropriate corrective actions must be taken to prevent the equipment from being used while an identified safety hazard exists on the equipment.
- g. § 1613.5(e): If a certifying agency determined that an apparent deficiency was a safety hazard but the equipment was not taken out of service and no temporary alternative measures allowed by Article 15 were implemented, consider a citation of § 1613.5(e).
- h. § 1613.6(f): Consider a citation of § 1613.6(f) if, after a certifying agency determined that the deficiency was not yet a safety hazard and that the deficiency still needed to be monitored, the employer did not ensure that the deficiency was monitored in monthly inspections.
- i. § 1613.6(g): If the inspection was completed but not documented, maintained, and retained for 12 months by the employer that conducted the inspection, consider a citation of § 1613.6(g). If the inspection was maintained properly and documented but:
 - § 1613.6(g)(1)(A): If the documentation but did not include a list of the items inspected and the results of the inspection, consider a citation of § 1613.1(g)(1)(A).
 - § 1613.6(g)(1)(B): If the documentation did not include the name and signature of the person who conducted the inspection and the date, consider a citation of § 1613.6(g)(1)(B).

Multiple citations proposed under § 1613.6(g) may be grouped under one citation.

7. § 1613.7: Severe Service Inspection

A qualified person must conduct an inspection of the equipment when the severity of the equipment's use or conditions to which it has been subjected are such that there is a reasonable probability of equipment damage or excessive wear.

Examples of such use or conditions include, but are not limited to loading the equipment at or near its maximum rated capacity, shock loading the boom, or prolonged exposure to a corrosive atmosphere and when harsh activities like pile driving, demolition, and dredging are performed.

Inspection Guidance

- a. The same type of information obtained from the Compliance Officer's observation of equipment operation, visual inspection of the equipment, and interviews with employees can also be used to determine if the equipment was operated under severe conditions. Using this information, also verify whether a severe service inspection has been conducted when conditions of the equipment's use warrant.
- b. Beyond documenting the monitoring of apparent deficiencies that are not yet safety hazards, there is no documentation required for this inspection. If possible, interview the qualified inspector to determine:
 - why the equipment was or was not inspected in accord with § 1613.7;
 - the identification of any apparent deficiencies that she or he identified during the required inspection;
 - what, if any, determinations were made regarding the safety of the apparent deficiency; and
 - what kind of information was used in making this determination and how she or he came to those conclusions.

Citation Policy

- c. § 1613.7: If the equipment was used or exposed to severe conditions and was used again:
 - before being inspected by a qualified person, consider a citation of § 1613.7.
 - § 1613.7(a) through (c): After the equipment was inspected by a qualified person but at least one of the requirements of § 1613.7(a) through (c) were not met, consider a citation of the specific provision of § 1613.7 that was not met.
 - When violations of §§ 1613.7(b) or (c) occur, the AVD for this citation should describe the provisions of § 1613.6 that were not met by the employer.
8. § 1613.8: Inspection of Equipment not Regularly Used

Equipment that has been idle for 3 months or more must be inspected by a qualified person in accordance with § 1613.5 (monthly inspection).

Inspection Guidance

- a. Typically, equipment covered by Article 15 would not be sitting idle for over three months on an active construction site. However, there may be occasions when the use of the equipment to perform construction is: infrequent on a site; has been interrupted for extended periods; or occurs on the same site where general industry activities are more frequently performed and the equipment is also stored until needed. Visually inspect the equipment and area around it for signs that the equipment has been idle for an extended period of time such as:
 - severe weathering of the equipment like light, flakey rust on the brakes, visible wire ropes, hoisting mechanisms, exhaust manifolds, and other frequently moved or heated parts;
 - vegetation growth around/underneath the equipment that is inconsistently higher than on the rest of the construction site;
 - the absence of tracks to/from the equipment in loosely compacted soil;
 - the presence of expired tags or out-of-date inspection documentation.
- b. If there is equipment on the site that appears to have been idle for an extended period of time, ask the employer, operator, lift director, or maintenance personnel to describe:
 - when was it last used and the construction activities the equipment was used to support;
 - how frequently the equipment has been used at the site; and
 - the equipment's status regarding who has inspected it, and how inspections occurred.

This information, along with the start and stop dates of the construction activities involving the equipment, may provide information regarding how long the equipment was idle.

Citation Policy

- c. When equipment has been idle for 3 months or more and has been used before it was inspected in accordance with § 1613.8, a citation of § 1613.8 should be considered.

9. § 1613.9: Manufacturer-Recommended Inspections

The employer must comply with any part of the equipment manufacturer's procedures regarding inspections that relate to safe operation. For example, for multi-purpose machines, sideboom cranes, and non-traditional hoisting equipment such as forklifts configured like a crane, the manufacturer may recommend: more frequent or extensive inspections; or the inspection of

equipment parts not listed in the requirements of Article 15. This provision requires the employer to conduct the inspections as per the manufacturer's recommendations when they pertain to the safe use of the equipment. Another example would be the inspection of a safety device, operational aid, or a critical part of a control system that is more comprehensive or has a more frequent schedule of inspection than required by § 1613.1 through 1613.9.

If a manufacturer required inspection supplements any of § 1613.4 through 1613.9's shift, monthly, or annual inspections, the expertise required for that inspection applies to the manufacturer's required inspection as well. For example, if the manufacturer requires additional inspections each shift, those inspections must be conducted by a competent person. If the manufacturer requires additional inspections each year, those must be done by a qualified person. If the manufacturer requires inspections separate from the shift, monthly, and yearly inspections required by § 1613.4 through 1613.6, those must be done by a competent person unless the manufacturer requires a higher level of expertise.

Inspection Guidance

- a. Review the equipment manufacturer's procedures to verify that there are no other safety-related inspections required by the manufacturer. For example, some newer equipment may be made of composite materials or designed to handle greater loads but may have structural tolerances that are less forgiving than older model steel cranes. Therefore, additional inspections may be required by the manufacturer for particular configurations of the equipment, during the use of some attachments, or under specified worksite conditions.
- b. Ask the employer, operator, maintenance personnel on site, and any equipment inspectors that are available if they are aware of any safety warnings or bulletins from the manufacturer that contain information on safety-related inspections. In some cases, information the manufacturer has acquired over years of product use may trigger the manufacturer to recommend more frequent inspection of the equipment.
- c. If the crane comes in contact with a power line or become energized, employers should consult any applicable manufacturer's recommendations prior to returning the crane to service. Such an event may require additional inspections if the manufacturer recommends them, the inspections would be mandatory under § 1613.9(a).

Citation Policy

- d. § 1613.9(a): If an employer fails to comply with any part of the equipment manufacturer's procedures regarding inspections that relate to safe operation of the equipment, consider a citation for each violation of § 1613.9(a).

10. § 1613.9(b): Availability of Inspection Documentation

All documents produced under § 1613.1 through 1613.9 must be available during the applicable document retention period to all persons who conduct inspections required by § 1613.1 through 1613.9.

Inspection Guidance

- a. Interview the inspectors to ensure that the employer has made the information available to them in accord with this provision.
- b. Article 15 occasionally specifies where particular documentation must be kept, such as on the equipment. However, when records must only be available, it is reasonable to allow employers time to access computers and facsimiles to retrieve information electronically because many employers may not keep the records at that particular jobsite.

Citation Policy

- c. § 1613.9(b): When documentation required by this section is not available to individuals who must conduct inspections required by the crane standard, consider a citation for each violation of § 1613.9(b). For example, if the employer is not able to make the annual and monthly inspection records available, separate citations for these violations can be considered to reflect the gravity of the hazardous condition of the equipment.

This provision shall not be cited merely because the documentation is not available to the Compliance Officer.

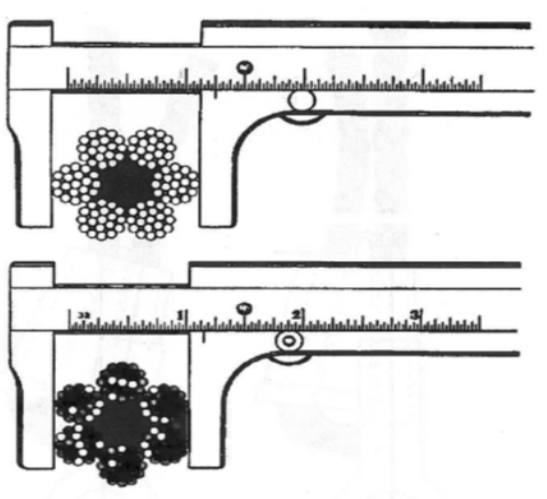
I. § 1613.10: Wire Rope Inspections

1. Inspections of wire rope must be conducted each shift, monthly, and annually.

Type of Inspection	Who Conducts Inspection	Documentation Required?
Shift (§ 1613.10(a))	Qualified person	No
Monthly (§ 1613.10(b))	Qualified person	Yes; keep at least three months
Annual (§ 1613.10(c))	Qualified person	Yes; keep at least 12 months

If the compliance inspection of the wire rope is a result of a rope failure, secure seized sections containing broken pieces of the wire rope for subsequent forensic analysis. Seizing is a method using wire to wrap the wire rope on both sides of an area to be cut in order to keep the wire rope from un-stranding. If the wire rope appears to be worn, calipers can be used to measure the circumference of the rope as show.

Correct



The upper illustration shows the correct method to measure wire rope. Note that the strands are oriented such that the rope's maximum width is measured.

Incorrect

Table: Wire Rope Deficiencies

Deficiency Category	Wire Rope Deficiency Description
<p>Category I (§ 1613.10(a)(2)(A))</p>	<p>Significant distortion of the wire rope such as kinking, crushing, un-stranding, birdcaging, signs of core failure, or steel core protrusion between the outer strands.</p> <p>Significant corrosion.</p> <p>Electric arc damage or heat damage.</p> <p>Improperly applied end connections.</p> <p>Significantly corroded, cracked, bent, or worn end connections.</p>
<p>Category II (§ 1613.10(a)(2)(B))</p>	<p>Visible broken wires for running wire ropes, for running rotation-resistant ropes, and in pendants or standing wire ropes. For the number of broken wires for each type, see § 1613.10(a)(2)(B)(1).</p> <p>A diameter reduction of more than 5 percent from nominal diameter.</p>
<p>Category III (§ 1613.10(a)(2)(C))</p>	<p>For rotation-resistant rope, a core protrusion or other distortion indicating core failure.</p> <p>Prior electrical contact with a power line.</p> <p>A broken strand.</p>

J. § 1613.1(a): Wire Rope--Shift Inspections

1. A competent person must begin a visual inspection before each shift the equipment is used and complete the inspection before or during that shift. The competent person must inspect wire ropes (running and standing) likely to be used during the shift for apparent deficiencies. Neither untwisting (opening) of wire rope nor booming down is required. Booming down to perform this inspection at the worksite may not be practical for a variety of reasons, therefore the Compliance Officer should be prepared to inspect the boom at a distance in many cases.

Inspection Guidance

- a. Observe the operation of the equipment and visually inspect the wire rope for any of the apparent deficiencies described in § 1613.10(a)(2). Wires broken from fatigue often can only be seen at close range, at perhaps from 3 to 4 feet. Without booming down, or if the rope is moving rapidly, the broken wires may not be seen. For example, the wire ropes that raise and lower the boom on mobile cranes run over sheaves that may be 20 to 30 feet at the top of a gantry or mast. If the boom is not raised or lowered significantly during use, the working section of rope may not return to be visible on the winch drum where it can be more easily seen. A significant amount of fatigue damage can occur, leading to catastrophic failure before an annual inspection can be made. Therefore, when necessary, binoculars should be used to facilitate spotting signs of wire rope deficiencies like fatigue breaks, arc strikes, and valley breaks due to shock loading.
- b. Core damage in rotation resistant wire ropes, such as that which could exist at connection and clipped termination points, is not easily detected during a visual inspection. Therefore, if rotation-resistant rope is used for the rigging in service, inspect the rigging and verify that it has been assembled and used in accordance with also the recommendations of the manufacturers of the rotation-resistant rope. If apparent deficiencies in the rope are observed during the Cal/OSHA compliance inspection, use calipers to measure the rope's diameter at the damaged area, document the measurement, and compare it to the specifications of the manufacturer. Use the manufacture's recommendation to determine if the wire rope should be replaced.
- c. Since Article 15 does not require documentation of shift inspections, ask the inspector/competent person to describe the sections of the wire rope he or she inspected. Compare this description with the deficiencies observed during the Cal/OSHA compliance inspection to gauge the inspector's experience level and to verify that the inspector completed the inspection.

If there are doubts about whether the competent person completed the inspection, or an apparent deficiency is observed during the Cal/OSHA compliance inspection, ask the inspector/competent person:

- to describe how he or she conducted the rope inspection;
- if he or she has completed the inspection;

- how he or she determined whether there was a deficiency;
- if he or she inspected the deficiency; and
- if he or she made a determination regarding whether the deficient equipment is a safety hazard.

Verify whether the inspection is on-going and whether an apparent discrepancy has been identified by the inspector. This helps in establishing employer knowledge of the hazard. If an apparent deficiency in the wire rope was identified, the competent person must determine if there is a safety hazard.

- d. For example, if the Compliance Officer observes a damaged section of the wire rope that has not been inspected, the safety of that apparent deficiency must be evaluated by the competent person or qualified person (if needed). Under such a scenario, if it is determined that the wire rope deficiency is a safety hazard, the wire rope must be taken out of service.
- e. If the wire rope has been in service for several months, the employer's failure to produce monthly inspection records may indicate that it was not conducting inspections each shift. However, conduct interviews with the employer, crew members, available inspectors, available maintenance personnel and the operator to verify compliance with the inspection requirement for each shift.
- f. If there are apparent deficiencies in the equipment, ask and document how the competent person determined that an identified deficiency was not a safety hazard. Use this information to confirm that the competent person conducted the required inspection.

Citation Policy

- g. § 1613.10(a)(1): If a qualified person did not conduct an inspection during a shift during which the equipment was used, consider a citation of § 1613.10(a)(1).
- h. § 1613.10(a)(2): Description of Category I through III Deficiencies

This provision shall not be cited because it merely provides the employer with a description of the types of deficiencies for which the wire rope must be inspected. When these deficiencies are identified, the employer must comply with the requirements of § 1613.10(a)(4).

- i. § 1613.10(a)(3): Types and Areas of Wire Rope that Need Closer Inspection.

This provision shall not be cited because it merely provides the employer with a description of a type of wire rope and areas of any wire rope that are more likely to harbor damaged rope. When deficiencies are identified in rotation-resistant rope or in the specified areas of any rope, the employer must comply with the requirements of § 1613.10(a)(4).

- j. § 1613.10(a)(4): Corrective Actions

If the competent person observed a deficiency in a wire rope likely to be used during a shift and:

- the competent person did not immediately determine whether the deficiency was a safety hazard, consider a citation of § 1613.10(a)(4)(A). The AVD for this citation should state the provisions of § 1613.10(a)(2)(A) that describe the Category I deficiencies that exist in the rope.
- the competent person determined that a Category I deficiency was a safety hazard, but the rope was not removed in accord with § 1613.10(a)(4)(A)1. or repaired in accordance with § 1613.10(a)(4)(A)1., consider a citation of the specific requirement of 1613.10(a)(4)(A). The AVD for this citation should state the provisions of § 1613.10(a)(2)(A) that describe the Category I deficiencies that exist in the rope.
- the competent person has identified a Category II deficiency, but the employer has not taken one of the corrective actions specified in § 1613.10(a)(4)(B), consider a citation of § 1613.10(a)(4)(B). The AVD for this citation should state the provisions of § 1613.10(a)(2)(B) that describe the Category II deficiencies that exist in the rope.
- the competent person has identified a Category III deficiency, but the employer has not taken one of the corrective actions specified in § 1613.10(a)(4)(C), consider a citation of § 1613.10(a)(4)(C). The AVD for this citation should state the provisions of § 1613.10(a)(2)(C) that describe the Category III deficiencies that exist in the rope.
- § 1613.10(a)(4)(D): The hoist or equipment was removed in accord with an applicable requirement of § 1613.10, but the equipment or hoist was not tagged in accord with § 1616.1(g)(1), consider a citation of § 1613.10(a)(4)(D). The AVD for this citation should state the provisions of § 1616.1(g)(1) with which the employer did not comply.

K. § 1613.10(b): Wire Rope--Monthly Inspections

1. A competent person must complete a monthly inspection of the wire ropes (running and standing) in accordance with the requirements of § 1613.10(a), Shift Inspection. This inspection is to identify apparent deficiencies in the wire ropes likely to be used during the operation of the equipment. The employer must maintain documentation from the last three monthly inspections.

Inspection Guidance

- a. Ask to review the required monthly inspection documentation.
- b. Ask the inspector/competent person to describe the sections of the wire rope he or she inspected and for the types of deficiencies he or she was looking for. Compare this description with the deficiencies identified in the Cal/OSHA compliance inspection to gauge the inspector' experience level and the thoroughness of the inspection.

Citation Policy

c. § 1613.10(b)(1): Wire Rope Monthly Inspection

If a competent person did not complete a monthly inspection of the wire ropes in accord with § 1613.10(a), Shift Inspection, consider a citation of § 1613.10(b)(1).

d. § 1613.10(b)(2): Monitoring of Wire Rope Deficiencies

If a wire rope deficiency identified during the annual inspection was not monitored as per instruction from the annual inspection, consider a citation of § 1613.10(b)(2).

e. § 1613.10(b)(3): Corrective Actions for Monthly Wire Rope Inspection

If the competent person deemed a deficiency in a wire rope to be a safety hazard but the employer did not take corrective actions under § 1613.10(a)(4), consider a citation of § 1613.10(b)(3). The AVD for this citation should state the provisions of § 1613.10(a)(4) with which the employer did not comply.

Information about a monitored deficiency obtained during review of inspection records can be used to confirm the duration of the deficiency and to gauge how rapidly the condition has deteriorated. If deficiencies requiring further observation are noted on the monthly inspection records, document any information obtained during the compliance inspection regarding how the employer ensured the safety of the equipment until the wire rope was repaired or replaced.

f. § 1613.10(b)(4): Documentation for Monthly Wire Rope Inspection

If the employer:

- does not document the monthly inspection, consider a citation for a violation of § 1613.10(b)(4).
- If the employer documented the monthly inspection, but did not meet all the requirements of §1613(a)(3), consider a citation for a violation of § 1613.10(b)(4) The AVD for this citation should state the provisions of § 1613.5(a)(3) with which the employer did not comply.

L. § 1613.10(c): Wire Rope--Annual Inspection

1. At least every 12 months, a qualified person must inspect the entire length of wire rope in use on the equipment, in accordance with § 1613.10(a), Shift Inspection, and the additional inspection criteria specified under § 1613.10(c)(2)(B).

Wire rope deficiencies that a qualified person has determined are not safety hazards must still be monitored in monthly inspections. Wire rope with safety hazards must be taken out of service and replaced, or repaired in accord with applicable requirements of § 1613.10.

The employer must retain documentation of the required annual inspection for a minimum of 12 months.

Inspection Guidance

- a. Review the required documentation of the annual inspection.
- b. Interview the employer, operator, lift director (if any), and equipment inspector (if available) to verify that a qualified person inspected the wire rope. Confirm the qualifications of the qualified person by asking about:
 - his or her experience with the equipment; and
 - the extent and duration of his or her crane-related experience.
- c. Ask the inspector/qualified person to describe the wire rope which he or she inspected and the types of deficiencies for which he or she looked. Compare this description to the deficiencies identified in the Cal/OSHA compliance inspection to gauge the inspector's experience level and the thoroughness of the inspection.
- d. Use any relevant facts obtained from required documentation, interviews, and collection of information discussed under § 1613.10(b) above, to verify the employer's compliance with § 1613.10(c).

Citation Policy

- e. §§ 1613.10(c)(1) to (c)(2): Annual Inspection of Wire Rope

When wire rope in use on the equipment has not been inspected in over 12 months by a qualified person:

- in accord with paragraph § 1613.10(a), Shift Inspection, consider a citation of § 1613.10(c)(1). The AVD for this citation should state the provisions of § 1613.10(a) with which the employer did not comply.
 - in accord with the additional inspection criteria specified under § 1613.10(c)(2), consider citations for violations of the applicable requirements of § 1613.10(c)(2).
- f. § 1613.10(c)(3): When wire rope has been inspected in the last 12 months by a qualified person, but the qualified person did not make a determination regarding the safety of an apparent wire rope deficiency, consider a citation of § 1613.1(c)(3).
 - § 1613.10(c)(3)(i): Corrective Actions. When the employer did not take one of the corrective actions specified under § 1613.10(c)(3) after a qualified person determined that a wire rope deficiency was a safety hazard, consider a citation for violations of applicable requirements of § 1613.10(c)(3)(A).
 - § 1613.10(c)(3)(B): Monthly Monitoring of Wire Rope Deficiencies. A wire rope deficiency identified during the annual inspection was not monitored during the monthly
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inspection as per instruction from the annual inspection, consider a citation for violations of applicable requirements of § 1613.10(c)(3)(B).

- g. § 1613.10(c)(4): Documentation for Annual Wire Rope Inspection.

When the inspection was not documented or documentation was not retained in accord with § 1613.6(g), Annual/Comprehensive Inspection Documentation, consider a citation of § 1613.10(c)(4). The AVD for this citation should state the provisions of § 1613.6(g) with which the employer did not comply.

M. § 1613.10(d): Rope Lubricants

1. The employer must not use rope lubricants that may hinder visual inspections

Inspection Guidance

- a. Visually inspect accessible areas of the wire rope for improper lubricant.
- b. When the suitability of the lubricant is in question, Compliance Officer should consult the manufacturer of the wire rope or any relevant information that is available to verify the lubricant recommended by the manufacturer for that type of wire rope.
- c. If the wire rope lubricant used by the employer differs from that recommended by the used was suitable.

Citation Policy

- d. § 1613.10(d): If the rope lubricant is of a type that hinders inspection of the rope, consider a citation of § 1613.10(d).

N. § 1613.10(e): Availability of Wire Rope Inspection Documentation

1. All documents produced under § 1613.10 must be available, during the applicable document retention period, to all persons who conduct inspections required by § 1613.10.

Inspection Guidance

- a. Conduct interviews to verify that information from the annual inspection documentation is available to inspectors who must perform a wire rope inspection required by the crane standard.

If the employer does not keep written copies of the required documents on site, an inference should not be drawn that they may not have been made accessible to inspectors through other means like computers and facsimiles. Nor does the employer's ability to produce the documents for the Compliance Officer necessarily imply that the documents were made available to individuals who conduct the required inspections. Although the employer is not required by the crane standard to make the inspection documents available to the Compliance Officer, if the equipment is being operated at the time of the compliance inspection,

information from required inspections, such as about monitored equipment deficiencies or recorded safety determinations, must be available to the individual who conducts or conducted each shift inspection.

Citation Policy

- b. § 1613.10(e): If the employer has not made required inspection documents available to any person who conducts an inspection required under § 1613.10, during its required documentation retention period, consider a citation of § 1613.10(e).

O. § 1614: Wire Rope Selection and Installation Criteria

This section does not apply to rigging. Unless specified in other sections of the crane standard, rigging requirements are covered under Article 101 of Title 8 CCR Subchapter 7

1. § 1614(a): Wire Rope Selection

The employer must select and install original equipment wire rope according to the requirements of § 1614. Replacement wire rope must be chosen based on recommendations of one of the following:

- the wire rope manufacturer;
- the equipment manufacturer;
or
- a qualified person.

Inspection Guidance

- a. Conduct interviews to determine whether the employer used original equipment wire rope, rotation-resistant wire rope, or some other type of rope. If there are concerns about the rope's type or design, it may be necessary to contact its manufacturer using any visible part or serial numbers on the wire rope for identification purposes.
- b. If the employer used rotation-resistant wire rope, ask those interviewed to confirm its type. If this information is not immediately available, it can possibly be obtained from the equipment operations manual, wire rope certification, or a shipping invoice. Also note from this information the standards (such as consensus standards) to which the manufacturer designed the wire rope, if stated.

Types of Wire Rope

Wire rope is classified as either "standard rope" or "rotation-resistant rope." Rotation-resistant rope, in turn, can be constructed in various ways, and Article 15 lists three "types" of rope designs. For all three types, rotation-resistant rope's internal design resists twisting better than standard rope. Rotation-resistant rope therefore enables better control of the load because it tends to keep the load from rotating while it is being hoisted or suspended. However, the design of rotation-resistant rope also makes it more susceptible to internal damage than standard rope and such internal damage can be hard to detect by visual inspection.

The verification of wire rope specifications is often a complex analysis and the Compliance Officer may need to consult with a qualified person with regard to wire rope to be able to identify the type of wire rope that is on the hoist line. This person could be the wire rope manufacturer, or a qualified person such as a safety consultant, operator, mechanic, or wire rope inspector.

- c. Ask those interviewed to describe how the employer determined that the wire rope used was appropriate for the equipment.
- d. Use any relevant facts collected from interviews and document reviews to help confirm how the wire rope selection was made, who did it, and what resources were used to make the selection.

Citation Policy

- e. § 1614(a): Consider a citation of § 1614(a) if the employer does not meet the standard's requirements for selection of wire rope used on the equipment.
2. § 1614(b): Wire Rope Design Criteria (other than rotation-resistant wire rope).

Inspection Guidance

- a. Visually inspect wire rope used on the equipment or available for service on the jobsite and use any relevant facts obtained from the required documentation, interviews, and collection of information discussed for the application of § 1613.10 to verify that the wire rope is in good condition.
- b. Use any relevant facts discussed above for the application of § 1614(a) and obtained from required documentation, such as inspection records (§ 1613.10(e)), recommendations from the manufacturer or equipment inspectors (§ 1613.10(c)(3)(B)), and modification approvals (§ 1610.6(a)(1)(A) and (b) and 1614(e)(3)(C)) to verify that the non-rotation-resistant wire rope used meets the requirements of section 5-1.7.1 of ANSI B30.5-2004 or the requirements of § 1614(b)(2). If necessary, consult the wire rope manufacturer or Regional Construction Coordinator for guidance when making this verification.

Citation Policy

- c. § 1614(b): Consider a citation of § 1614(b) if the non-rotation-resistant wire rope used on the equipment does not meet the criteria specified in the standard.
3. § 1614(c): Compatibility

Inspection Guidance

- a. Visually inspect the wire ropes for apparent deficiencies as described in § 1613.10(a)(2) and when they exist, inspect the equipment to ensure that the damage was not caused by misalignment, entanglement, or excessive rubbing due the rope's incompatibility with equipment such as reeving and hoist drums. See Wire Rope Deficiencies chart in discussion of § 1613.10 above.
 - b. In addition to the prohibitions specified in § 1614 for particular types of wire rope, review any requirements from the wire rope manufacturer.
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- c. Ask the employer, maintenance personnel, the operator, and inspectors (if available) if they are aware of any such prohibitions from the manufacturer, and, if so, to describe them and the hazard they address.

Citation Policy

- d. § 1614(c): Consider a citation of § 1614(c) if the wire rope is not compatible with the equipment or the functioning of the equipment has been compromised.

4. § 1614(d): Boom Hoist Reeving

Inspection Guidance

- a. Use any relevant facts discussed above to confirm the type of rope used on the equipment.
- b. Visually inspect the boom hoist reeving of the equipment to ensure that fiber core and rotation-resistant ropes are only used in boom hoist reeving under the conditions specified in § 1614(d).

Citation Policy

- c. § 1614(d): Consider citations for violations of the applicable provisions of § 1614(d) if a particular type of wire rope is used on the equipment under conditions prohibited by the standard.

5. § 1614(e): Rotation-Resistant Wire Rope Definitions and Use Requirements

Definitions of the Types of Rotation-Resistant Wire Rope

Type	Rotation-Resistant Wire Rope Description
Type I	Stranded rope constructed to have little or no tendency to rotate or, if guided, transmits little or no torque. It has at least 15 outer strands and comprises an assembly of at least three layers of strands laid helically coiled over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.
Type II	Stranded rope constructed to have significant resistance to rotation. It has at least 10 outer strands and comprises an assembly of two or more layers of strands laid helically over a center in two or three operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

Type III	Stranded rope constructed to have limited resistance to rotation. It has no more than nine outer strands, and comprises an assembly of two layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.
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Inspection Guidance

- a. Observe and document the types of construction activities the hoisting equipment is used to support. In particular, note when the equipment is used to perform repetitive lifts or duty cycle work such as pile driving, material handling such as clamshell or dragline work or using an electromagnet to handle scrap metal.

Rotation-Resistant Wire Rope

There is an increased risk of damaging the core of some types of rotation-resistant ropes during the performance of repetitive lifts or duty cycle work such as pile driving, material handling such as clamshell or dragline work or using an electromagnet to handle scrap metal. Damage to the internal core may not be easily detected during prolonged operation between inspections, making some types of rotation-resistant wire rope unacceptable for this type of work.

- b. Interview the employer, maintenance personnel, operator equipment inspector (if available) to confirm the type and safety factor of the rope when rotation-resistant wire rope is used.
- c. When the safety factor is not immediately available, it can possibly be obtained from the equipment operations manual or wire rope certification. Also note the standards (such as consensus standards) according to which the manufacturer designed the wire rope, if stated.
- d. When type II and III rotation-resistant wire rope of a safety factor of less than five was used, verify that a qualified person conducted a shift inspection in accord with § 1613.10(a). (See inspection guidance and citation policy for § 1613.10(a).)
- e. If there are concerns about the rope's type and design, it may be necessary to contact its manufacturer using any visible part/serial numbers on the wire rope. If necessary, consult the wire rope manufacturer or Regional Construction Coordinator for guidance regarding the design and safe use of rotation-resistant wire rope.

Citation Policy

- f. § 1614(e): When type I, II or III rotation-resistant wire rope was used and did not meet the applicable requirements or was used under conditions prohibited by § 1614(e)(2), consider citations for violations of applicable provision of § 1614(e)(2). Where applicable, group multiple violations of the standard.
6. § 1614(f) through (h): General Requirements

The requirements of §§ 1614(f) through (h) address hazards related to the use of wire rope clips, sockets, and the seizing of wire rope that has been cut.

What is Seizing?

Seizing is physical binding of wire rope needed to hold the wire in the strands and the strands themselves together in place during the cutting of wire rope. Seizing of the strands keeps intact the areas of the rope beyond the area to be cut. Seizing must be done in accord with the manufacturer's recommendations to prevent further damage to the rope. Seizing and subsequent cutting of failed portions of rope should be conducted only by qualified individuals.

For compliance inspection purposes, it is also important that wire rope, which has been obtained from the employer as evidence, has also been properly seized to prevent the unraveling of the evidence rope.

Inspection Guidance

- a. Visually inspect the wire rope for apparent deficiencies, paying particular attention to areas of the rope where rope clips and sockets are used and seizing has been done. Ensure that the devices have been used and seizing has been done in accord with the requirements of § 1614(f) through (h).

Citation Policy

- b. § 1614(f) through (h): Consider citations for violations of applicable provisions of §§ 1614(f) through (h) if the requirements of those standards have not been met.

P. § 1615.1 and 1615.2: Safety Devices and Operational Aids

These sections list the safety devices and operational aids that are required on all equipment covered by Article 15, unless otherwise specified, such as for tower cranes and other equipment which have specified supplemental requirements.

In general, proper operation of the specified safety devices and operational aids is required. However, when an operational aid is not working properly, the employer, while arranging to have the aid repaired or replaced, may implement temporary alternative measures.

1. § 1615.1: Safety Devices

Operation of the equipment is prohibited unless all of the safety devices listed in paragraphs (a)(1) through (a)(7) of § 1615.1 are in proper working order.

When the devices are not working properly, the equipment must be taken out of service in accord with § 1616.1(g) until the devices are repaired or replaced.

Inspection Guidance

- a. It may or may not be evident through observation of the hoisting operation that a safety device is not working properly. Occasionally, there may be other visual indications of

improperly operating safety devices or operational aids. For example, when crew members or the operator appear to be taking extraordinary precautions during the hoisting job that may be related to the leveling or stability of the equipment, control of the boom or load line, or braking of the equipment. These actions, while they could be the work practices of a safety conscious employer, may also be an indication that there are known deficiencies in safety devices or operational aids.

- b. Interview the operator and maintenance personnel to verify that all safety devices are present and functioning properly. Paragraphs (a)(1) through (a)(7) of § 1615.1 can be used as a checklist. The operator can also be asked to show where the devices are on the equipment.
- c. If any of the devices listed in paragraphs (a)(1) through (a)(7) of § 1615.1 are missing or not functioning, observe and document operation of the equipment, interview the operator, maintenance personnel, lift director, and employer, and review any available maintenance/repair documentation to determine:
 - if and when the equipment was operated without properly working safety devices;
 - whether proper tag-out procedures under § 1616.1 were followed;
 - when the safety device was removed/or ceased to function;
 - when repair is scheduled to occur, or replacement parts were ordered and scheduled to arrive; and
 - if any safety devices were inoperable when personnel were hoisted.
- d. Note, in accord with § 1616.1(j), the operator is required to inform, in writing at the end of the shift, the person (such as the lift director or maintenance personnel) designated to receive such information of needed equipment repairs and adjustments. Ask for and make copies of any such exchanges of information as this documentation may contain information about deficiencies regarding safety devices.

If a device stops working properly during observation of the hoisting job or the information about the deficient device is obtained from an interview, verify and document whether the operator stopped the operation safely and the worksite conditions under which the hoisting job was stopped.

Safely Stop

For the application of this provision, “safely stop operations” gives notice to the employer that the operator is not necessarily expected to stop the equipment immediately if doing so would create a hazardous situation. Under this provision, the operator must rely on her or his knowledge and skills to determine when stopping the hoisting operation would present a hazard. Operations may not resume until such time as the aid or device has been repaired, replaced, or a temporary alternative measure is implemented when allowed by the standard.

For example, if stopping crane operations immediately would jeopardize the stability or structural integrity of the crane, operations could continue until the crane or load could be positioned better.

For hoisting operations that would suspend the load over employees should operations be stopped, the equipment could be safely operated longer to allow the load to be landed or swung and suspended in/over a place that would not be a hazard.

Another example could be when stopping the hoisting operation would not allow a hoisted structural member of a building to be supported and secured to stabilize the frame of the building.

Citation Policy

- e. § 1615.1(a)(1) through (a)(7): If a safety device required by this section is missing, consider citations for violations of provisions requiring the specific device that is missing. For example, § 1615.1(a)(2) requires a boom stop on all equipment except hydraulic equipment and derricks. If the boom stop has been removed or no longer functions, consider a citation under § 1615.1(a)(2).
- f. § 1615.1(b): Consider a citation for violation of § 1615.1(b) under the following circumstances:
- if a device or devices listed in paragraphs (a)(1) through (a)(7) of § 1615.1 are not functioning and the employer still allows the equipment to be operated, or
 - if a device ceases to function, and the operator does not stop operations, or
 - if a device ceases to function, the operator stops operations in a safe manner, but then does not take equipment out of service and resumes operations before the device is working properly.

Even if multiple devices on one piece of equipment are not functioning properly, only one citation under § 1615.1(b) may be issued. The AVD of this citation should list the specific safety device(s) in paragraphs (a)(1) through (a)(7) of § 1615.1 that are not functioning.

For more guidance regarding what is meant by requiring the operator to “safely stop” the equipment when a safety device stops working during crane operation, see the Safely Stop

text box provided as inspection guidance for this provision. This provision may be cited, when it has been determined that the employer allowed crane operations to continue with an improperly working safety device even though there was a way to stop the operation without creating another hazardous condition at the worksite. When citing the employer for the operator's failure to safely stop, group the citation with § 1509(a).

In contrast, when crane operation was stopped such that another hazardous condition was created on the worksite, consider a citation for a violation of a provision other than § 1615.1(b) even though the operations were stopped "unsafely". For example, when the load was suspending over employees as described in the text box, it would be more appropriate to consider citations for violations of § 1616.3, Working Area Control, instead of § 1615.1(b) for "unsafely" stopping the load.

- g. § 1616.1(g): If proper tag-out procedures were not followed when a safety device was missing or was not functioning, consider citations for violations of applicable requirements of § 1616.1(g). Section 1615.1(b) shall not be cited for violations of tag-out procedures because § 1615.1(b) serves to remind the employer that compliance with the requirements of § 1616.1 is also required.

2. § 1615.2: Operational Aids

Section 1615.2 specifies requirements for operational aids and applies to all equipment unless otherwise specified in Article 15. See, for example, requirements for Tower Cranes, § 1619.1(e)(1).

Operations must not begin unless devices listed in § 1615.2(d) and (e) are properly working on the equipment or a specified temporary alternative measure has been implemented. When recommended by the manufacturer, the employer must comply with additional measures.

If a device stops working during operations, the operator must safely stop operations until the device is replaced or repaired so that it works properly again or:

- the deficient operational aid is tagged out of service, and
- specified temporary alternative measures are implemented or the device is replaced or repaired so that it works properly again.

Repairs must be completed within 7 working days after the employer received the repair/replacement parts.

Categories of Operational Aids

Category I aids include: boom hoist limiting device, luffing jib limiting device, and anti-two blocking device.

Category II aids include: boom angle or radius indicators, jib angle indicators, boom length indicators, load weighing and similar devices, outrigger/stabilizer position sensors/monitors, and hoist drum rotation indicators.

Category I operational aids that are not working properly must be repaired or replaced within 7 days after the deficiency occurs unless the employer documents that the repair/replacement parts will not be received in time.

Category II operational aids that are not working properly must be repaired or replaced within 30 days after the deficiency occurs unless the employer documents that the repair/replacement parts will not be received in time.

Section 1615.2(e)(4) clarifies that if a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted, and is not considered a modification under § 1610.6.

Inspection Guidance

- a. Make all inquiries relevant to operational aids and use the Inspection Guidance for § 1615.1 to help verify employer compliance with § 1615.2.
- b. Interviews with individuals such as the employer and operator, maintenance personnel, and lift crew should be conducted to verify that:
 - the operator and others working with the load understand the use and purpose of temporary alternative measures when used instead of an inoperable operational aid. Other crew members must also know this information to be able to recognize the hazard that exists if the alternative measures are not effectively implemented.
 - how the operator verifies, on a daily basis, that operational aids are functioning properly.
- c. If the equipment is being operated with a temporary alternative measure implemented:
 - obtain the date that the operational aid ceased to function properly;
 - confirm the temporary alternative measure implemented;
 - verify that the temporary alternative measure meets the applicable requirements in §§ 1615.2(d) and (e), or those of the manufacturer, if the manufacturer's requirements are more protective;
 - verify that the employer complied with the requirements of § 1616.1(j) regarding need for adjustments and repairs; and
 - verify and document the dates of any receipts for parts ordered to repair or replace an operational aid or safety device and/or relevant installation dates for parts.

Citation Policy

- d. § 1615.2(a): If an operational aid listed in paragraphs (d) and (e) of § 1615.2 is missing and no temporary alternative measure has been implemented, consider a citation for violation of § 1615.2(a).

For example, if there is not a boom hoist limiting device on the equipment and no temporary alternative measure is in place

- e. § 1615.2(b): If a device listed in (d) and (e) of § 1615.2 was not functioning, no temporary alternative measure was implemented, and the equipment was operated, consider a citation for violation of § 1615.2(b).

Note to §§ 1615.2(a) and (b):

- The AVD of the citation should list the specific missing or nonfunctioning operational aid(s) noted in paragraphs (d) and (e) of § 1615.2.
 - If a temporary alternative measure has been established, but not successfully implemented, the AVD should list the specific temporary alternative measure that the employer attempted to use and explain why it was inadequate.
 - Even if multiple aids on one piece of equipment are not on the equipment or not functioning, only one citation under § 1615.2(a) and one citation under § 1615.2(b) may be issued.
- f. § 1615.2(c): Consider a citation of § 1615.2(c) if an operational aid ceases to function during operations, and the operator does not stop operations when it is safe to do so. Group this citation with § 1509(a).

Consider a citation for violation of § 1615.2(b) when the compliance inspection reveals the operator stopped operations upon discovery of the deficiency, but then the operations resumed without repairing the operational aid or implementing an alternative measure.

See the discussion of “safe to stop” provided in this compliance directive for § 1615.1, Safety Devices.

- g. § 1615.2(d) or (e): When the employer was operating equipment with a temporary alternative measure properly in place, but the applicable time limit established by § 1615.2(d) or (e) lapsed, consider a citation for violation of 1615.2(a) for missing operational aids or § 1615.2(b) for an operational aid not working. The AVD for this citation should list the specific provision in paragraphs (d)(1) through (d)(3) or (e)(1) through (e)(5) of § 1615.2 requiring the missing or non-functioning operational aid and corresponding temporary alternative measure used.

If violations of §§ 1615.2(d) and (e) are applicable to multiple operational aids required for the equipment, only one citation of § 1615.2(a) and (b) should be cited because violation of any one provision of §§ 1615.2(d) and (e) would trigger a violation of §§ 1615.2(a) or (b).

When citing the employer for failure to implement the temporary alternative measure specified in § 1615.2(e)(5)(A), group the citation with § 1509(a).

Q. § 1616.1: Operation and § 1616.2: Authority to Stop

These sections cover the general requirements for equipment operations. The employer must comply with all manufacturer procedures, including those for the use of attachments. These requirements address a variety of communication and safety concerns, such as hazards related to:

- Workers being struck during unintentional movements of the equipment and/or load, or while within the equipment's swing radius or blind-spot areas.
- Changing conditions of the worksite such as ice, wind, and precipitation.
- Side-loading of the boom.
- Exceeding the capacity of the equipment.

The final rule focuses on concerns related to equipment operations that are very common to construction activities. The standard specifies requirements for leaving equipment unattended, that the operator's attention not be diverted from the operation of the equipment.

Duties of Crane Operators and Other Employees

Section 1616.1 includes several duties for the crane operator and other employees at the worksite. Section 1509(a) requires that the employer ensure, via effective communication and enforcement of work rules, that an operator, crew member, or other employee performs the tasks required by Article 15. Where an employee does not meet a requirement of Article 15, and there is no language explicitly requiring the employer's compliance, consider grouping the citation with § 1509(a). See discussion of § 1509 (a) in the *Scope* section for additional guidance.

1. § 1616.1(a) through (e) Operation

Inspection Guidance

- a. The employer's compliance with most provisions of §§ 1616.1 and 1616.2 can be confirmed by observing workers operating the equipment.

For example, during operations, note:

- how and where suspended loads are left unattended;
- if there any employees in areas where they may be struck by moving equipment or the load;
- whether the job involved buildings, vehicle/pedestrian traffic, weather, ground conditions, etc.;

- the condition of the equipment--are the tires inflated, are outriggers fully extended, are panels missing, and are there any signs of fluid leakages?;
- the time, date, and any construction activities being performed when it appeared that the equipment was undergoing repairs or was idle;
- where barrier and warning signs have been erected;
- how the loads are handled. For example: what kinds of loads are hoisted? Are there any lifts out of the view of the operator? Does the crane have to travel with the load?;
- who appears to be in charge or making decisions affecting safety. For example, who communicates with the operator? Are there signals given to the operator? Under what circumstances are the signals given?
- if the full attention of the operator is on operation of the equipment. Note if an employee is using a cell phone while operating the equipment and determine if the cell phone is being used for signaling purposes. In accord with Article 15, a cell phone may only be used as a means of communication with the signal person and would have to be a hands-free system when used for that purpose.

Remote Controls

The use of equipment with **remote controls** is becoming more common on construction sites, especially when materials are hoisted onto a structure. Therefore, note when the operator uses remote controls to position the load and also offload the equipment. In support of any citations regarding the operator being distracted, it is important to document what activities distracted the operator and how it was a distraction. Keep in mind that the operator is not operating the crane using remote controls when he or she locks out the controls and then helps offload the crane. Under a scenario like this, the offloading of the crane would not be considered a diversion. (Note that the operator would still need to keep the remote controls immediately accessible to comply with the requirements of 1616.1.

- b. Interview individuals and especially the operator regarding their observations of hoisting activities and the employer's compliance with § 1616.1 and §1616.2. In general, the provisions of this section should be used to develop questions for employees regarding their knowledge of any hazardous conditions observed. For example, ask individuals to describe any scenarios when the operation of the crane has raised safety concerns at the worksite and the ability to perform assigned tasks safely.
- c. Verify that the equipment's operation procedures and load charts are available to the operator in the cab and that they are applicable to the equipment being used at the worksite.

Crane Identification

Often, the applicability of the operator's manual and load charts to a piece of equipment can be verified by ensuring that serial numbers or the make and model specified on the documentation match that of the equipment being operated (§ 1616.1(c)(1)).

- d. If employer-developed operator's procedures are being used,
 - determine why the manufacturer's procedures are no longer available or why they are not being used;
 - determine who developed the operator's procedures; and
 - verify the employer's compliance with § 1616.1(b).
- e. Consider checking cellular phone company records to verify compliance with § 1616.1(d).

Citation Policy

- f. § 1616.1(a): Consider a violation of this section where a manufacturer recommended procedure was not followed. This section may be grouped with each of a more specific violation of § 1616.1, if another operation requirement was not followed.
- g. § 1616.1(a) through (c): Unless specified otherwise, when applicable requirements of § 1616.1(a) through (c) have not been met, consider citations for violations of the applicable provisions. Citations for violations of multiple requirements under the same paragraph may be grouped when appropriate.
- h. When the manufacturer's operation procedures are unavailable and:
 - the employer did not develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments, consider a citation of § 1616.1(b)(1).
 - the operation procedures for the operational controls were not developed by a qualified person, consider a citation of § 1616.1(b)(2).
 - the operation procedures related to the capacity of the equipment were not developed and signed by a registered professional engineer familiar with the equipment, consider a citation of § 1616.1(b)(3).
- i. § 1616.1(d): Where interviews establish that the operator was distracted while operating the crane, consider a citation of this section.
- j. § 1616.1(e): In cases when the operator left the controls while the load was suspended and:
 - the requirements of paragraphs (e)(1)-(6) of § 1616.1 were not met, citations for violations of applicable requirements of § 1616.1(e)(1) should be considered. Consider grouping citations for violations of multiple requirements of § 1616.1(e)(1) because regardless of which requirement of this provision is violated, it results in a violation of § 1616.1(e)(1).

- working gear (such as slings, spreader bars, ladders, and welding machines) was suspended over an exit or entrance and/or where the weight of the working gear was not negligible relative to the lifting capacity of the equipment as positioned, consider a citation of § 1616.1(e)(2). This exception was provided for employers who leave lightweight items suspended overnight to avoid theft, but should not be done in such a way that significantly strains the equipment.

2. § 1616.1(g): Tag-out

Inspection Guidance

- a. To determine if the equipment was used while a function or the equipment as a whole was taken out of service, use any relevant facts from the Inspection Guidance for the application of §§ 1616.1(a) through (e), and ask employees:
 - have they seen a warning tag on the out-of-service equipment and when;
 - to describe what terms like tagged-out and out of service mean to them;
 - who is authorized to place or remove a warning tag;
 - to describe any instructions that were given to the operator regarding an out-of-service function or equipment;
 - who determines when it is safe to continue operations with the function or equipment tagged out.

Citation Policy

- b. § 1616.1(g): If the employer took the equipment out of service and:
 - § 1616.1(g)(1): The equipment or a function of the equipment was not tagged-out in accord with the requirements of § 1616.1(g)(1), consider a citation of § 1616.1(g)(1).
 - § 1616.1(g)(2): The requirements of § 1616.1(g)(2)(A) were not met, consider citations for violations of applicable requirements of § 1616.1(g)(2)(A). Consider grouping citations for violations of multiple provisions under § 1616.1(g)(2)(A).
 - § 1616.1(f)(2)(B): The requirements of § 1616.1(f)(2)(B) were not met, consider a citation of § 1616.1(f)(2)(B). Specific requirements of §§ 1616.1(f)(2)(A)(i) and (f)(2)(A)(ii) that were violated should be referenced in the AVD of this citation.

3. § 1616.1(h) through (aa) Operation

Inspection Guidance

- a. To verify compliance with § 1616.1(j), use information collected for paragraphs (a) through (g) of § 1616.1 and also ask interviewees to describe:
- any needed repairs or adjustments of the equipment and when they were first aware of them.
 - how the employer informed employees before each shift of needed adjustments and repairs of the equipment or temporary alternative measures implemented.
 - any temporary alternative measures implemented and the hazards from which the employees were intended to be protected. For example, in absence of operational devices or when they are not operating properly, how are limitations being maintained to ensure that the crane is always operated within proper capacity, radius, etc.
 - if the equipment was operated in excess of its rated capacity and if the employer expressly required it. For example, an employer may have directed the operator to operate the equipment in excess of its rated capacity by relying on the equipment's safety factor.

Repairs and Adjustments of Equipment

Section § 1613.1(a), inspection of repaired or adjusted equipment, requires that repairs or adjustments of the equipment that affect its safe function and capacity must be done in accordance with the manufacturer's or qualified person's recommendations. As guidance for the application of this section, the preamble of the final rule of the Federal OSHA regulation explains that repairs or adjustments are meant to restore equipment to original design specifications and safety factors. Otherwise, Cal/OSHA could consider the activity a modification of the equipment. In other words, repair or adjustment of a system or component that affect safety must be consistent with the engineering in the original equipment design. [75 FR 47968]

Citation Policy

- b. § 1616.1(h) through (aa): Unless specified otherwise under this citation policy section, when applicable requirements of §§ 1616.1(h) through (aa) have not been met, consider citations for violations of the applicable provisions. Citations for violations of multiple requirements under the same paragraph may be grouped when appropriate.
- c. § 1616.1(j): When adjustments or repairs of the equipment were necessary and:
- § 1616.1(j)(1): If the operator did not promptly inform, in writing, the person designated by the employer to receive such information or the next operator on a successive shift, consider a citation of § 1616.1(j)(1).
 - § 1616.1(j)(2): If the employer did not notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and any alternative measures, consider a citation of § 1616.1(j)(2).

- d. § 1616.1(k): When safety devices and operational aids were used as a substitute for the exercise of professional judgment by the operator, consider a citation of § 1616.1(k).

For example, the equipment had a limiting device to help the operator prevent the crane from tipping over when loads and boom lengths approach limits specified on the load chart. During the hoisting operation, the operator relied solely on the limiting device to warn her or him or to stop the equipment prior to reaching the tipping point of the equipment. When it can be determined, that the operator did not use her or his skill and experience with the equipment to not exceed the limits specified on the load charts, consider a citation of § 1616.1(k).

- e. § 1616.1(n): When the equipment was operated:
- § 1616.1(n)(1): If operated in excess of its rated capacity, consider a citation of § 1616.1(o)(1);
 - § 1616.1(n)(2): If the operator was expressly required to operate the equipment in a manner that its rated capacity was exceeded, consider a citation of § 1616.1(n)(2).
 - § 1616.1(n)(3): If the operator did not verify the weight of the load as being within the capacity of the equipment using one of the methods specified in paragraphs (o)(3)(i) and (o)(3)(ii) of § 1616.1, consider a citation of § 1616.1(n)(3). When the employer attempts to use one of the specified methods for verifying the weight of the load but the method was deficient, the provision of § 1616.1(n)(3) which the employer used and a description of its deficiency should be referenced in the AVD.
- f. § 1616.1(o): When the boom or other parts of the equipment contacted an obstruction, consider a citation of § 1616.1(o). The hazardous condition may have been triggered by violations of other provisions of Article 15. For example, a safety device or operational aid may not have been working, the signal person may not have been qualified to give the operator signals, and the operator may have relied on electronic warnings instead of exercising her or his professional judgment to avoid contacting the object, or may have been distracted when operating the equipment. When appropriate, consider grouping with other citations, such as § 1616.1(k). See citation policy for §1616.1(k).
- g. § 1616.1(q): When loads were lifted over the front area of wheel-mounted equipment in a situation not permitted by the manufacturer, consider a citation of § 1616.1(q). When appropriate, consider grouping with a violation of § 1616.1(a).
- h. § 1616.1(s): When the load or the boom was lowered below the point where less than two full wraps of rope remained on their respective drums and this work practice was not permitted by the manufacturer, consider a citation of § 1616.1(s). When appropriate, consider grouping with a violation of § 1616.1(a).
- i. § 1616.1(t): When the equipment was used to travel with the load:
- § 1616.1(t)(1): If the practice is prohibited by the manufacturer, consider a citation of § 1616.1(a).

- § 1616.1(t)(2): If the practice was allowed by the manufacturer but the employer did not ensure that the requirements of paragraphs (t)(4)(A) and (t)(4)(B) of § 1616.1 were met, consider a citation of the applicable requirement of § 1616.1(t). Consider grouping citations of multiple requirements of § 1616.1(t).

When appropriate, consider grouping citations under § 1616.1(t) with a violation of § 1616.1(a).

- j. § 1616.1(w): When brakes are not adjusted in accord with manufacturer procedures to prevent unintended movement, consider a citation of § 1616.1(w). When appropriate, consider grouping citations under § 1616.1(t) with a citation of § 1616.1(a).
- k. § 1617.1(b): If a safety problem occurred and an employee gave a stop or emergency stop signal to the operator, but the operator continued operations, consider a citation for violation of § 1617.1(b).

11. § 1616.1(z): The equipment was not a tower crane and

- § 1616.1(z)(1)(A): If the equipment was operated without the counterweight or ballast in place as specified by the manufacturer, consider a citation of § 1616.1(z)(1)(A). When appropriate, consider grouping citations under § 1616.1(z) with a violation of § 1616.1(a).
- § 1616.1(z)(1)(A): If the maximum counterweight or ballast specified by the manufacturer for the equipment was exceeded, consider a citation of § 1616.1(z)(1)(B). When appropriate, consider grouping citations under § 1616.1(z) with a violation of § 1616.1(a).
- § 1616.1(z)(2): This provision is informational and should not be cited.

4. § 1616.2: Authority to Stop Operation

Inspection Guidance

- a. In addition to using relevant facts obtained from methods of information collection discussed for the application of §§ 1615.1 and 1615.2, interview the operator and employer to:
 - verify that the operator is aware that he or she has the authority to stop and refuse to handle loads when there are concerns regarding the safety of the hoisting operation.
 - determine if the operator has stopped operations due to safety concerns of projects for this employer in the past. This information may serve as evidence that the operator is aware of having this authority to stop the operation and the employer is aware that it must ensure that the operator's safety concerns are addressed by a qualified person.
 - obtain a description of how the employer addressed the operator's safety concerns, and who authorized the restart of crane operations.

- determine if and how the operator may have been discouraged from exercising her or his authority to stop operations.

Citation Policy

- b. § 1616.2: When there was a concern regarding safety and the employer did not give the operator the authority to stop and refuse to handle loads until a qualified person determined that safety was assured, consider a citation of § 1616.2.

R. §1617.1: Signals General Requirements

1. § 1617.1(a): A signal person must be used in each of the following circumstances:

- The point of operation is not in full view of the operator (§ 1617.1(a)(1)).
- The equipment is traveling and the view in the direction of travel is obstructed (§ 1617.1(a)(2)).
- The operator or person handling the load determines that a signal person is necessary (§ 1617.1(a)(3)).

Inspection Guidance

- a. During the inspection, if operations are underway, equipment is moving, and it appears that a signal is necessary, interview the employer to determine why a signal person is not being used.
- b. A live video system that provides a full view to the crane operator and enables the operator to see all that is needed to operate the equipment safely satisfies the “full view” requirement in § 1617.1(a)(1), but a mirror system generally does not. The sufficiency of any system depends on the particular situation.

Citation Policy

- c. § 1617.1(a)(1) through (3): If a signal person is not being used and one or more of the situations noted above is present, consider a citation for violation of the standard. The citation should be for a violation of the most specific provision applicable to the hazards present. For example, cite § 1617.1(a)(1) if the operator does not have full view of the point of operation and a signal person is not being used.

If more than one of the circumstances in §§ 1617.1(a)(1)-(3) are present, only one citation for violation of § 1617.1(a) should be considered. Instead, consider citing to the general provision § 1617.1(a), and list the specific deficiencies in compliance with provisions in § 1617.1(a)(1)-(3).

If one or more of the circumstances listed in § 1617.1(a) is present and a signal person is being used, request the signal person’s qualification documentation and verify that the signal

person is qualified for the type of signal being used. If the employer is unable to present a qualification document for a signal person or the documentation does not include the type of signal used, consider a citation under § 1618.2(a) or a sub-provision of that section. See the Signal Person Qualifications section in this directive for additional inspection guidance for § 1618.2(a).

2. § 1617.1(b): Signals to operators must be by hand, voice, audible or new signals.

Citation Policy

- a. § 1617.1(b): A violation of § 1617.1(b) should generally not be cited. Violations associated with new signals should generally be cited under § 1617.1(d), pursuant to the guidance noted below.
3. § 1617.1(d): Hand Signals. When hand signals are used, a uniform signal system shall be used on all operations and shall be clearly understood by the operator.

Inspection Guidance

- a. If hand signals are being used, look for a hand signal chart posted in the vicinity (most likely on the crane). Observe the signal person to verify that signals given are consistent with those on the chart.
- b. If non-standard hand signals are observed, evaluate whether both parties understand the signals during operator and signal person interviews. The interviews should verify:
 - that the operator, signal person, and lift director (where there is one) met to discuss the signals before beginning the hoisting operation, and
 - that all parties agreed on the signals to be used.

Citation Policy

- c. § 1617.1(d)(2) In cases where use of non-standard hand signals are proper, if there was no pre-operation contact between the signal person, operator, and lift director or there is disagreement as to the non-standard hand signals that were used, consider a citation for violation of § 1617.1(d)(2).
4. § 1617.1(e): requires that signals used and means of transmitting them must be appropriate for site conditions. Signals other than hand, voice or audible are not allowed under Title 8.

Inspection Guidance

- a. Observe the site for obstructions (e.g., visual or audible interference) which might impact the transmitting of signals.
- b. Ask the operator if he or she could clearly understand the signals given.

Citation Policy

- c. § 1617.1(e): If the signals used or the means of transmitting the signals (line of sight, video, radio, etc.) are not appropriate to the site conditions, consider a citation for violation of § 1617.1(e).
5. § 1617.1(f): The employer must ensure that the operator safely stops operations if the ability to transmit signals between the operator and the signal person is compromised or interrupted, and operations must remain stopped until the ability to transmit signals is reestablished and a proper signal is given and understood.

Inspection Guidance

- a. If it appears that the ability to transmit signals between the operator and the signal person was interrupted due to visual or audible disturbance, interview the operator and signal person to determine whether the operator understood the signals that the signal person was giving.
- b. If the operator and signal person did not understand one another, ask the operator why he or she did not stop operations.
- c. If there is a halt in operations, and operations subsequently resume without communication between the operator and signal person or a proper signal, interview the operator and signal person to determine why operations were halted and why they were resumed.

Citation Policy

- d. § 1617.1(f): Consider a citation for violation of § 1617.1(f) if an interruption of signals is observed and the operator fails to stop operations, or if a halt in operations is observed, due to signal interruption, and operations resume without a proper signal. The AVD should specify the circumstances giving rise to the citation to ensure that the employer has adequate notice (i.e. failure to stop or failure to properly resume operations). If the citation is for failure to stop operations, group the citation with § 1610.1(f).
6. § 1617.1(g): Under § 1617.1(g), if the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations until the operator and signal person agree that the problem is resolved. In addition, under 1617.1(b), the operator is required to obey a stop or emergency stop signal given by another person. See the Operation and Authority to Stop section in this directive for additional guidance regarding citations of § 1616.1(b). If the operator does not stop, group this citation with § 1509(a).

Inspection Guidance

- a. If a Compliance Officer becomes aware of a safety problem, or an accident has occurred, determine whether operations were stopped.
 - An example of a safety problem would be if the signal person signals to the operator to lower the load, but the operator sees that an employee has moved under the load, the operator would have to stop and communicate the hazard to the signal person.

- Another example is where the signal person gives a hand signal but it appears to the operator that the signal person is using the wrong signal. The operator would be required to stop and communicate with the signal person to resolve the problem.
- b. If a halt in operations is observed, and then work resumes without communication between the operator and signal person, interview the operator and signal person to determine why operations were halted and why they were resumed.

Citation Policy

- c. § 1617.1(g): Consider a citation for violation of § 1617.1(g) (1) if a safety problem that requires communication between the operator and signal person occurred, but the operator fails to stop operations, or (2) if a halt in operations due to a safety problem is observed and then operations resume without a proper signal. The AVD should specify the circumstances giving rise to the citation (i.e. failure to stop or failure to properly resume operations).
7. § 1617.1(h): Only one person may give signals to a crane or derrick at a time, unless one person is alerting the operator of a safety problem while another person is giving a signal.

Inspection Guidance

- a. Observe the operation of the equipment and interview the operator to determine who is giving signals, and whether multiple people are giving signals.
- b. If multiple employees are observed giving signals, assess the following:
- Which employee was designated to give signals during that hoisting operation?
 - Why did multiple people give signals?
 - Was one of the signals a stop or emergency stop signal? If so, did the operator stop?
 - Did a safety problem occur during operations?

Citation Policy

- c. § 1617.1(h): If more than one person at a time is observed giving signals to the operator but none of them are alerting the operator of a safety problem, consider a citation for violation of § 1617.1(h).
8. § 1617.1(j): Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal. The operator is required to obey a stop or emergency stop signal under § 1617.1(b). See section covering; “Operation and Authority to Stop” in this directive for additional guidance regarding citations of §1617.1(b).

Inspection Guidance

- a. If a Compliance Officer becomes aware of a safety problem or an accident has occurred, but the operator did not stop operations, determine whether a stop or emergency signal was given by any employee.
- b. If no stop or emergency stop signal was given, determine whether other employees were aware of the safety problem.
- c. If persons are observed alerting the operator to stop and the operator neglects such signals, interview the operator to determine the reason for not stopping operations.

Citation Policy

- d. § 1616.1(j): If a safety problem occurred and an employee was aware of the safety problem but failed to give a stop or emergency stop signal to the operator, consider a citation for violation of § 1509.
9. § 1617.1(j): All directions given to the operator by the signal person must be given from the operator's direction perspective. This means that the signal person must give signals as if he or she was sitting in the operator's seat and facing the same direction as the operator.

Inspection Guidance

- a. Observe the hoisting operation for indications of problems with communication between the operator and signal person such as:
 - the operator having to stop to verify what the signals mean, or
 - the operator appearing to question the safety of the actions that she or he has been signaled to perform.
- b. Observe signals given, or listen to voice commands if they can be heard, to verify that the signals are being given from the operator's direction/perspective and interview the operator to confirm.

Citation Policy

- c. § 1617.1(j): If directions are being given from other than the operator's direction/perspective, consider a citation for violation of § 1617.1(j).
10. § 1617.1(k): If a signal person is in communication with more than one crane or derrick, a system must be used for identifying which piece of equipment each signal is for. That system must be at least as effective as § 1617.1(k)(1), which permits the signal person to identify the crane/derrick the signal is for prior to giving the signal.

Inspection Guidance

- a. Observe equipment operations to determine whether the same signal person is communicating with multiple pieces of equipment.

- b. Observe the operation for indications that a system is being used to distinguish the signals given to various pieces of equipment and verify that a system has been implemented through interviews.

Citation Policy

- c. § 1617.1(k): If signals for multiple pieces of equipment are given by one signal person, but no system is used for distinguishing between equipment, or a system is used which is not as effective as the system in § 1617.1(k)(1), consider a citation for violation of § 1617.1(k).

S. § 1617.2: Radio, telephone or other electronic transmission of signals

1.

<p>Dedicated Channel: a line of communication assigned by the employer who controls the communication system to only one signal person and crane/derrick or to a coordinated group of cranes/derricks/signal person(s).</p> <p>- Use of a dedicated channel ensures that the operator and signal person are not interrupted or confused by users performing other tasks or by instructions not intended for them.</p>
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Inspection Guidance

- a. Verify by observation of operations and interviews with the crane operator, signal person and/or lift director that the following requirements under this section are met:
 - that devices were tested prior to operations to ensure that transmission is effective, clear and reliable, in accord with § 1617.2(a),
 - that signal transmission is through a dedicated channel unless there are multiple cranes, derricks or signal persons or the crane is operated on or around railroad tracks and coordinated with equipment on the tracks, in accord with § 1617.2(b), and
 - that the operator uses a hands-free system for receiving the transmission of electronic signals, in accord with § 1617.2(c). A hands-free system is a system that does not require the operator to depress a button, manipulate a switch, or take any action to receive the incoming signal.
- b. Transmission of an electronic signal that is not clear, effective, or reliable could pose a significant hazard, and such transmission would generally not meet the “effective” requirement under § 1617.2(a). Some issues that may affect signal efficacy include static, time delay, and dropped signals. If the signal person becomes aware that transmission of electronic signals is interrupted during hoisting, the signal person must visually or audibly signal the operator as required by § 1617.2(d) who must safely stop operations in accordance with 1617.1(f).

Citation Policy

- c. § 1617.2(a) through (c): Consider a citation for violation of:

- § 1617.2(a), if devices were not tested before operations,
- § 1617.2(b), if signals are not being transmitted through a dedicated channel and the exceptions are not applicable, and/or
- § 1617.2(c), if the operator uses a non-hands-free system to receive signals.
- § 1617.2(d), if the signal person fails to signal the operator when aware of an interruption in transmission during hoisting.

T. §1617.3: Voice signals—additional requirements

1. § 1617.3(a) through (c): This section contains supplemental requirements for voice signals.
Inspection Guidance
 - a. When possible, listen to voice signals being given on site. Verify by observation of operations with voice signals and interviews of the operator, signal person and/or lift director if the following requirements under this section were met:
 - that voice signals were agreed upon by the operator, signal person, and lift director before operations began and whenever another worker was added or substituted during an operation, in accord with § 1617.3(a),
 - that each voice signal contains the following three elements in that order: (1) function (such as “hoist,” “boom,” etc.) and direction, (2) distance and/or speed, and (3) function, then stop command, in accord with § 1617.3(b), and
 - that the operator, signal person and lift director are able to effectively communicate in the language the signals are given in, in accord with § 1617.3(c).
 - b. An example of a proper voice signal would be: “hoist up; 10 feet; hoist stop.” Actual words used may vary, but the order of the signals given must remain consistent under § 1617.3(b).
 - c. Observation of any misunderstandings or miscommunications between parties involved in the operation may suggest that one or more of these requirements has not been satisfied.

Citation Policy

- d. § 1617.3(a) through (c): Consider a citation for violation of:
 - § 1617.3(a), if the operator, signal person and lift director do not share the same understanding of what voice signals should be used,
 - § 1617.3(b), if voice signals do not contain the proper elements in the proper order, and/or

- §1617.3(c), if the operator, signal person and lift director are not able to communicate effectively in the language signals are given in.

U. §1617.1(d): Signals—hand signal chart

1. § 1617.1(d)(4): Hand signal charts must be on the equipment or conspicuously posted near hoisting operations.

Inspection Guidance

- a. Visually inspect the equipment and worksite to ensure that there is a hand signal chart visible (usually on the crane), and that the chart is legible and not too weathered.
- b. If the hand signal chart is not readily visible, ask the employer where it is located.

Citation Policy

- C. § 1617.1(d)(4): If there is no hand signal chart, the chart is not posted on equipment or near hoisting operations, or the chart is illegible, consider a citation for violation of § 1617.1(d)(4).

V. §1610.7: Fall Protection

This section covers fall protection requirements that are applicable to equipment covered by Article 15.

- requirements for determining adequate anchorage points on the equipment, and
- using the load line as an anchor for fall protection/restraint systems. This section also clarifies that fall protection equipment is not required when an employee is at or near the draw-works (when equipment is running), in the cab, or on the deck.

Fall Protection Equipment: guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems.

Personal fall arrest system (PFAS): a system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors, and a body harness, and may also include a lanyard, deceleration device, lifeline, or suitable combination of these things.

1. §1610.7(a): Application

Inspection Guidance

- a. If tower cranes are present, note that only the fall protection requirements of paragraphs (c)(1), (c)(3), (d), (g) and (h), of § 1610.7 apply to tower cranes.

Paragraphs (b), (c)(1), (c)(2), (d), (e), (f) and (g), of § 1610.7 apply to all other equipment covered by Article 15.

- b. Visually inspect the worksite, observe the hoisting operations (when possible), and interview the employer, operator, lift director (if any), maintenance personnel, and crew members to determine when and where employees must work at elevated locations on the equipment. Fall protection requirements vary depending on the elevation; therefore, it is critical to determine and document the elevations at which employees are working.

Citation Policy

- c. § 1610.7(a)(1): This provision should not be cited, as it only establishes the scope for the application of the requirements of §§ 1610.7(b) through (h).
2. § 1610.7(b) and (c): Boom Walkways, Steps, Handholds, Ladders, Grabrails, Guardrails, and Railings

This paragraph requires equipment manufactured after July 7, 2012 to be equipped:

- with walkways on lattice booms when the vertical profile of the boom from cord centerline to cord centerline is 6 or more feet.
- to provide safe access and egress between the ground and the operator work station(s), including the forward and rear positions, by the provisions of such devices as steps, handholds, ladders, guardrails and railings.

Inspection Guidance

- a. Verify and document the manufacturing date of the equipment in use.
- b. Visually inspect the equipment to determine if it is equipped with a lattice boom and document by camera or video (when possible) the configuration and condition of the boom. When equipped with walkways, and where there is access to the boom for inspection, document the condition of observed walkways, handrails, steps, guardrails, ladders, etc.
- c. It is recommended that the employer be asked to lower the boom of the equipment only after consulting with the Area Office about any concerns regarding the condition of the boom and its configuration. Arrange a time with the employer to have the boom safely lowered for inspection purposes.

When the boom of the equipment is not down, examine design specifications of the walkway system possibly in the operator's manual and/or available maintenance manuals. In addition to the review of the manuals, verify from the operator, employer, and/or maintenance personnel that the walkway system on the equipment is the same as specified in the manuals.

- d. When possible, observe how the operator accesses and egresses the work station and document when it appears that devices such as steps, handholds, ladders, guardrails and railings are needed to aid the operator's movement on the equipment. Review of the

operations manual may provide recommendations regarding how to safely access and egress the operator work station of equipment, as well as the devices that were provided by the manufacturer to facilitate safe access and egress.

In situations where replacement parts have been used, document any instances where devices are missing or have not been properly maintained.

- e. Under conditions when it appears that the work station cannot be safely accessed and egressed, ask the employer to describe why the required safeguards or devices were not provided and document explanations regarding the feasibility of providing these safeguards or devices.
- f. Visually inspect the lattice boom to determine if it is supported by pendants or bars, and when the boom is lowered and there is access for compliance inspection purposes:
 - measure and document the: width of the walkway, height of the guardrails and/or handrails, distance between rungs if bent, broken, or missing, fall distances from work positions on the equipment, cord widths, and brace dimensions, and take any other measurements necessary to verify the employer's compliance with § 1610.7(c).
 - visually inspect the guardrails, railings, and other fall protection attachments to verify that they are permanently attached to the equipment. This information may also be obtained from interviews with the operator, lift crew members, and maintenance personnel. For example, the operator or one of the workers may be responsible for putting up or taking down removable attachments. Document when the attachments are removable.
 - document any evidence that would indicate that guardrails, railings, or permanent fall protection attachments can or have already snagged a pendant or bar, including interviews with the operator, lift crew members, and maintenance personnel. Guardrails, railings, and other permanent fall protection attachments are prohibited in situations where fall protection attachments can snag a pendant.

Citation Policy

- g. § 1610.7(b)(2)(B)(1): Paragraph (b)(2)(B)(1) Of § 1610.7 should not be cited because it only informs the employer that guardrails/railings/and other permanent fall protection attachments are not required along walkways.
- h. § 1610.7(b): Consider citations for violations of applicable requirements of this provision when:
 - boom walkways are required and the boom was not configured with a walkway, or the walkway does not meet the requirements of §1610.7(b)(2)(A).
 - guardrails, railings, and other permanent fall protection attachments are used along a walkway under one of the conditions prohibited by provisions of § 1610.7(b)(2)(B).

- i. § 1610.7(c): Consider citations for violations under this provision when steps, handholds, ladders, grabrails, guardrails, and railings are needed to facilitate safe access and access between the ground and the operator work station/cab and the devices:
 - were not provided;
 - were provided but were missing; or
 - were provided, but the requirements of § 1610.7(c) were not met.

3. §1610.7 (d) through (h): Personal Fall Arrest, Positioning Device, and Fall Restraint Systems

- 1. These paragraphs set forth requirements for when personal fall arrest systems, positioning devices, or fall restraint must be used and the criteria that those systems and their components must meet.

When Fall Protection Equipment Must Be Used By Workers While On the Equipment

Activity	Trigger height for fall protection
Assembly/disassembly	15 feet
Tower cranes when erecting, climbing (jumping) or dismantling	15 feet
Non-assembly/disassembly when the lattice boom is at horizontal*	15 feet
Non-assembly/disassembly—non-lattice booms*	7 ½ feet
Non-assembly/disassembly when the lattice boom is not at horizontal*	7 ½ feet
Tower cranes when not erecting, climbing (jumping), or dismantling	7 ½ feet
*Applies both when moving point-to-point on a boom and when at a work station on any part of the equipment.	

- a. Visually inspect the hoisting equipment, and identify and document (by measurement, camera, or video) elevated areas of the equipment at which fall protection must be used.
- b. When possible, observe and document when employees were at elevated locations or moving point to point on the equipment, to verify that workers are using fall protection equipment in accord with the requirements of §1610.7(e) and (h). Information needed to make this verification can also be obtained from interviews with the employer, lift crew members, lift director (if available), maintenance personnel, operator, and inspectors (if available). Use trigger heights (chart above) to determine what fall protection requirements apply.

- c. If workers were at elevated locations on the equipment without fall protection equipment, take measurements of working surface and fall distances to lower levels; document the employee locations and fall distances through video, interviews with manufacturers (if necessary), copies of range diagrams, boom angle, etc.
- d. Visually inspect any fall protection systems available for use on the jobsite to verify that they have been maintained in good condition, appear to be compatible with the system's other components and that they and their components meet the requirements of § 1670(b) except the system anchorage requirements of §§ 1670(b)(10) and (c)(4) are not applicable. However, the requirements of §§ 1670(b)(10) and (c)(4) are used as references for a competent person when considering the suitability of a substantial part of the crane as a possible anchorage for a fall protection system.

Typically, the specifications of fall protection equipment can be obtained from information provided by the equipment manufacturer, such as user's guides. Locate and use identifiers on the fall protection equipment, such as model numbers, and capacity ratings to verify that the equipment is being used properly in accord with information provided by the manufacturer or other qualified individuals.

- e. When fall protection equipment has been anchored to parts of the crane, identify the competent person who determined that the anchorage would be sufficient. If possible, interview the competent person to verify the individual's expertise regarding the subject matter and to obtain and document a description of how the competent person made this determination.

Citation Policy

- f. §1610.7(d): When the use of a personal fall arrest or fall restraint system is required and the employer did not meet the requirements of §1670(b), consider a citation of § 1610.7(d). The AVD should also identify what requirement of § 1670(b) were violated.
 - g. § 1610.7(e) and (f): When fall protection equipment was not used, on equipment other than a tower crane, under one of the conditions specified in §§ 1610.7(e) or (f), consider citations for violations of applicable provisions of §1610.7(e) and (f).
 - h. §1610.7(g): When the use of fall protection equipment was required and its anchorage did not meet the requirement § 1610.7(g), consider citations for violations of applicable provisions of § 1610.7(g). The AVD should also describe what provision of § 1670(b)(10) or § 1670(c)(4) the competent person knew or should have known the anchorage would not meet.
 - i. §1610.7(h): When fall protection equipment was not used on a tower crane under one of the conditions specified in § 1610.7(h), consider citations for violations of applicable provisions of § 1610.7(h).
4. § 1610.7(j): Anchoring to the Load Line.

This paragraph specifies the conditions under which fall protection equipment can be anchored safely to the load line of equipment covered by Article 15.

Inspection Guidance

- a. When possible, observe the operation, or conduct interviews to determine and document when a worker's fall protection equipment is or was anchored to the load line of hoisting equipment. When the workers are or were anchored to the load line, verify and document:
 - the location of the operator because he or she must be on the worksite while the workers are anchored to the load line of the equipment;
 - when and how the operator was notified that the equipment is being used to anchor fall protection on the worksite;
 - if other loads were also suspended from the load line when the workers were also anchored to the load line;
 - when employees are being hoisted by the load line and lanyard and the employer has not met the requirements of § 1616.6, Hoisting Personnel.
- b. When fall protection equipment was used and anchored to the load line of hoisting equipment, interview the employer, operator, and workers to identify the qualified person who made the determinations required by § 1610.7(j)(1).
- c. Review any available documentation, and/or have the qualified person describe, how the determination was made that the anchorage setup and rated capacity met § 1610.7(g)(2) (which refers to § 1670(b)(10) for 5,000 pound criteria). Document, or obtain a copy, of any information obtained from the qualified person regarding this determination.
- d. Interview the qualified person to verify the individual's expertise and to obtain and document a description of how the qualified person made this determination.

Citation Policy

- e. § 1610.7(g): When fall protection equipment was anchored to the load line and the requirements of § 1610.7(g) were not met, consider citations for violations of applicable provisions of § 1610.7(g).
5. § 1509(a)/3203(a)(7): Requires training to be provided to workers including those who work at elevated locations on equipment covered by Article 15

Inspection Guidance

- a. Observe the actions of, and interview, individuals to verify that they were trained as required by § 1509 to use required fall protection equipment in accord with the requirements of §

1610.7(d). Elements of §§ 1610.7, 1670 can be used to form questions that may obtain information regarding their training.

Citation Policy

- b. § 1509(a): When the workers, who were at elevated locations on the equipment and exposed to fall hazards specified by § 1610.7, were not trained to use the fall protection equipment required by § 1610.7(d), consider citations for violations of applicable provisions of § 1509(a)

W. § 1616.3: Work Area Control.

Section 1616.3 addresses the striking/pinching/crushing hazards associated with rotating superstructures of equipment.

Superstructure/upper works means the revolving frame of equipment on which the operating machinery (and in many cases the engine) are mounted along with the operator's cab. The counterweight is typically supported on the rear of the superstructure/upper works and the boom or other attachment is mounted on the front.

1. § 1616.3(a): Swing Radius Hazards.

The requirements of § 1616.3 apply when there are accessible areas in which the equipment's rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

- Striking and injuring an employee: or
- Pinching/crushing an employee against another part of the equipment or another object.

When such equipment is used, the employer must meet the requirements of §1616.3(a)(2)

Inspection Guidance

- a. Visually inspect, and observe the operation of, the equipment to determine whether the equipment has a rotating superstructure that presents "reasonably foreseeable" swing radius hazards in areas that are accessible to workers. If so, document by camera/video any hazard areas around the equipment and any signs, warning/control lines, railings, or similar barriers in those areas. This information will also be used to verify the employer's compliance with the hazard area designation requirements of § 1616.3(a)(2)(B).

Reasonably Foreseeable

Examples illustrating the presence or absence of “**reasonably foreseeable**” swing radius hazards:

Example #1: The bottom of the rear of the rotating superstructure is 12 feet above the ground. An employee standing on the ground within that swing radius could not be struck by the rotating superstructure since the rotating superstructure would swing well above him/her. There is nothing within that area on which the employee could stand. In this example the area does not pose a reasonably foreseeable risk of being struck or pinched/crushed.

Example #2: Same scenario as example #1 above, except that a truck with material that is to be unloaded from its bed is within the swing radius. If an employee were to stand on the truck bed the employee would be within the swing radius. In this example, there is a reasonably foreseeable risk of an employee being stuck or pinched/crushed.

Citation Policy

- b. § 1616.3(a)(1): This provision serves to establish the scope for the application of the requirements of §§ 1616.3(a)(1) through (b). It should not be cited.
2. § 1616.3(a)(2): Keeping Employees Out of Hazard Areas

To prevent workers from entering swing hazard areas, employers must (A) train workers to recognize swing radius hazards; and (B) erect and maintain a method of demarcation around the perimeter of the hazard area.

Inspection Guidance

- a. If a swing radius hazard area is determined to exist under § 1616.3(a)(1), verify whether all employees assigned to work on or near the equipment were adequately trained on swing radius hazards.
- b. Observe the actions of and interview individuals that were assigned to work on or near the equipment, to verify if they were trained to protect themselves from the hazard areas. When employees do not appear to recognize the barrier around the hazard area, ask about their work actions and training.
- c. Determine whether hazard areas around the equipment are demarcated by barriers. If not, determine whether the employer demonstrated the infeasibility of such barriers and clearly communicated the hazards via warning signs and high visibility markings on the equipment, and trained workers to understand the significance of those signs/markings. Document the employer’s rationale for why barriers are infeasible and whether it considered any other alternative safety procedures to protect employees.

Citation Policy

- d. § 1616.3(a)(2): Consider a citation for violations of specific requirements of this provision if equipment used exposed employees to a reasonably foreseeable risk of striking, pinching, and/or crushing from the rotating superstructure, and the employer did not meet the requirements of § 1616.3(a)(2)(A) and (a)(2)(B).

When the employer claims that it was infeasible to erect and maintain methods of demarcation around the perimeter of the hazard area, the AVD must also explain if the employer's rationale for infeasibility is deficient.

3. § 1616.3(a)(3): Protecting Employees in the Hazard Areas

This provision addresses hazards to employees working in the hazard area. It requires employees, before entering a hazard area, to ensure that the equipment operator is informed that they will be entering the hazard area. It also prohibits employees with knowledge of the presence of workers in the hazard area from rotating the superstructure until he/she is informed that they are in a safe position.

The method of communication between the equipment operator and workers in the hazard area must be established before the workers enter the hazard area. If a signal person is used to relay this information, he or she must meet the requirements of § 1618.2.

Acceptable Communication Systems

Below are some examples of **acceptable communication systems** between equipment operators and workers in the hazard area:

- use of a signal person who can give a prearranged "all clear" signal to the operator when the hazard area is clear of workers
- use of portable air horns by the workers in the hazard area to signal the equipment operator when it is safe to rotate the superstructure

Inspection Guidance

- a. When there are accessible hazard areas around the equipment's superstructure, document when and under what conditions workers entered those areas and what workers were doing while there. In addition, document the location of hazard areas that are out of the view of the operator.
- b. Interview the crew members, operator, lift director, and lift crew members to:
 - determine whether the employer has established and enforced the use of notification procedures when employees must go in the hazard areas out of the view of the operator.
 - obtain and document a description of the pre-arranged method of communication, e.g., what was the method used and when was it discussed?

Often there are indications that employees have entered hazard areas, such as footprints in the mud or items in the areas like signaling flags, water coolers, lunchboxes, gloves, jackets, helmets, tool boxes, etc. If such indications are present, search for further evidence of employee presence in hazard areas.

Citation Policy

- c. § 1616.3(a)(3): Consider a citation of this provision if the employer fails to establish and require use of procedures for notifying equipment operators of the presence of workers in the hazard area and/or procedures for notifying operators of workers exiting from the work area.

Also consider a citation if an operator, with knowledge of the presence of workers in the hazard area, rotates the equipment superstructure prior to verifying that the employees are not in the zone of danger.

Note that although the specific language of § 1616.3(a)(3) requires employees entering the hazard area to provide notification, the employer is ultimately responsible for ensuring that an effective system of communication is established and followed by employees. If such a communication system is not established and followed, consider citing the employer(s) under this provision. Under this scenario, this citation should be grouped with a citation of § 1509(a).

4. § 4993.1(b): Two or More Pieces of Equipment with Intersecting Working Radii

When multiple pieces of equipment are positioned and used so that they have overlapping working radii, this provision requires the controlling entity to institute a system that coordinates their activities. For example, meeting this requirement would prevent: the equipment from colliding with one another; or the striking, or pinching in between moving equipment, of workers who are within the working radii of both pieces of equipment. In the absence of a controlling entity on a work site, the employer(s) operating the equipment must institute such a system.

Inspection Guidance

- a. Refer to the Inspection Guidance provided above under § 1610.5(c) (Ground Conditions) of this directive for guidance on determining the existence of a controlling entity on the work site.
- b. Interview the employer, controlling employer (if there is one), the operator, lift director (if there is one), and lift crew members, to determine which employer is responsible for the operation of each piece of equipment in use at the work site.
- c. Determine whether the working radii of the equipment overlap by documenting information on the distances between individual pieces of equipment and working radii for each piece of equipment.

Citation Policy

- d. § 4993.1(b): When multiple cranes with overlapping work radii are operated in the absence of a system to coordinate their operations, consider a citation of § 4993.1(b). If the construction site does not have a controlling entity, consider citing the employer(s) operating equipment with intersecting working radii.

X. §1616.4: Keeping Clear of the Load

This section identifies the employees that may and may not be in the fall zone of the load and under the lift routes of the loads that must be hoisted. The section also outlines requirements on the location of employees during tilt-up and tilt-down operations.

1. § 1616.4(a): Hoisting Routes

Inspection Guidance

- a. Observe the hoisting operation and route to determine and document by camera/video the construction activities that are being performed and where the loads are being staged to be hoisted in support of the activities.
- b. Note the types of loads suspended by the equipment and when and where employees are in the fall zones of those loads. Look for other potential hoisting routes and load staging areas that the employer could use that would not put employees in the fall zone.
- c. Interview the employer, operator, and lift supervisor (if any) and document how and why the hoisting route was chosen and why the hoisting job could not be done using a safer hoisting route and load staging area. Be sure to ask about and document any hoisting-related local requirements, such as public safety codes, that may limit the employer's options for hoisting routes. Ask why that particular hoisting route was chosen.

Fall zone: the area (including but not limited to the area directly beneath the load) into which it is reasonably foreseeable that partially or completely suspended materials could accidentally fall.

Directly under the load: applies when a part or all of an employee is partially or completely directly beneath a suspended load.

Fall zone and Travel Path of the Load

When determining the size of a **fall zone**, the type of load being hoisted should be factored into this consideration. For example, a solid load such as a concrete block, would have a much smaller fall zone than a bundle of pipe or a tank of liquid should there be loss of control of the load, especially when the load is moving. The hazard area is wherever the employee can be struck by the load.

Public Safety: Many, especially urban, construction sites may have relatively small footprints that may be bound on all sides by roads, sidewalks with high vehicular and pedestrian traffic. Due to the employer's compliance with local and public safety requirements, it may not always be feasible for the employer to provide a hoist route that does not fly any loads over the heads of employees who are concentrated within the small footprint of the construction site to perform construction activities. Therefore, where possible, hoisting routes must be used that minimize the exposure of employees to hoisted loads to the extent consistent with public safety.

Citation Policy

- d. § 1616.4(a): Consider a citation of § 1616.4(a) when an alternative hoisting route could have been used that would have reduced the number of, or eliminated employees that must be in the fall zone of a suspended load.

The AVD of the citation should describe how the hoisting route could have been altered to better protect employees from the hazard of suspended loads.

2. §1616.4(b) through (d): Working within the Fall Zone and Rigging of the Load

This section specifies the only conditions (other than for tilt-up or tilt-down operations) under which employees are allowed to be in the fall zone of a load when the operator is not moving the load.

Inspection Guidance

- a. Photograph and document when and where an observed hoisting activity involves: tilt-up or tilt-down operations, the use of a concrete bucket; the initial connection of the load to a component or structure; or a load that must be hooked, guided, or unhooked. Note which employees were in the fall zone, the extent of the exposure, and what they were doing while there.
- b. Interview the crew members, employer, operator, and lift director (if any) to document why employees are in the fall zone and to verify the employer's compliance with §§ 1616.4(b) and (d).
- c. When employees were in the fall zone to hook, unhook, receive, or guide loads, document who did the rigging and verify whether the rigging was done by a qualified rigger. See the Assembly/Disassembly section in this directive for the definition of qualified rigger and for guidance in assessing the individual's qualifications.
- d. Determine through interviews, review of any available and relevant rigging documentation (like a lift plan or special instructions from the rigger or a manufacturer), or visual inspection of the rigging and load to determine the employer's compliance with the requirements of § 1616.4(c). When possible, video or photograph the rigging used.

Tilt-up or Tilt-down Operations: means raising/lowering a load from the horizontal to vertical or vertical to horizontal.

Citation Policy

- e. § 1616.4(b): Consider a citation of § 1616.4(b) when employees were in the fall zone of a load that was suspended but not moving and the employees were not:
 - guiding, hooking, or unhooking a load,
 - operating a concrete hopper or concrete bucket, or
 - initially attaching the load to a component or structure.

Consider citations for violations of §§ 1720(c)(3) and (c)(4) when equipment other than a crane or derrick is used to hoist a concrete bucket. Consider citations for violations of § 1720(c)(1) and (c)(2) regarding the design of the concrete bucket.

- f. § 1616.4(c): When an employee was in the fall zone of a load while engaged in one of the activities specified in § 1616.4(b) and a requirement of §1616.4(c) was not met, consider a citation of the applicable requirement of §1616.4(c).
 - g. § 1616.4(d): When an employee was not needed to receive the load and the employee was in the fall zone of the load, consider a citation of § 1616.4(d).
3. § 1616.4(e) and 1715: Tilt-up and Tilt-down Operations.

This section prohibits any employee from being directly beneath the load during the performance of tilt-up or tilt-down operations. The area under a tilt-up panel where the panel would fall if released is considered directly under the load. In addition, this section limits the employees who can be in the fall zone of this particular type of load to only those who are essential to the performance of 3 specified operations. These operations are:

- physically guiding the load;
- closely monitoring and giving instructions regarding the load's movement; or
- Either detaching the load from, or initially attaching the load to, another component or structure.

Inspection Guidance

- a. Photograph and document when and where an observed hoisting is a tilt-up or tilt-down operation. Note what employees were in the fall zone and what they were doing while there.
- b. Use any relevant information collected from inspection guidance discussed above for the application of §§ 1616.4(a) through (d) to help verify the employer's compliance with the requirements of § 1616.4(e).

Citation Policy

- c. § 1616.4(e) and 1715: When an employee was in the fall zone of a load while engaged in tilt-up or tilt-down operations and the employee was either directly under the load or not engaged in an activity specified in § 1616.4(e)(2), consider a citation of applicable requirements of § 1616.4(e) and 1715.

Y. § 1616.5: Boom Free Fall and Controlled Load Lowering

This section discusses requirements relating to free fall of the boom and load line. Included are provisions addressing the prohibitions that apply if the equipment has a boom that is designed to free fall, as well as some specified methods of preventing free fall of the boom.

This section also addresses hazards related to the operation of hydraulic, telescoping booms requiring an integrally mounted holding device to prevent the boom from retracting if there is a hydraulic failure.

In addition, hazards related to free fall of the load line are addressed. Free falls are prohibited under specified conditions.

1. § 1616.5(a) and (b): Prohibitions and Prevention of Free Fall of the Boom

Typically, equipment with boom mechanisms that have free fall capability (“live booms”) are found on older friction cranes, derricks, and cranes designed for use on barges.

Live booms on equipment manufactured on or after October 31, 1984 are not permitted.

Paragraphs (a) and (b) of § 1616.5 work in conjunction to allow older models of equipment with live booms (manufactured before October 31, 1984) to be used safely by restricting the equipment’s use to operations where none of the following worksite conditions are present:

- When an employee is in the fall zone of the boom or load;
- When an employee is being hoisted;
- When the load or boom is directly over or within Table A (1612.1) distance of the power line including the radius of vertical travel of the boom/load ;
- When the load is over a shaft and employees are in the shaft;
- When the load is over a cofferdam and an employee is in the fall zone of the boom/load; and
- During lifting operations at a refinery or tank farm.

Under these conditions, free fall of the boom is prohibited when loads are hoisted with equipment (manufactured before October 31, 1984) unless the equipment is equipped with the secondary braking mechanisms/devices listed in § 1616.5(b)(1) to (4).

Inspection Guidance

- a. Determine the date of manufacture of the equipment from operating manuals, equipment identification labels, or other identification sources. The key determination is whether the equipment was manufactured (1) before October 31, 1984, or (2) on or after that date. This information will be relevant to the employer’s compliance with § 1616.5.
- b. Observe the performance of hoisting operations if possible and document whether equipment with a live boom has been used in any of the six prohibited situations listed above.
- c. When operation of the equipment is observed in proximity to an overhead power line, be sure to photograph/video and document all measurements necessary to determine boom and load fall radius and Table A clearance distances, including the equipment’s position relative to the power line, boom length, load dimensions, power line height, and power line voltage. This information will be used to verify the employer’s compliance with Table A clearance distances and § 1616.5(a)(2).

Calculating Boom and Load Fall Radius

When calculating the **boom radius**, consider both the vertical fall radius as well as a potential swing radius equal to the length of the boom itself when measured from the pivot point at center pin. When the pivot point of the equipment is not obvious, it can be determined through review of the operations/service manuals or by asking the operator, maintenance personnel, or employer.

When calculating **load fall radius**, this would be a similar calculation to the "Fall Zone" as identified in § 1616.4. The fall zone depends on the load itself. A bundle of pipe or vessel full of liquid would have a much larger fall zone than a single block of concrete.

- d. When equipment with a live boom is used to move loads over a shaft, document when employees were present in the shaft during lifts
- e. When equipment with a live boom is used to move a load over a cofferdam, document if employees are present in the cofferdam during lifts and for how long. However, note that there is no violation of § 1616.5(a)(2) except when the employees in the cofferdam were in the actual fall zone of the boom or load.
- f. When a worksite condition specified in § 1616.5(a)(1) exists:
 - if the live boom has a friction drum, verify by visual inspection, employee interviews, and/or equipment manuals that there is a friction clutch and a braking device, plus a secondary braking or locking device.
 - if the live boom has hydraulic drums, verify by visual inspection, employee interviews, and/or equipment manuals that the hydraulic drums have an integrally mounted holding device or internal static brake.
 - if the live boom has hydraulic boom cylinders, verify by visual inspection, employee interviews, and/or equipment manuals that all hydraulic boom cylinders have an integrally mounted holding devices.

NOTE: Neither clutches nor hydraulic motors are considered to be braking or locking devices for purposes of this Article.

Citation Policy

- g. § 1616.5(a)(2): Consider a citation for violation of § 1616.5(a)(2) when a load was hoisted using equipment:
 - with a live boom (manufactured before October 31, 1984),
 - under any of the six prohibited conditions listed under §§1616.5(a)(1)(A)-(a)(1)(F), and
 - that is not a floating crane/derrick or land crane/derrick on a vessel/floating device.

The AVD of the citation should list the specific conditions in paragraphs (a)(1)(A) through (a)(1)(F) of § 1616.5 that existed when free fall of the boom occurred.

2. § 1616.5(c): Preventing Uncontrolled Retraction

Hydraulic Telescoping Booms (also known as “hydraulic extensible booms”) are required to have an integrally mounted holding device to prevent boom retraction in the event of a hydraulic failure. An integrally mounted holding device (such as a load hold check valve) is designed to prevent retraction of the boom in the event of catastrophic hydraulic failure, such as a supply hose rupture. It is not designed to prevent retractions caused by minor systemic fluctuations in the hydraulic system caused by temperature changes.

Inspection Guidance

- a. Through visual inspection, operating manuals, and interviews, determine if the equipment is configured with a hydraulic, telescoping boom.
- b. If equipped with a hydraulic, telescoping boom, through visual inspection, determine if the boom is equipped with the required holding device. If the presence of the device is not apparent, review the operating manual, manufacturer’s equipment specifications, and interview the employer, operator, or available maintenance personnel to verify. For example, the employer can be asked for a copy of any available documentation of tests performed to confirm the operation of this device.

Citation Policy

- c. § 1616.5(c): Consider a citation of § 1616.5(c) if the hydraulic telescoping boom does not have an integrally mounted holding device.

3. § 1616.5(d): Load Line Free Fall

Load line Free Fall: Where only the brake is used to regulate the descent of the load line (the drive mechanism is not used to drive the load down faster or retard its lowering).
Controlled Load Lowering: Lowering a load by means of a mechanical hoist drum device that allows a hoisted load to be lowered with maximum control using the gear train or hydraulic components of the hoist mechanism; requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlled lowering of the load line is required and free fall of the load is not allowed under the following worksite conditions:

- When an employee is directly under the load;
- When an employee is being hoisted;

- When the load or boom is directly over or within Table A (§ 1612.1) distance of the power line including the radius of vertical travel of the boom/load;
- When the load is over an occupied shaft;
- When the load is over a cofferdam and employees are in the fall zone of the load.

Inspection Guidance

- a. Observe the operation of the equipment and interview the operator, and/or use camera/video equipment when loads are permitted to free fall in any of the five situations listed above. If using video, maximize audio gain to capture the presence or absence of hoist drive motor sounds. Absence of hoist drive motor sounds may indicate a free fall of the boom or load.
- b. When operation of the equipment with load line free fall is observed in proximity to a power line, be sure to photograph/video and document all measurements necessary to determine boom and load fall radius and Table A clearance distances, including the equipment's position relative to the power line, boom length, load dimensions, power line height, and power line voltage. This information will be used to verify the employer's compliance with Table A clearances distances and § 1616.5(a)(2).
- c. When equipment is observed being used to move a load over a cofferdam, document whenever employees were present in the cofferdam. However, note that there is no violation of § 1616.5(d)(5) except when the employees in the cofferdam were actually in the fall zone and load line free fall was used.

Citation Policy

- d. § 1616.5(d): Consider citations for violations of applicable requirements of 1616.5(d) when a free fall of the load occurred under one of the conditions specified in §§ 1616.5(d)(1)-(5).

The AVD of the citation should list the specific condition in paragraphs (d)(1) through (d)(5) of § 1616.5 that existed when free fall of the load line occurred.

Z. §1618.1: Operator Qualification and Certification

1. §1618.1(a) and 1618.1(e): Operator Qualification and Competency

Operator Competency

Section 1618.1 contains the requirements for operator competency and qualification, except for derricks, sideboom cranes, or equipment with a maximum capacity of 2,000 pounds or less. In those cases, the operators of that equipment must be qualified by training and experience to operate the equipment used at the jobsite. See discussion of § 1618.4(c)(3) of this directive for guidance regarding the assessment of operators who do not have to be certified in accord with § 1618.1.

To meet the requirements of § 1618.1, operators must be assessed and determined (by an audited employer program, government entity, or U.S. military) to have the skills necessary to operate a specified type and capacity of crane safely. After the operator is qualified, the employer must ensure that the operator operates the equipment in accord with the requirements of Article 15. The following terms are based on requirements within 29 CFR 1618.1 and apply to operator qualification requirements:

- “Qualification” for the application of § 1618.1 is the term used when an operator’s skills have been assessed through one of three methods: 1.) qualification by an audited employer program, 2.) qualification by the U.S. military (limited to employees of the Department of Defense or members of the Armed Forces), or 3.) qualification through a state or local license that meets the requirements of § 1618.1(c).
- “Operators in training” who work in those jurisdictions where state or local licensing that meets the requirements of 1928.1427(e) must be trained to operate the equipment to perform tasks that are within her or his ability and only under the supervision of a certified/qualified operator. When a local license is not required, all equipment operators must be able to operate the equipment in accord with the requirements of Article 15.

Options for Establishing Operator Competency or Qualification

Operators of mobile cranes having a boom length of 25 feet or greater or a maximum rated load capacity of 15,000 pounds or greater shall have a valid certificate of competency in accordance with 5006.1.

Effective Dates

This section also specifies a phase-in period for additional equipment operator certification and qualification requirements. The operator certification/qualification requirements of Article 15 become effective on November 10, 2017. Until then, employers are required to ensure that operators are competent to operate the equipment as specified under § 1618.1(e) and certified pursuant to 5006.1.

Inspection Guidance

- a. Interviews should be conducted to document the relevant credentials and level of experience of these individuals whenever necessary as support for a citation. For example, the individual can be asked to describe:
 - extent and duration of his or her relevant experience with the equipment at the site or similar sites;
 - to perform the types of crane operations assigned;
 - to perform inspections of the crane;
 - to operate the crane in the configurations needed to perform crane jobs assigned;

- to recognize when the crane is properly assembled and set-up;
 - to use the operating systems of the particular cranes that he or she operates; and
 - to recognize and address crane hazards that are particular to the work site.
 - certificates, degrees, or other supporting documents related to the operation of the crane and/or performance of the construction activity.
- b. If the documentation is a locally-required license, verify that the licensing authority has determined that the local licensing program meets the requirements of Title 8 CCR 1618.1(c)(2) and (b). When a license/certification that meets the federal floor is required by a state or local requirement, ask the employer for documentation of its operators' state certification. Some operators may carry documentation with them while some employers may keep copies of those documents in a central location to facilitate accessibility. Ask the operator if he or she has a certificate or card that demonstrates the employee is certified to operate that type and capacity of crane. Possession of such certification may be construed as one piece of evidence that the operator is qualified to operate the crane in question.
- c. If there are concerns regarding a local licensing program, if necessary, contact a Regional Senior Safety Engineer for assistance.
- d. Look at the equipment, and if necessary, review its operations manual to determine if the type of the equipment is consistent with the type in which the operator is competent to operate.
- e. Look at the equipment, and if necessary, review its operations manual to determine if the capacity of the equipment is consistent with the operator's competency level as determined by the employer.
- f. If the operator has a local license or certification, verify that the certification testing language specified on the operator's certification/qualification documentation is the same as that in the crane manual, load charts, etc., used for the equipment operated at the jobsite.

Other Criteria for Operators

In addition to meeting all other certification/qualification requirements, in accord with § 1618.1(h) the operator must be able to use applicable operators manuals, load charts, etc.).

Citation Policy

- g. §1618.1(a)(1): When a state or local authority requires a license or certification that meets the federal floor, consider a citation of § 1618.1(a)(1) when the equipment has been or is being operated by an operator:

- if the employee cannot produce a copy of a valid license from a non-military government entity, such as a state or local office, that meets the requirements of paragraphs (e)(2) and (j) of § 1618.1; or
- if the operator is not qualified by the US military.

For inquiries about the applicability of this provision to the crane operator certification/license required by a particular state or local jurisdiction, please contact the National Office for more guidance.

2. §1618.1(e)(3)(A) and (B): Consider a citation of 1618.1(e)(3)(A) or (B) when the equipment is not safely operated by a trained or competent operator.

AA. § 1618.2: Signal Person Qualifications

1. § 1618.2(a): Employers must ensure that each signal person meets the Qualification Requirements in § 1618.2(c) before that person may give any signals. Employers have two options for meeting this requirement:
 - § 1618.2(a)(1) (Option (1)): The signal person has documentation from a third-party qualified evaluator showing that the signal person met the Qualification Requirements, or
 - § 1618.2(a)(2) (Option (2)): The employer's qualified evaluator has assessed the signal person and provided documentation that he or she met the Qualification Requirements.

Qualified Evaluators

Qualified evaluator (third-party) is an entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether an individual meets the qualification requirements for a signal person.

- Cal-OSHA does not evaluate or endorse specific products or programs, and makes no determination as to whether a certification program meets the definition of a "qualified evaluator (third-party)."

- Labor-management joint apprenticeship training programs that train and assess signal persons would typically meet the definition for a third-party qualified evaluator.

Qualified evaluator (not a third-party) is a person employed by the signal person's employer who has shown that he/she is competent in assessing whether an individual meets the qualification requirements for a signal person.

Inspection Guidance

- a. Ask the employer to see qualification documentation for all signal persons on site.

- b. If the employer produces no documentation, interview the employer and signal person to determine whether documentation exists.
- c. When qualification documentation is produced by the employer, examine it to verify its authenticity and to determine whether the documentation is from a third-party qualified evaluator (Option (1)) or from the employer's audited evaluator (Option (2)).
- d. Under § 1618.2(a)(2), employers are not permitted to rely on a former employer's assessment of a signal person's qualifications. Verify that a signal person's documentation does not come from a former employer.
- e. Under § 1618.2(a)(3), the employer must document the signal person's qualification/evaluation and make it available at the worksite. This can include physical documentation, such as a qualification card, or electronically through use of an on-site computer or other device. Documentation must specify each type of signal for which the signal person meets the Qualification Requirements in § 1618.2(c) (e.g., hand signals, radio signals, or flag signals).
 - Verify that the method/types of signals used during the operation are consistent with those specified on the signal person's qualification documentation.
- f. If an audited employer program (Option (2)) was used, review the program to evaluate whether it covers the Qualification Requirements of § 1618.2(c). Determine by observation and interviews if there are indications that signal persons may not have been properly trained, and interview the employer to determine how the qualified evaluator's qualifications were confirmed. If there is no written program, interview the employer to determine whether the program ensures that signal persons meet the Qualification Requirements of § 1618.2(c).

Citation Policy

- g. § 1618.2(a): Consider a citation for violation of § 1618.2(a) if:
 - the employer does not have qualification documentation for all signal persons giving signals,
 - the employer is relying on a signal person's qualification documentation from a former employer,
 - the signal person is using types of signals that he or she is not qualified to use, or
 - the employer relies on a qualified evaluator program under Option (2) that does not satisfy the Qualification Requirements of § 1618.2(c). If an inadequate employer qualified evaluator program is the basis for a §1618.2(a) citation, the AVD accompanying the citation should list the specific provision(s) of § 1618.2(c) that the employer's program failed to address.
- h. § 1618.2(a)(3): Consider a citation for violation of § 1618.2(a)(3) instead of § 1618.2(a) if:

- no qualification documentation is produced on site by the employer but a signal person or employer has documentation off-site showing that the signal person satisfied Option (1) or Option (2), or
- the documentation does not specify type(s) of signals for which the signal person meets the Qualification Requirements.

Evaluator Designated by a City/Local Authority

When an evaluator designated by a City/Local Authority is qualified to perform an assessment of a signal person's qualifications, employers who have their signal persons qualified by that evaluator would be in compliance with § 1618.2(a). However, section 1618.2 does not require an employer to use any particular evaluator (including city or local authority-mandated evaluator) to assess the qualifications of the employer's signal persons, provided that the evaluator used is "qualified" within the meaning of the standard.

2. § 1618.2(b): Employers must not allow a signal person who has documentation that meets the requirements of § 1618.2(a), but whose actions indicate that he or she does not meet the basic knowledge requirements under § 1618.2(c), to give signals during operations until he or she is retrained and reassessed.

Inspection Guidance

- a. If there are indications that a signal person does not meet the requirements in § 1618.2(c), determine by whether the signal person is qualified and whether he or she has undergone subsequent assessment.

Citation Policy

- b. § 1618.2(b): If the employer is allowing a signal person who has documentation meeting the requirements of § 1618.2(a), but who does not meet the Qualification Requirements in § 1618.2(c) to continue signaling without retraining and reassessment, consider a citation for violation of § 1618.2(b). The AVD accompanying the citation should list the specific provision(s) of § 1618.2(c) that the signal person does not meet.
- c. § 1618.2(a) and (b): In situations where multiple signal people are on site, an employer could be cited for violations of both § 1618.2(a) and (b). One scenario that could lead to multiple citations could be where an employee was hired as a signal person, and that person had third-party qualification documentation (Option 1). In addition, the employer also provided a program to train signal persons (Option 2). If the employer's program was inadequate, consider a citation of § 1618.2(a). In addition, if the employer allowed the signal person with third-party documentation to give signals without retraining, and the employee's qualifications did not satisfy the requirements of 1618.2(c), a citation of § 1618.2 (b) could also be considered.
- d. § 1618.4(b): Although section 1618.4(b) establishes a duty for employers to retrain employees who do not meet the Qualification Requirements in § 1618.2(c), this requirement overlaps with the provisions of § 1618.2(b). To maintain consistency, citations addressing this hazard should generally be considered for a violation of § 1618.2(b) as opposed to §

1618.4(b). See section on Training, for additional guidance regarding citations for violations of §1618.4.

3. §1618.2(c): Signal person Qualification Requirements

Inspection Guidance

- a. Under § 1618.2(c)(1), signal persons should understand the type of signals used, and using hand signals, they must know be familiar with the Standard Method of hand signals. To determine whether § 1618.2(c)(1) is satisfied, consider the following:
 - Determine through observation and interviews if the operator understands the signals given by the signal person.
 - If hand signals are given, look for the hand signal chart posted in the vicinity (most likely on the crane).
 - Where possible, observe the signal person in action to verify that signals given are consistent with those on the chart.
- b. Under § 1618.2(c)(2), signal persons must be competent in the application of the type of signals used. To determine whether an employer is complying with § 1618.2(c)(2), consider the following:
 - Determine through observation and interviews how the signal method/type was selected for that job (particularly for non-traditional hand signals).
 - Observe the site for obstructions (e.g., visual or audible interference) that might make the type of signals used inappropriate for the job.
 - Assess whether the operator understands the signals given by the signal person.
- c. Under § 1618.2(c)(3), signal persons must have a basic understanding of equipment operation and equipment limitations, including crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.

Assess whether the signal person has a basic understanding of operations and equipment limitation, including how the crane and load will move in response to various signals.

- d. Under § 1618.2(c)(4), signal persons should understand the relevant requirements of §§ 1617.1- 1617.3 and 1618.2. See sections covering § 1617.1-1617.3 in this directive for additional guidance regarding citations for violations signal standards.

A signal person need not understand requirements under §§ 1617.1- 1617.3 pertaining to types of signals for which he or she is not qualified. For example, a signal person who is qualified to give hand signals is not required to understand the requirements under § 1617.2 for radio, telephone, or electronic signals.

- e. Under § 1618.2(c)(5), signal persons must demonstrate knowledge of the Qualification Requirements through both a practical test and an oral or written test. Verify that testing was administered.

Citation Policy

- f. § 1618.2(a) and/or § 1618.2(b): If deficiencies are observed in the signals given by a signal person, consider a citation under § 1618.2(a) or (b), as appropriate. List the specific § 1618.2(c) provisions the signal person does not satisfy in the AVD. Section 1618.2(c) should not be cited.

BB. § 1618.3: Qualifications of Maintenance and Repair Employees

1. § 1618.3(a): Maintenance, inspection, and repair personnel not meeting the certification requirements of § 1618.1 may operate a crane or derrick only when the requirements under §§ 1618.3(a)(1) and (2) are both met:

§ 1618.3(a)(1): Operation of the crane/derrick must be limited to the functions necessary to perform maintenance, inspect the equipment, or verify its performance.

§ 1618.3(a)(2): The personnel operating the crane must either operate the equipment under the direct supervision of an operator who meets the certification requirements of § 1618.1 (§ 1618.3(a)(2)(A)) or be familiar with the operations of the equipment (§ 1618.3(a)(2)(B)).

Inspection Guidance

- a. Ask personnel whether they are maintenance, inspection, or repair persons and by observation, interview and review of documentation determine if the employer is complying with § 1618.3(a)(1) by considering the following:
 - the qualifications of personnel conducting inspections, maintenance, or verification of performance;
 - whether the observed operation of the equipment was necessary for maintenance, to verify performance, or for inspection; this includes, but is not limited to, operation of equipment to access components, diagnose problems, and check repairs.
- b. To decide whether the requirements of § 1618.3(a)(2) are satisfied, interview the employee, note any observation of operation of the equipment, and consider the following:
 - if the equipment was operated under the supervision of a qualified/certified operator; and
 - if the equipment was operated by a maintenance/repair worker who is familiar with the equipment type, its characteristics, limitations, and hazards.

Citation Policy

- c. § 1618.3(a)(1): If the operation of the crane/derrick exceeded necessary functions for performing maintenance, inspection, or performance verification, consider a citation for violation of § 1618.3(a)(1).
 - d. § 1618.3(a)(2): If personnel operated the crane and were not familiar with the equipment, consider a citation for violation of § 1618.3(a)(2).
 - e. § 1618.3(a): If the maintenance, inspection, or repair person failed to satisfy the requirements of both § 1618.3(a)(1) and (2), consider a citation for violation of § 1618.3(a). Separate citations for violation of § 1618.3(a)(1) and (2) should not be issued. However, the AVD for the citation should set out the grounds for violation of each provision.
2. § 1618.3(b): Maintenance/repair personnel must be qualified with respect to both the equipment and the maintenance/repair tasks to be performed.

Inspection Guidance

- a. If maintenance or repairs were completed on the equipment, determine by observation and interview whether the maintenance or repair personnel meet the definition of a qualified person. Factors to consider include, but are not limited to:
 - education and degrees possessed by personnel,
 - amount of experience in this and related jobs,
 - maintenance/repair personnel's knowledge of the tasks being performed, and
 - knowledge of the equipment and its operation.

Citation Policy

- b. § 1618.3(b): If maintenance/repair personnel do not meet the definition of a qualified person with respect to the equipment or maintenance/repair tasks, consider a citation for violation of § 1618.3(b).

CC. § 1618.4: Training

1. Section 1618.4 applies to all equipment covered under Article 15 except for equipment covered under § 1610.8 (Equipment with a rated hoisting/lifting capacity of 2,000 pounds or less). Section 1618.4 includes three types of provisions:
 - Training requirements that are identical to, or overlap substantially with training requirements found in other sections of Article 15;
 - training requirements not found in other sections of Article 15; and

- general requirements regarding payment for training, administration of training, and retraining applicable to all training in Article 15.

Because the steps for evaluating the effectiveness of training requirements are similar for most kinds of training, the first part of this section, Inspection Guidance, provides general guidance for collection of information related to training during a worksite inspection and some specific guidance for collecting information related to specific training requirements in § 1618.4. Because many of the training requirements in § 1618.4 overlap with training requirements in other sections of Article 15, the second part of this section, Citation Policy, provides a basic hierarchy for determining which training requirement to consider for citations. Additionally, a chart which summarizes Article 15 training requirements, including § 1618.4 and other sections, provides citation policy for these requirements.

Inspection Guidance

- a. Determine by interview what activities are taking place on the worksite to establish which training requirements under Article 15, and in particular, §§ 1618.4(a) through (f) must be met. Refer to the chart in the second part of this section as a checklist for training requirements which may apply to the employer.
- b. Request and review any written training program materials the employer may have available.
- c. For each training requirement, ask for training records (i.e., written exams, evaluations, sign-in sheets, curriculums). Note that the employer is generally not required to maintain written records of training unless required by a standard.
- d. Interview the employer and employees to determine what training the employer has provided.
 - Do employees understand what was conveyed/covered in the training?
 - Do the employees feel that the training is useful? What did they learn?
 - When is training provided? How frequently? How long does training last?
 - When was the employee last trained? What was the training about?
 - Did the training involve operating equipment or performing activities, or was it verbal training only?
 - Is training provided by the employer directly or an outside vendor?
- e. Many of the training requirements in Article 15 have an evaluation component. In addition, § 1618.4(g)(1) requires employers to evaluate each employee required to be trained under Article 15 to confirm that the employee understands the training. Interview the employer and employees to determine the following:

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- How does the employer confirm that the employee understands training information?
 - What method or system for evaluating whether employees understand the instructions has the employer implemented? Are evaluation records kept?
 - The method of evaluating an employee's training for effectiveness will vary by subject matter and employee. Any number of methods could be used to determine if an employee has understood the training provided. For example, during assembly/disassembly a certain method of blocking may be needed. The supervisor trains and instructs the employee on the proper method. The supervisor can then ask questions about the task and have the employee describe the hazards and procedures while being observed doing the job. Based on how the employee responds, the assessment has been completed when the evaluator is confident that the employee understands the training and can safely do the job.
- f. Section 1618.4(g)(2) provides requirements for refresher training in relevant topics for employees when, based on the conduct or evaluation of an employee, there is an indication that retraining is necessary. Other requirements in Article 15 provide for retraining as well. In addition to the questions suggested above in paragraphs (d) and (e), observe employees to note obvious need for retraining. If an employee who is required to be trained is observed demonstrating a lack of understanding of safety requirements or hazards related to a particular activity in which training is required, interview the employer and the employee:
- Has this employee ever been retrained? Have any employees been retrained?
 - What is the system for determining when retraining is needed? Are there regular evaluations?
 - Does the employee have an understanding of the activity and what is being done incorrectly?
- g. Section 1618.4(g)(3) states that whenever training is required under Article 15, it must be provided at no cost to the employee. Other requirements under Article 15 deal with payment for training as well. To assess compliance with requirements related to payment for training, interview the employer and employees to determine whether employees ever had to pay for training.
- Was that training mandatory?
 - If so, what was the subject matter of the training?
- h. Section 1618.4(d) requires the employer to train each competent and qualified person in the requirements of Article 15 that are applicable to their respective roles. To evaluate compliance, determine what competent and qualified persons are required for the work being done. Interview the employer and competent/qualified persons to see if they received adequate training and how the employer evaluates the knowledge level of these employees.
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Citation Policy

Compliance officers should generally follow the following citation policy hierarchy when deciding what provision or provisions to cite for deficiencies in the training of employees:

- Consider citations under the most applicable vertical standard in Article 15.
- If the vertical standard does not cover the training violation, consider citations for violation of the requirements under § 1618.4.
- If no vertical standard applies and § 1618.4 does not cover the training violation, consider
- citations under the more general § 1509 (Injury and Illness Prevention Program).

The following chart summarizes Article 15 training requirements, including § 1618.4 and other sections, and provides citation policy for these requirements:

Provision(s)	Training Requirements
<p>§ 1612.1(g)(1)–(3)</p> <p>§ 1618.4(a)</p>	<p>Power line safety: For operations covered by § 1612.1, § 1612.2 and, the employer must train each operator and crew member assigned to work with equipment in the topics in §§ 1612.1(g)(1) through (3). See power lines sections of this directive for additional guidance regarding citations for violations of § 1612.1-1612.3.</p> <p>The requirement in § 1612.1(g) is identical to the requirement in § 1618.4(a).</p> <p><i>Citation Policy:</i> Group as follows:</p> <ul style="list-style-type: none"> • For operations under § 1612.1 (up to 350 kV), consider citing §§ 1612.1(g)(1) through (3); • For operations under § 1612.2 (more than 350 kV), consider grouping each citation of § 1612.1(g)(1) through (3) with § 1612.2; and <p>Do not consider citations under § 1618.4(a).</p>
<p>§ 1509(a)/3203(a)(7)</p>	<p>Fall protection: Under § 1509(a), the employer must train each employee who may be exposed to fall hazards while on or hoisted by Article 15 equipment.</p>

Provision(s)	Training Requirements
<p>§§ 1616.3(a)(2)(A)through (B)</p> <p>§ 1618.4(e)</p>	<p>Swing radius hazards: Under § 1616.3(a)(2)(A), employees <i>assigned</i> to work on or near the equipment (“authorized personnel”) must be trained to recognize struck-by and pinch/crush hazard areas of rotating superstructures. Under § 1616.3(a)(2)(B), if the employer uses warning signs and high-visibility markings to protect against swing radius hazards, the employer must train employees to understand these markings. See section covering <i>Work Area Control</i> in this directive for additional guidance on citations for §§ 1616.3(a)(2)(A) through (B).</p> <p>Under § 1618.4(e), the employer must train <i>all</i> employees on or near equipment to keep clear of holes, crush/pinch points, and <i>all</i> hazards in § 1616.3.</p> <p>Citation Policy: Sections 1616.3(a)(2)(A-B) and § 1618.4(e) overlap, but are not identical. Consider citing § 1618.4(e) <i>only if</i> §§ 1616.3(a)(2)(A) through (B) do not cover the specific circumstance, but § 1618.4(e) does, as follows:</p> <ul style="list-style-type: none"> • Section 1618.4(e) requires training for <i>all</i> employees on or near equipment, but § 1616.3(a)(2) covers only “authorized personnel.” Consider a citation under § 1618.4(e) for an employee on or near the equipment that the employer has not “authorized” to be there. <p>Section 1618.4(e) requires training for <i>all</i> hazards in § 1616.3, not just ones specified in § 1616.3(a)(2)(A) through (B). Consider a citation under § 1618.4(e) when an employee is not trained in a hazard listed under § 1616.3, other than the hazards in §§ 1616.3(a)(2)(A) through (B).</p>

Provision(s)	Training Requirements
§ 1618.1(a)	<p>Operator training: The employer must ensure that the person operating equipment covered by Article 15 is operating the equipment during a training period in accord with § 1618.1(d), <i>or</i> qualified or certified to operate the equipment in accordance with §§ 1618.1(a)(1) through (3).</p> <p>Note that § 1618.1(a)(2) and § 1618.1(d) do not apply until July 7, 2015. Until then, § 1618.1(e) provides training requirements for operators when § 1618.1(a)(1) does not apply. See the <i>Operator Qualification and Certification</i> section in this directive for additional guidance on citations under § 1618.1(a).</p>
§ 1618.1(d)(1) § 1618.1(b) § 1618.4(c)(1)	<p>Operator trainee/apprentice: Section 1618.1(j) provides minimum operator qualification and certification criteria.</p> <p>Under § 1618.1(f)(1), <i>before</i> operator trainees may operate equipment, the employer must provide them training sufficient to operate equipment safely within the § 1618.1 trainee limitations. The limitations, including continuous monitoring, allow trainees to engage in practical learning <i>without</i> having mastered all areas in § 1618.1(b). While § 1618.1(f)(1) provides minimum requirements for trainees to begin practicing on equipment, § 1618.4(c)(1) refers to minimum operator qualification/certification requirements.</p> <p>Under § 1618.4(c)(1), operator trainees must receive training in the areas addressed in § 1618.1(b).</p> <p>Citation Policy: Consider citing § 1618.4(c)(1) instead of § 1618.1(b) only if the employee is currently an operator trainee, <i>not</i> if the employee is an operator who has already completed a certification program that did not meet minimum criteria in § 1618.1(b). The AVD should list the areas in § 1618.1(b) not covered.</p> <p>See the <i>Operator Qualification and Certification</i> section in this directive for additional guidance regarding citations for violations of §§ 1618.1(f)(1) and (j).</p>

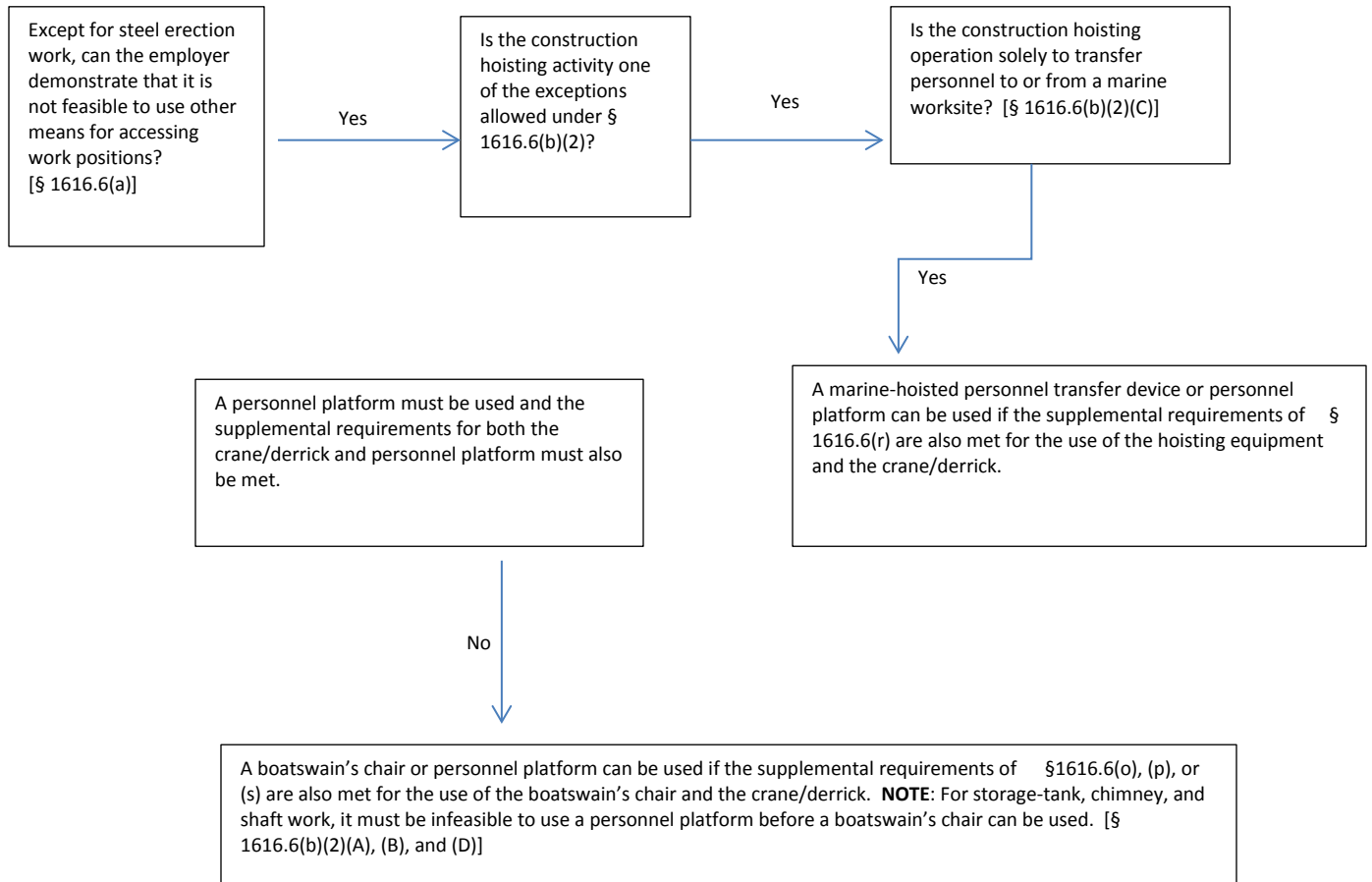
Provision(s)	Training Requirements
§ 1618.1(a)(3) § 1618.4(c)(1)	<p>Operator training cost: Under § 1618.1(a)(4), employers must provide qualification or certification to operators employed on November 8, 2010 at no cost to the operators. See the <i>Operator Qualification and Certification</i> section in this directive for additional guidance regarding citations of § 1618.1(a)(4).</p> <p>Under § 1618.4(c)(1), employers must provide retraining for trainees who do not pass a qualification or certification test.</p>
§ 1618.1(e)(3)(B) § 1618.4(c)(2)	<p>Operator training during phase-in period: Under § 1618.1(e)(3)(B), during the § 1618.1 phase-in period, an employee assigned to operate the equipment, who does not have the knowledge or ability to operate it safely, must be provided with necessary training before operating the equipment. The employer must ensure that the operator is evaluated to confirm that he or she understands the training. This requirement is effective July 7, 2011 through November 9, 2014.</p> <p>Under § 1618.4(c)(2), the employer must train each operator not yet certified or qualified during the phase-in period. in the areas in § 1618.1(b).</p> <p>The requirements of § 1618.1(b) are interpreted as “fundamental to safe crane operation.” Therefore, the requirement in § 1618.4(c)(2) to train operators in the requirements of § 1618.1(b) significantly overlaps with the requirement of § 1618.1(e)(3)(B) to ensure that operators are trained in the knowledge and ability to operate the equipment safely.</p> <p>Citation Policy: Do not consider citations under § 1618.4(c)(2), because § 1618.1(e)(3)(B) covers the same hazards.</p> <p>See the <i>Operator Qualification and Certification</i> section in this directive for additional guidance on citations of § 1618.1(j) and (e)(3)(B).</p>

Provision(s)	Training Requirements
<p>§ 1618.4(c)(3)</p> <p>§ 1619.2(q)</p> <p>§ 1610.8(e)</p>	<p>Operators of equipment excepted from § 1618.1: Equipment covered under § 1619.2 (Derricks), 1694 and § 1610.8 (2,000-pound maximum rated capacity) are exempted from the requirements of § 1618.1.</p> <p>Under § 1619.2(q), the employer must train each operator of a derrick on the safe operation of equipment the individual will operate.</p> <p>Under § 1610.8(e), the employer must train each operator of equipment with a rated hoisting/lifting capacity of 2,000 pounds or less in the safe operation of the equipment the individual will operate.</p> <p>Under § 1618.4(c)(3), the employer must train each operator of equipment excepted from § 1618.1 on the safe operation of the equipment the individual will operate. This is the provision used to cite employers for lack of sideboom crane training.</p> <p>Citation Policy: Consider a citation under § 1619.2(q) if the employer did not train an operator of a derrick on the safe operation of the equipment before the individual operated the equipment. Do not consider a citation of § 1618.4(c)(3), because § 1619.2(q) is the vertical standard, and it prevents the same hazard.</p> <p>Consider a citation under § 1610.8(e) if the employer did not train an operator of equipment with a rated hoisting/lifting capacity of 2,000 pounds or less on the safe operation of the equipment before the individual operated the equipment. Do not consider a citation of § 1618.4(c)(3), because equipment under § 1610.8 is exempt from the requirements of § 1618.4.</p>
<p>§ 1618.4(c)(4)(A)</p>	<p>Operator training—boom hoist brake test: Operators must be trained to determine if the boom hoist brake needs to be adjusted or repaired by first raising the boom a short distance and testing the brake.</p>
<p>§ 1618.4(c)(4)(B)</p>	<p>Operator training—emergency procedures (halting unintended movement): Where available, operators must be trained on the manufacturer’s emergency procedures for halting unintended equipment movement.</p>

Provision(s)	Training Requirements
<p>§ 1618.2(b)</p> <p>§ 1618.4(b)</p>	<p>Signal person retraining: Under § 1618.2(b), an employer must provide retraining for a signal person who does not meet the qualification requirements of § 1618.2(c) before allowing that person to continue giving signals.</p> <p>Under § 1618.4(b), an employer must ensure that a signal person who does not meet the qualification requirements of § 1618.2(c) is trained in the areas addressed in § 1618.2(c).</p> <p>Citation Policy: Consider a citation of § 1618.2(b) if a signal person has proof of certification under § 1618.2(a), but does not meet the qualification requirements of § 1618.2(c), and is giving signals. See the <i>Signal Person Qualifications</i> section in this directive for additional guidance regarding citations of §§ 1618.2(a) and (b).</p> <p>Do not consider citations under § 1618.4(b).</p>
<p>§ 1618.4(d)</p>	<p>Competent and qualified persons: Competent persons and qualified persons must be trained in the requirements of this Article applicable to their respective roles.</p>
<p>§ 1618.4(f)</p>	<p>Tag-out: Under § 1618.1(f), operator certification must include application of safe shut-down and securing procedures. See the <i>Operator Certification and Qualification</i> section in this directive for additional guidance regarding citations of § 1618.1(f).</p> <p>Under § 1618.4(f), operators and other employees authorized to start/energize equipment or operate equipment controls (such as maintenance and repair workers) must be trained in the tag-out procedures in §§ 1616.1(f) and (g).</p> <p>Citation Policy: Do not consider a citation under § 1618.1(b) unless the operator does not meet the qualification and certification requirements of § 1618.1(a). If it is before July 7, 2015, consider citations for an operator who does not meet the requirements of § 1618.1(b) under § 1618.1(e).</p>
<p>§ 1618.4(g)(1)</p>	<p>Training administration: The employer must evaluate each employee who is required to be trained to ensure that he/she understands the information provided in training.</p>

Provision(s)	Training Requirements
§ 1618.4(g)(2)	Refresher training (general): Refresher training in relevant topics shall be provided when the employee’s conduct or an evaluation of the employee’s knowledge indicates that retraining is necessary.
§ 1618.4(g)(3)	Payment for training: The employer must provide the training required by Article 15 at no cost to the employee.
§ 1619.3(c)(2)(B)	Swing radius hazards (floating cranes): Where the employer protects against swing radius hazards on floating cranes by using warning signs and high-visibility markings, the employer must train employees to understand what the markings signify. See section covering <i>Floating Cranes/Derricks</i> in this directive for additional guidance regarding citations of § 1619.3(c)(2)(B).

DD. § 1616.6: Hoisting Personnel



1. § 1616.6(a): General Personnel Hoisting Requirements

This section specifies supplemental requirements that are applicable to Article 15 equipment when used to hoist one or more employees.

The hoisting of personnel is prohibited except when the employer demonstrates that the erection, use, and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or worksite conditions. Exception: This paragraph does not apply to work covered by CISO Article 29. The requirements for hoisting personnel to perform steel erection are found in § 1710.

Inspection Guidance

- a. Through observation of personnel hoisting activity and interviews, verify:
 - the type of hoisting equipment (i.e., personnel platform, boatswain's chair, marine-hoisted personnel transfer device, etc.) used to hoist personnel;
 - the construction activity for which the personnel are being hoisted to support (i.e., drilling, pile driving, marine personnel transfer, chimney work, tank construction, work in a shaft, etc.);
 - that power distribution and transmission work is being done when personnel are hoisted by a crane/derrick closer than 50 feet of a power line over 350 kV, or 20 feet if the line is 350 kV or less;
 - that the equipment was uniformly level and the surface beneath the equipment was firm and stable;
 - that all required safety devices and operational aids are on the equipment and working properly;
 - that a qualified person made determinations regarding the ground support beneath the crane/derrick and the safety of the operation in bad weather, and designed the hoisting equipment (i.e., personnel platform, boatswain's chair, marine-hoisted personnel transfer device, etc.) and its attachments;
 - that a competent person: conducted the duties required for a trial lift, proof testing, and inspection;
 - that pre-lift meetings were conducted and attended by the operator, signal person, employees to be hoisted, and the person responsible for the task to be performed;
 - the type of fall protection used by personnel when hoisted by the crane/derrick;
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- the conditions of the worksite, such as the project's proximity to power lines and heavily traveled roads and sidewalks that could limit where access equipment and personnel hoists (§1630) could be used;
 - the use of personnel hoists and access equipment (other than cranes) and where this equipment is being used.
- b. Ask the employer to describe why it is not feasible for employees to use other equipment, such as aerial lifts, stairways, ladders, scaffolds, or personnel hoists, to access work positions. Document this rationale.

Citation Policy

- c. § 1616.6(a) through (n): Unless specified otherwise under this Citation Policy section, when requirements of §§ 1616.6(a) through (m) have not been met, consider citations of the specific requirements. If the citation is for some requirement for the operator, signal person, or other employee, group each with §1509(a).
- d. § 1616.6(d)(5): If personnel hoisting operations began but:
- the required devices were not used, consider citations of specific requirements of § 1616.6(d)(5); or
 - the required devices were not working properly when the crane/derrick was operated, consider citations of § 1616.6(d)(5)(G); group this citation with § 11509(a).
3. § 1616.6(o): Provisions that are Specific to Personnel Hoisting in Drill Shafts

Inspection Guidance

- a. Using the inspection guidance provided above for general requirements of this section, and through interviews and observation of the hoisting activity, verify that employees have been hoisted by crane/derrick in or out of drill shafts.

Citation Policy

- b. § 1616.6(o): Unless specified otherwise under this Citation Policy section, when requirements of § 1616.6(o) have not be met, consider citations of the specific requirements.
- c. § 1616.6(o)(2): Section 1616.6(o)(2) would not be cited when the employer did not meet all requirements of § 1616.6(a) through (n) for the use of a crane/derrick to hoist personnel in a drill shaft using a personnel platform. Section 1616.6(o)(2) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to drill shaft work when a personnel platform is used. For violations of provisions referenced by § 1616.6(o)(2), consider citations of specific requirements of § 1616.6(a) through (n).

- d. § 1616.6(o)(3)-(A): Section 1616.6(o)(3)-(A) would not be cited when the employer did not meet all requirements it references for the use of a crane/derrick to hoist personnel in a drill shaft using a boatswain's chair. Section 1616.6(o)(3)(A) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to drill shaft work when a boatswain's chair is used.

For violations of provisions referenced by § 1616.6(o)(3)(A), consider citations of specific requirements of the referenced provisions. The term "boatswain's chair" must be used in the AVD in place of "personnel platform" anywhere it appears in the regulatory text of the provisions violated.

4. § 1616.6 (p): Provisions that are Specific to Personnel Hoisting for Pile Driving Operations

Inspection Guidance

- a. Using the Inspection Guidance provided above for general requirements of this section, and through interviews and observation of the hoisting activity, verify that employees have been hoisted by crane/derrick during the performance of pile-driving work.

Citation Policy

- b. § 1616.6(p): Unless specified otherwise under this Citation Policy section, when requirements of § 1616.6(p) have not be met, consider citations for violations of the specific requirements.
- c. § 1616.6(p)(3): Section 1616.6(p)(3) would not be cited when the employer did not meet all requirements of § 1616.6(b) through (n) for the use of a crane/derrick to hoist personnel when performing pile driving work using a personnel platform. Section 1616.6(p)(3) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to pile-driving work when a personnel platform is used. For violations of provisions referenced by § 1616.6(p)(3), consider citations for violations of specific requirements of §§ 1616.6(b) through (n).
- d. § 1616.6(p)(4)(i): Section 1616.6(p)(4)(A) would not be cited when the employer did not meet all requirements it references for the use of a crane/derrick to hoist personnel during the performance of pile driving work using a boatswain's chair. Section 1616.6(p)(4)(A) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to pile-driving work when a boatswain's chair is used.

For violations of provisions referenced by § 1616.6(p)(4)(A), consider citations for violations of specific requirements of the referenced provisions. The term "boatswain's chair" must be used in the AVD in place of "personnel platform" anywhere it appears in the regulatory text of the provisions violated.

5. § 1616.6(r): Provisions that are Specific to Hoisting Personnel for Marine Transfer

Marine transfer is the transferring of personnel to and from marine construction sites. [75 FR 48044]

Inspection Guidance

- a. Using the Inspection Guidance provided above for general requirements of this section, and through interviews and observation of the hoisting activity, verify that employees have been hoisted by crane/derrick during marine transfer.

Citation Policy

- b. § 1616.6(r): Unless specified otherwise under this Citation Policy section, when requirements of § 1616.6(r) have not be met, consider citations of the specific requirements.
- c. § 1616.6(r)(2): Section 1616.6(r)(2) would not be cited when the employer did not meet all requirements of § 1616.6(a) through (n) for the use of a crane/derrick to hoist personnel for marine transfer using a personnel platform. Section 1616.6(r)(2) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to marine transfer when a personnel platform is used. For violations of provisions referenced by § 1616.6(r)(2), consider citations of specific requirements of §§ 1616.6(a) through (n).
- d. § 1616.6(r)(3)(A): Section 1616.6(r)(3)(A) would not be cited when the employer did not meet all requirements it references for the use of a crane/derrick to hoist personnel during marine transfer using a marine-hoisted personnel transfer device. Section 1616.6(r)(3)(A) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to marine transfer when a marine-hoisted personnel transfer device is used.

For violations of provisions referenced by § 1616.6(r)(3)(A), consider citations of specific requirements of the referenced provisions. The term “marine-hoisted personnel transfer device” must be used in the AVD in place of “personnel platform” anywhere it appears in the regulatory text of the provisions violated.

6. § 1616.6(s): Provisions that are Specific to Hoisting Personnel for Storage-Tank, Shaft, and Chimney Work

Inspection Guidance

- a. Using the Inspection Guidance provided above for general requirements of this section, and through interviews and observation of the hoisting activity, verify that employees have been hoisted by crane/derrick during the performance of storage-tank, shaft, and chimney work.
- b. Ask the employer to describe why it believes it is not feasible to use a personnel platform when employees must be hoisted or lowered by a crane/derrick to access work positions and whether it considered alternate protective measures. Document this rationale.

Citation Policy

- c. § 1616.6(s): Unless specified otherwise under this Citation Policy section, when requirements of § 1616.6(s) have not be met, consider citations of the specific requirements.
- d. § 1616.6(s)(2): Section 1616.6(s)(2) must not be cited when the employer did not meet all requirements of § 1616.6(a) through (n) for the use of a crane/derrick to hoist personnel for marine transfer using a personnel platform. Section 1616.6(s)(2) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to storage tank, chimney, and shaft work when a personnel platform is used.

For violations of provisions referenced by § 1616.6(s)(2), consider citations of specific requirements of §§ 1616.6(a) through (n).

- e. § 1616.6(s)(3)(A): Section 1616.6(s)(3)(A) would not be cited when the employer did not meet all requirements it references for the use of a crane/derrick to hoist personnel during the performance of shaft, chimney, and storage tank work using a boatswain’s chair. Section 1616.6(s)(3)(A) is only informational and clarifies what supplemental hoisting requirements of § 1616.6 are applicable to shaft, chimney, and storage tank work when a boatswain’s chair is used.

For violations of provisions referenced by § 1616.6(s)(3)(A), consider citations of specific requirements of the referenced provisions. The term “boatswain’s chair” must be used in the AVD in place of “personnel platform” anywhere it appears in the regulatory text of the provisions violated.

EE. § 1616.7: Multiple Crane/Derrick Lifts—Supplemental Requirements

This section describes the requirements for development and implementation of a plan when more than one crane/derrick supports the load. The most important aspect of this section is to ensure that qualified persons make determinations regarding the capacity and safe use of the equipment and that the work practices and employee protections are effectively communicated to the employees involved in the hoisting job.

1. § 1616.7(a): Plan Development.

When more than one crane or derrick will support the load, employers must plan the operation in accord with the following criteria:

- § 1616.7(a)(1): A qualified person must develop the plan.
- § 1616.7(a)(2): The plan design must ensure that the requirements of Article 15 are met.
- § 1616.7(a)(3): The employer must ensure that engineering expertise is provided when the qualified person determines that it is needed for planning the lift.

Inspection Guidance

- a. When a load is observed being hoisted by more than one crane, determine whether the employer has developed a plan meeting the requirements of § 1616.7(a)(1-3).
- b. The multiple-crane lift plan does not have to be in writing. If the plan is in writing, examine the plan. If not, interview the employer and lift director to determine what the plan was and whether the requirements in § 1616.7(a)(1-3) are met.
- c. Confirm that a qualified person developed the lift plan. If possible, interview the qualified person to assess their qualifications.
- d. Through review of the written or described multi-crane lift plan, confirm that the plan was designed to meet the requirements of Article 15. For example, consider whether the plan addresses hazards such as:
 - ground conditions,
 - proximity to power lines,
 - hazardous weather conditions,
 - rigging (any custom rigging),
 - work area control, and
 - worksite communication.
- e. Through interviews, determine if there were problems with the lift plan and if the qualified person requested engineering expertise from the employer.

Citation Policy

- f. § 1616.7(a): Consider a citation for violation of § 1616.7(a) if more than one crane/derrick is supporting the load and the employer has no plan for a multiple-crane lift.
- g. § 1616.7(a)(1): Consider a citation of § 1616.7(a)(1) if a qualified person did not develop the plan.
- h. § 1616.7(a)(2): Consider a citation of § 1616.7(a)(2) if the employer's plan did not address part of Article 15 related to multiple crane lifts, such as but not exclusively:
 - Ground conditions, § 1610.5
 - Power line safety, §§ 1611.5 to 1612.4
 - Signal requirements, §§ 1617.1 to 1617.1(d)
 - Work area control, § 1616.3

- Keeping clear of the load, § 1616.4
- Free fall and controlled load lowering, § 1616.5

The above list contains some requirements of the standard that could be implicated by a multiple crane lift operation. When the crane engaged in a multiple lift violated some part of Article 15, and the lift plan was not designed to prevent the violation, consider a citation for § 1616.7(a)(2) grouped with each applicable requirement of Article 15 violated.

- i. § 1616.7(a)(3): Consider a citation of § 1616.7(a)(3) if the qualified person determined that engineering expertise was required to develop the plan, but the employer did not provide it.
2. § 1616.7(b): Plan Implementation.

The lift must be directed by a person (lift director) who satisfies the requirements of a competent and qualified person or by a competent person assisted by one or more qualified persons. The lift director must review the plan in a meeting with all workers who are involved with the lift before the lift takes place. The meeting must include employees of other companies involved with the lift operation.

Inspection Guidance

- a. Interview the lift director, if the employer has one, and other employees involved in the lift to verify that that a person or persons meeting the requirements of § 1616.7(b) directed the lift. If there are indications that the performance of a multiple-crane lift is unsafe, evaluate whether the lift director was a qualified person. Obtain information about the level of experience, knowledge, training and authority of the lift director and gauge the applicability of this knowledge and experience to the hoisting job being performed. Interviews may cover subjects such as:
 - a description of the multi-crane lift plan;
 - how the load was calculated;
 - what ground conditions were addressed and how they were addressed;
 - who selected and did the rigging;
 - any determinations made about hazards identified and how the lift director addressed these hazards;
 - the lift director's prior experience with similar lifts; and
 - the individuals designated to perform required inspections.
- b. Interview the lift director, employer, and employees to determine whether a meeting with all workers involved with the lift took place, and whether employees were apprised of the plan

during the meeting. If the lift director modified the plan, did he or she hold another meeting to present the modified plan.

Citation Policy

- c. § 1616.7(b): If the person or persons who directed the lift do not meet the requirements of this standard, consider a citation for § 1616.7(b). Specify in the AVD what deficiencies in the lift director's or directors' qualifications were present (e.g., that the lift director was qualified, but not competent). Also consider citing this standard if no one was assigned to direct the lift.
- d. § 1616.7(b): If there was no pre-lift meeting or if the meeting did not cover the multiple crane/derrick lift plan, consider a citation of § 1616.7(b). Group this citation with § 1509(a).

FF. § 1610.4: Design, Construction, and Testing

Section 1610.4 applies to equipment with manufacturer-rated hoisting/lifting capacity of more than 2,000 pounds.

1. § 1610.4(a) through (c), §§ 1610.4(d)(7) through (d)(13), a § 1610.4(e). Sections 1610.4(a) through (b) incorporate by reference minimum requirements for design, construction, and testing of mobile and locomotive cranes. Section 1610.4(a) applies to equipment manufactured before July 7, 2011; § 1610.4(b) applies to equipment manufactured on or after that date.

Section 1610.4(c) provides requirements for the prototype testing of mobile, locomotive, and tower cranes manufactured on or after November 8, 2010. Prototype testing is the functional and safety testing which takes place, most often at the place of manufacture or specialized laboratories, of a model of a particular piece of equipment before it is manufactured, mass produced, and/or allowed to enter the marketplace.

Sections 1610.4(d)(7)-(d)(13) provide additional requirements for the design and construction of all equipment covered by § 1610.4.

Section 1610.4(e) provides a "safe harbor" for employers who can show manufacturer documentation indicating that the equipment is in compliance with §§ 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13). This provision does not apply if the equipment is modified, unless said modifications are in compliance with § 1610.6 (Equipment Modifications).

Inspection Guidance

- a. Inspect the equipment and interview the employer and operator to determine whether the equipment is manufacturer-designed and built, employer-modified, or employer-built. If the employer modified the equipment, ensure compliance with the requirements of § 1610.6.
- b. If a manufacturer designed and constructed the equipment, the employer does not need to independently determine whether its equipment meets the requirements of §§ 1610.4(a)-(c) and §§ 1610.4(d)(7)-(d)(13). The employer can rely on documentation from the

manufacturer, provided such documentation exists. The employer is not required to maintain copies of the manufacturer's documentation on site.

- c. If there are concerns that manufactured equipment does not comply with § 1610.4(a)-(c) or § 1610.4(d)(7)-(d)(13), contact the equipment manufacturer to obtain the manufacturer's documentation.

Citation Policy

- d. § 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13): If the equipment is employer-made or otherwise altered in violation of § 1610.6, or if the employer is unable to refer to documentation from the equipment manufacturer, consider citations for violations of the relevant provisions of § 1610.4(a) through (c) and §§ 1610.4(d)(7) through (d)(13). Do not consider citations under § 1610.4(e). When appropriate, citations for violations of § 1610.6 may be grouped with each citation under this section.

If the manufacturer's documentation reveals that the equipment does not meet these requirements, advise the employer that it must either bring the equipment into compliance or stop using it. The employer may be subject to future citations under § 1610.4(a)-(c) or 1610.4(d)(7) through (d)(13) once this notice is provided. Similarly, if the employer is otherwise on notice that manufactured equipment is out of compliance with requirements under § 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13), for example, if Cal/OSHA publishes a statement about a particular piece of equipment that generally does not comply with § 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13), or if the employer's RPE has given the employer notice that the equipment is out of compliance with § 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13), the employer may be subject to citations under these provisions.

- e. § 1610.4(e): This is not a citable requirement. Under § 1610.4(e), if the employer has not changed the equipment (except in accord with § 1610.6 (Equipment modifications)) and the employer can refer to manufacturer documentation demonstrating that the equipment meets the requirements of these sections, then it satisfies its obligations under § 1610.4(a) through (c) and § 1610.4(d)(7) through (d)(13). See the Equipment Modifications section in this directive for additional guidance regarding citations of § 1610.6.

Note: Cal/OSHA anticipates that in most cases, the manufacturer will provide documentation consistent with the requirements of this section. Noncompliance with §§ 1610.4(a) through (c) and §§ 1610.4(d)(7) through (d)(13) is thus most likely where the equipment is designed or built by the employer or another non-manufacturer entity.

2. § 1610.4(d)(1) through (d)(6): Sections 1610.4(d)(1) through (d)(6) contain requirements that apply to all equipment covered by Article 15 with a manufacturer-rated hoisting/lifting capacity of more than 2,000 pounds.

Inspection Guidance

- a. Inspect the equipment and interview the employer and operator to confirm compliance with § 1610.4(d)(1) through (d)(6). The requirements under § 1610.4(d)(1) through (d)(6) may be used as a checklist.
- b. Ask the operator or other personnel to see the rated capacity and related information that must be available in the cab under § 1610.4(d)(1). Review the information for the minimum required information listed in § 1610.4(d)(1)(A) through (P).
- c. Inspect the equipment and interview the employer and operator to confirm that load hooks, ball assemblies and load blocks meet the requirements of § 1610.4(d)(2) through (d)(3).
- d. Ensure that all hooks are equipped with latches meeting the design requirements of § 1610.4(d)(4)(C), unless (A) a qualified person determined that it was safer to hoist and place the load without latches or with the latches removed/tied back; and (B) the route for the load was pre-planned to ensure that no employee (except employees necessary for hooking or unhooking the load) was in the fall zone.
- e. If latches are not used, interview the employer and operator to identify the person who made safety determinations under § 1610.4(d)(4)(B)1., and verify that the person was qualified. Observe the operation of the equipment to determine whether non-essential personnel were in the fall zone in violation of § 1610.4(d)(4)(B)2.
- f. Confirm that all posted warnings are maintained in a legible condition consistent with § 1610.4(d)(5).
- g. Ask the operator or other personnel to see the fire extinguisher and verify that it is located on the equipment in accord with § 1610.4(d)(6).

Citation Policy

- h. § 1610.4(d)(1) through (6): If the employer has not satisfied one of the requirements listed in § 1610.4(d)(1) through (d)(6), consider a citation for violation of that provision. The citation should reference the most specific provision(s) applicable. If the employer violates multiple requirements listed in § 1610.4(d)(1) through (d)(6), consider separate citations for each violation. Citations may be grouped for penalty purposes.

GG. § 1610.6: Equipment Modifications

1. § 1610.6(a): Manufacturer's Approval of the Modification Proposal.

Section 1610.6(a) provides that modifications or additions that affect the capacity or safe operation of the equipment are prohibited except where one of the five options listed in §§ 1610.6(a)(1) through (5) is met.

Modifications/additions must be approved by the manufacturer; or, if a manufacturer is unavailable or unwilling to provide approval, an employer may obtain approval from a registered professional engineer (RPE) who is a qualified person with respect to equipment.

This section uses the term modification/addition to clarify that an addition to the equipment is a type of modification. For example, the addition of a generator to the back of the cab of a crane may be an addition that affects the capacity or safe operation of the equipment because it alters backward stability.

§ 1610.6(a)(1) permits modification/additions affecting the capacity or safe operation of the equipment with manufacturer review and written approval. Load charts, procedures, manuals and plates/tags/decals must all be updated to reflect the modification.

§ 1610.6(a)(2) through (4) provides three situations in which the employer can make modifications/additions affecting the capacity or safe operation of the equipment without manufacturer review and written approval. These situations are: the manufacturer refuses to review the request, the manufacturer is unavailable, or the employer requests review, but the manufacturer does not complete it within 120 days.

§ 1610.6(a)(5) permits modifications without manufacturer review and written approval and without the employer attempting to obtain approval, if the equipment is used for marine work sites and contains major structural components from more than one manufacturer.

Inspection Guidance

- a. Determine by observation and interview whether modifications or additions affecting the capacity or safe operation of the equipment have been made.
 - b. If any modifications or additions have been made, ask the employer if it has obtained written approval from the manufacturer. Ask to see any written approval to ensure that it conforms to the modifications or additions made.
 - c. If the employer does not have written approval from the manufacturer, ask whether the employer requested manufacturer approval and whether any of the situations in §§ 1610.6(a)(2) through (4) applied. The employer must have provided a detailed description of the proposed modification to the manufacturer and asked the manufacturer to approve the particular modification/addition.
 - Ask the employer for copies of written requests for approval sent to the manufacturer.
 - Ask the employer what response it received after requesting manufacturer approval. Review any documentation that the employer received from the manufacturer.
 - Did the manufacturer refuse the request to review approval, and if so, why?
 - Was the manufacturer unavailable? Is the manufacturer out of business? Has no successor company has taken over?
 - When did the employer send the request to review to the manufacturer? Did the manufacturer respond within 30 days to acknowledge the request or initiate the review?
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- Did the manufacturer agree to review the request? If so, when? Have 120 or more days elapsed since the manufacturer agreed? Does the employer have documentation to show that the manufacturer agreed to review the request?
 - Is the equipment designed for use on marine work sites (construction worksites located in, on or above the water), with major structural components from more than one manufacturer?
- d. If the employer obtained written approval from the manufacturer, or if one of the circumstances in §§1610.6(a)(2) through (5) exempts the employer from obtaining manufacturer approval, inspect load charts, procedures, manuals and plates/tags/decals for updates that reflect changes as a result of the modification/addition and confirm that the safety factor of equipment was not reduced.
- e. If the employer did not obtain written approval from the manufacturer, but one of the circumstances in § 1610.6(a)(2) through (5) applies, the employer must satisfy the requirements of § 1610.6(a)(2)(A) through (B). This section allows an employer to make modifications or additions that do not reduce the original safety factor of the equipment by using a qualified RPE. The RPE must also update load charts, procedures, manuals and plates/tags/decals to reflect the modification.
- If modifications were made without manufacturer approval, ask to see the written approval from the RPE for those modifications. Sections 1610.6(a)(2)(A) through (B) do not expressly require the RPE approval to be in writing, but the RPE must formally approve the change and specify the equipment configurations.
 - Interview the employer to determine the RPE's experience, qualifications, and familiarity with the type of equipment and modification. The RPE must be a qualified person with respect to the equipment involved. This means that the RPE must have specialized knowledge beyond that of a general RPE to assess the particular modified equipment.
 - Review the modification documentation and interview the employer/operator to ensure that the modification conformed to the RPE's approval. An example of an approval that satisfies this requirement would be: "This is an approval to add an additional boom section of the above-described design for a brand K lattice boom crane, model 1. This approval applies only when the crane is configured without a jib."

Citation Policy

- f. § 1610.6(a): If the employer has not obtained the manufacturer's written approval under § 1610.6(a)(1) and none of the circumstances under § 1610.6(a)(2) through (5) applies, consider a citation of § 1610.6(a).
- g. § 1610.6(a)(1) through (5): If an employer has obtained the manufacturer's written approval under § 1610.6(a)(1) or an exception under §§ 1610.6(a)(2) through (5) applies, but the employer failed to meet one of the specific requirements under this section, consider a citation for violation of the most specific applicable provision. For example, if the employer

obtained written approval from the manufacturer, but the safety factor of the equipment was reduced, consider a citation for violation of § 1610.6(a)(1)(C). Likewise, if the employer requested manufacturer approval, but the manufacturer refused to review the request and the RPE who reviewed the modification was not qualified, consider a citation of § 1610.6(a)(2)(A).

- h. When considering citations under § 1610.6(a)(3) through (5), if the employer failed to meet one of the specific requirements from § 1610.6(a)(2)(A) through (B) that are incorporated by reference into those standards, the citation should group the applicable provision under § 1610.6(a)(3) through (5) that incorporates § 1610.6(a)(2)(A) through (B) with the specific provision in §§ 1610.6(a)(2)(A) through (B) that was not satisfied. For example, if the employer has equipment that meets the requirements of § 1610.6(a)(3) because the manufacturer was unavailable, but the RPE was not qualified, consider a citation of § 1610.6(a)(3) grouped with § 1610.6(a)(2)(A).

2. § 1610.6(b): Manufacturer's Rejection of the Proposed Modification.

If the manufacturer rejects the proposed modifications and provides reasons for the rejection in writing, the employer may not make modifications or additions to the equipment.

Inspection Guidance

- a. Determine by observation and interview whether modifications or additions affecting the capacity or safe operation of the equipment have been made.
- b. If any modifications or additions have been made, ask the employer if it obtained written approval from the manufacturer.
- c. If the employer does not have written approval from the manufacturer, interview the employer to determine whether the employer requested manufacturer approval and whether the employer received a response.
- d. If the employer received a written response from the manufacturer rejecting the proposed modification, interview the employer to determine why the employer proceeded with the modification. Ask to review the manufacturer's response and read it to determine whether it contains reasons for the rejection.
- e. If the manufacturer rejects the proposed modifications, but does not do so in writing, or does not explain the rejection in writing, the employer should follow § 1610.6(a)(2). Refer to guidance for enforcement of § 1610.6(a)(2), above.

Citation Policy

- f. § 1610.6(a)(2)(A) through (B): Consider a citation for violation of § 1610.6(a)(2)(A) through (B) if the manufacturer rejects the proposal for modification without explaining the rejection in writing and the modification failed to meet one or more of the requirements listed in § 1610.6(a)(2)(A) through (ii). For example, if the manufacturer rejects proposed modifications in writing without explaining the rejection and the RPE required under § 1610.6(a)(2)(A) is

not qualified, but the employer proceeds with the modification, consider a citation of § 1610.6(a)(2)(A).

Do not group the citation with § 1610.6(b) because the employer has satisfied the requirements in § 1610.6(b), and the manufacturer's inadequate rejection notice is the equivalent of a refusal to review the request in § 1610.6(a)(2).

- g. § 1610.6(b): Consider a citation of § 1610.6(b) if the employer modifies/adds to equipment after the manufacturer has rejected the proposed modification/addition in writing and explained the rejection.

HH. § 1619.1: Tower Cranes—Supplemental Requirements

1. § 1619.1(a): Section 1619.1 addresses the supplemental requirements for tower cranes, as they are defined in § 1610.3. All sections in Article 15 apply to tower cranes unless stated otherwise.

Citation Policy

- a. § 1619.1(a): This provision should not be cited because it is only informational. § 1619.1(b)(1).

2. Assembly/Disassembly Process.

Sections 1611.1 (Assembly/Disassembly—selection of manufacturer or employer procedures), 1611.2 (Assembly/Disassembly—general requirements (applies to all assembly and disassembly operations)), 1611.3 (Disassembly—additional requirements for dismantling of booms and jibs (applies to both the use of manufacturer procedures and employer procedures) and 1611.4

Tower Crane: a type of lifting structure which utilizes a vertical mast or tower to support a working boom (jib) in an elevated position. Loads are suspended from the working boom. While the working boom may be of the fixed type (horizontal or angled) or have luffing capacity, it can always rotate to swing loads, either by rotating on the top of the tower (top slewing) or by rotation of the tower (bottom slewing). The tower base may be fixed in one location or ballasted and moveable between locations. Mobile cranes that are configured with luffing jib and/or tower attachments are not considered tower cranes under this section.

Assembly/disassembly (A/D): the assembly and/or disassembly of equipment covered under this standard. With regard to tower cranes, “erecting and climbing” replaces “assembly” and “dismantling” replaces “disassembly.” Regardless of whether the crane is initially erected to its full height or is climbed or jumped in stages, the process of increasing the height of the crane is an erection process. All assembly and disassembly operations must comply with either the procedures specified by the manufacturer or procedures developed by the employer that meet the criteria listed in § 1611.4. Under either alternative, they must comply with all manufacturer prohibitions.

Climbing and/or jumping qualify as assembly.

Climbing or Jumping: these two terms, which have the same meaning, refer to the process in which a tower crane is raised to a new working height. In many cases, a tower crane is first erected and used at one height, and then as the height of the structure being built increases, the height of the tower crane is increased in stages to keep pace with it, either by adding additional tower sections to the top of the crane (top climbing), or by a system in which the entire crane is raised inside the structure (inside climbing). (The term “jumping” is also used in reference to derricks, but it has a different meaning.)

Inspection Guidance

- a. Inspect the rigging used for erecting and dismantling. Conduct this inspection even if no erecting or dismantling is underway.
- b. Verify if the manufacturer's procedures call for specific rigging fixtures for hoisting the sections.
 - Are the fixtures in proper condition?
 - If rigging does not match the manufacturer's procedures, are there employer procedures for the gear used?

Citation Policy

- c. § 1619.1(b)(1) and 1611.1-.1406: When considering a citation for violation of a requirement listed under §§ 1611.1 through 1611.4, cite to the provision or provisions within those standards containing the most specific applicable requirements. Because § 1619.1(b)(1) amends § 1611.1-1611.4 to address hazards specific to cranes, each citation under §§ 1611.1-1611.4 involving tower cranes should be grouped with § 1619.1(b)(1).
3. § 1619.1(b)(2): Dangerous Areas for Self-erecting Tower Cranes:

During erection, climbing and dismantling, no one is permitted to be in or under the tower, jib or rotating portion of the crane until a competent person indicates it is safe and the crane is secured in a locked position unless (1) the manufacturer's instructions direct them to be there, and (2) the personnel under the tower, jib or rotating portions of the crane are necessary personnel. Other personnel may enter the area in or under the tower, jib or rotating portion of the crane only after the competent person in charge indicates it is safe and the crane is secured in a locked position.

A **self-erecting tower crane** is a tower crane that erects while controlled from ground level without the assistance of another crane.

Inspection Guidance

- a. If the crane is being erected, climbed or dismantled, determine by observation and interview whether personnel are or were in the area in or under the tower, jib or rotating portion of the crane, and if so, how many personnel were in that area.
- b. If personnel are or were in this area during erection, climbing or dismantling, interview the employer or operator to determine whether this was after the competent person in charge indicated that it was safe, and after the crane was secured in a locked position.
 - Ask the operator or employer who the competent person was, and, if possible, interview that person to verify that person is competent. Ask the competent person how he or she knew that it was safe to enter these areas.

- Verify by observation and interview that the crane is secured in a locked position.
- c. If the crane was not secure or a competent person did not indicate it was safe to be in or under the tower, jib or rotating portion of the crane:
- Review the manufacturer's instructions to determine whether erection, climbing or dismantling had tasks that required employees to be in this area of the crane.
 - Determine by interview of the employer, operator, competent person and/or other employees what each person under the tower, jib or rotating portion of the crane was doing and whether it was a task required by the manufacturer's instructions.
 - Determine who decided the number of personnel and which personnel would be in the area under the tower, jib or rotating portion of the crane before it was secured. Interview that person to assess how he or she made that determination.
 - An employer has discretion in determining which or how many personnel are necessary to complete the manufacturer's instruction, but the work being done by personnel under the tower, jib or rotating portion of the crane must correspond with the manufacturer's instructions.

Citation Policy

- d. § 1619.1(b)(2): Consider a citation for violation of this standard if a self-erecting tower crane is not secured in a locked position or a competent person did not determine it was safe to enter the area under the tower, jib, or rotating portion of the crane, and one of the following two circumstances is present:
- if there were personnel in the area under the tower, jib, or rotating portion of the crane before it was secured, and the manufacturer's instructions do not require personnel to be in this area in order to erect, climb, or dismantle the crane, or
 - if there were personnel in the area under the tower before it was secured, but they were not determined to be necessary personnel by the employer, operator or other competent person involved in the erecting, climbing, or dismantling of the crane, or they are not performing tasks required by the manufacturer's instructions.
- Specify in the AVD which circumstance gave rise to the citation.
3. § 1619.1(b)(3): Foundation and Structural Supports

Foundation and structural supports must be designed by the manufacturer or a registered professional engineer (RPE). Structural supports include the portions of the structure used for support of the tower and the means of attachment.

Inspection Guidance

- a. Determine through interview of the employer, operator and/or other personnel, whether the foundation and structural supports of the tower crane were designed by the manufacturer or an RPE.
 - Request and inspect any documentation that shows who designed the foundation and structural support of the crane. (The building department's approval documentation may be evidence.) Note that the employer is not required to have such documentation on site. The DBS of many cities do not regulate the design and construction of temporary structures including tower cranes
 - Examine any documentation and/or ask the employer to describe how the crane's foundation was built. Look at the foundation and supports. Is there evidence that it was built according to the engineer's plans and specifications?
 - If an RPE designed the foundation and structural supports, verify the RPE's credentials, if possible.
 - If there are doubts that the foundation or structural support were designed by the manufacturer or an RPE, or that they comply with that design, request that the employer obtain records of the foundation and structural support design from the manufacturer or RPE and make those available for inspection.
 - Some structural support work may be considered steel erection if it meets the scope of the standard as described in § 1710(a).

Citation Policy

- b. § 1619.1(b)(3): If the foundation and structural supports were not designed by manufacturer or RPE, consider a citation of this standard.
4. § 1619.1(b)(4): Hazards Specific to Tower Cranes that must be addressed by the A/D Director.

This section incorporates the requirements for specific hazards from § 1611.2(h)(1) through (h)(9) and adds additional requirements in § 1619.1(b)(4)(A) through (C) for the A/D director. See section on Assembly/Disassembly in this directive for additional inspection guidance regarding citations for violations of the requirements of §1611.2(h)(1) through (h)(9).

Inspection Guidance

- a. When inspecting or investigating the erection process for tower cranes, consider asking the following questions to obtain information regarding the erection operation and the qualifications of the A/D director:
 - Who is the A/D director? Is he or she present on site?
 - Whose procedures are being used for the climb/jump—the manufacturer's or the employer's?

- Can the A/D director explain the procedures?
- Were the procedures for climbing/jumping reviewed by the A/D director?
- How many tower crane climbs/jumps has the A/D director performed/directed?
- Has the A/D ever directed climbs/jumps before and was he or she the only one directing?
- If the A/D director did not direct the climb/jump, who did?
- What kind of training or education does the A/D director have to qualify him or her for climbing/jumping cranes?
- What type of slings does the A/D director use?
- How does the A/D director inspect slings before jumping?
- Has the crew been trained on the hazards of the erection for their respective roles?
- Who trained the A/D director?

Citation Policy

- b. § 1611.2(h)(1) through (h)(9) and 1619.1(b)(1): If the A/D director failed to address specific hazards listed in §§ 1611.2(h)(1) through (h)(9), consider citations under the specific provision or provisions of § 1611.2(h)(1) through (h)(9) that were violated, and group each with a citation of § 1619.1(b)(1), as discussed above. Citations under § 1611.2(h)(1) through (h)(9) should not be issued under § 1619.1(b)(4).
 - c. §1619.1(b)(4)(A) through (C): If the A/D director failed to address one of the supplemental hazards in this section, consider a citation for violation of the specific provision which the A/D director failed to address. If multiple provisions were not addressed, consider separate citations for each violation. Multiple citations under §§ 1619.1(b)(4)(A) through (b)(4)(C) may be grouped for penalty purposes.
5. § 1619.1(b)(5): Towers must meet manufacturer's plumb tolerance, or where not specified, a minimum plumb tolerance of 1:500. A qualified person must verify plumb tolerance.

Inspection Guidance

- a. Determine how plumb tolerance was verified. If possible, interview the employee(s) involved in determining plumb tolerance, and whether the employee was qualified in accord with the definition of qualified person in § 1504, and what plumb tolerance was used.

Citation Policy

- b. § 1619.1(b)(5): Consider a citation for violation of this standard if (1) the manufacturer's plumb tolerance was specified but not met, or (2) the manufacturer's plumb tolerance was not specified and a minimum tolerance of 1:500 was not used, or (3) a non-qualified person verified plumb tolerance.
6. § 1619.1(b)(6): Where there is more than one fixed jib (hammerhead) tower crane, cranes must not be able to come in contact with one another. Cranes may pass over one another without violating the standard.

Inspection Guidance

- a. If there are multiple cranes, determine if they may be able to contact one another. If so, address this during employer and operator interviews.

Climbing: the process in which a tower crane is raised to a new working height, either by adding additional tower sections to the top of the crane (top climbing), or by a system in which the entire crane is raised inside the structure (inside climbing).

Citation Policy

- b. § 1619.1(b)(6): If there are multiple fixed jib tower cranes that could potentially come in contact with one another, consider a citation of this standard.
7. § 1619.1(b)(7): This paragraph contains requirements for climbing procedures in § 1619.1(b)(7)(A) through (b)(7)(B). Employers must comply with manufacturer prohibitions and have an RPE verify that the host structure can sustain imposed forces to prevent collapse hazards. Examples of typical host structures include a building, parking garage, bridge or pier.

Inspection Guidance

- a. Determine if the manufacturer's procedures or the employer's procedures are being used for climbing. Request to review the instructions used.
- b. Determine by interview who verified the structural stability. Request any available documentation which verifies the RPE's credentials and/or if the RPE is available on site; interview to verify credentials. Note that the employer is not required to maintain a record of the RPE or that person's credentials on site.

Citation Policy

- c. § 1619.1(b)(7)(A): Consider a citation of this standard if the employer did not comply with the manufacturer's climbing requirements.
- d. § 1619.1(b)(7)(B): Consider a citation of this standard if the employer did not have an RPE verify the structure's ability to sustain imposed forces prior to a climb.
8. § 1619.1(b)(8): This paragraph contains requirements for the counterweight and/or ballast on a tower crane. Equipment must not be erected, dismantled or operated without the amount and position of counterweight/ballast specified by the manufacturer or RPE in place. The maximum weight may not be exceeded.

Inspection Guidance

- a. Find out if the manufacturer's procedures or RPE specifications for amount and position of counterweight/ballast are being used. Does the amount and position of counterweight/ballast conform to these specifications?

Citation Policy

- b. § 1619.1(b)(8)(A): Consider a citation of this standard if the employer did not meet the manufacturer's or RPE specifications for the amount and position of counterweight/ballast being used.
 - c. § 1619.1(b)(8)(B): Consider a citation of this standard if the employer exceeded the maximum counterweight/ballast permitted by the manufacturer or RPE.
9. § 1619.1(c): Signs, banners, or similar items on tower cranes must be in accord with the manufacturer's specifications, or if unavailable, an RPE must approve their size and location in writing.

Inspection Guidance

- a. Verify the location of signs and interview the employer to determine whether the manufacturer's specifications or RPE specifications were used.
- b. Request to review the manufacturer's instructions, if available, to determine whether placement and size are correct.
- c. If RPE provided size and location requirements for signs, ask to review written specifications.

Citation Policy

- d. § 1619.1(c): Consider a citation of this standard (1) if the location or size of signs/banners is inconsistent with the manufacturer's instructions, or (2) if the manufacturer's instructions are unavailable and RPE has not provided written size and location specifications, or (3) if signs/banners do not conform with RPE specifications. Specify in the AVD which of these circumstances gave rise to the citation.
10. § 1619.1(d): The safety devices requirements of § 1615.1 does not apply to tower cranes (see § 1619.1(d)(1)). Instead, Section 1619.1(d) contains the requirements for safety devices that are applicable to tower cranes:
- § 1619.1(d)(2): The safety devices in §§ 1619.1(d)(2)(i) through (d)(2)(x) are mandatory on tower cranes.
 - § 1619.1(d)(3): Operations must not begin unless devices in § 1619.1(d)(2)(A) through (d)(2)(J) are in proper working order. If a device stops working, the operator must safely stop operations. Equipment must be taken out of service until the device is working properly.

- Section 1616.1(f) contains requirements for proper tag-out procedures which must be followed when the employer takes equipment or a function of the equipment out of service, such as, for example, when a safety device in §§ 1619.1(d)(2)(i) through (d)(2)(J) is not functioning. Under § 1616.1(g)(1), a tag must be placed in the cab stating that the equipment is out of service and not to be used, or if only a specific function is out of service, the tag must be located conspicuously and identify the function that is out of service. Under § 1616.1(g)(2), the operator must not start the equipment or use the function until the sign has been removed by an authorized person or the equipment otherwise meets the requirements of this section. See section on Operation and Authority to Stop in this directive for additional guidance regarding citations for violations of the requirements of § 1616.1.

Inspection Guidance

- a. Verify through operator interview that safety devices are present on the equipment and that they are functioning properly. The devices listed in § 1619.1(d)(2) can be used as a checklist. Ask the operator to point out the devices listed.
- b. If a device listed in §§ 1619.1(d)(2)(A) through (d)(2)(J) is missing or not functioning, check:
 - whether the equipment is being operated, and if not, when the equipment was last operated;
 - whether a proper tag-out procedure under § 1616.1 has been followed;
 - when the safety device was removed/when the safety device ceased to function;
 - when repair is scheduled to occur, or when replacement was ordered and is scheduled to arrive.
- c. If a device malfunction is observed, note whether the operator ceases operations and how they are stopped.
- d. For the application of this provision, “safely stop operations” gives notice to the employer that the operator is not necessarily expected to stop the equipment immediately if doing so would create a hazardous situation. Under this provision, the operator must rely on her or his knowledge and skills to determine when stopping the hoisting operation would create a greater hazard. Operations may not resume until such time as the aid or device has been repaired or replaced.
 - For example, when stopping the hoisting operations immediately would suspend the load over people and the equipment could be safely operated longer to allow the load to be landed or swung and suspended in/over a location that would not be a hazard.
 - Another example could be when stopping the hoisting operation immediately would not allow a structural member of a building to be supported or moved so that the member could be secured.

Citation Policy

- e. § 1619.1(d)(2)(A) through (d)(2)(J): If a safety device required by this section is missing, consider a citation for the provision which requires the specific device. For example, § 1619.1(d)(2)(I) requires an emergency stop switch at the operator's station. If there is no such switch, consider a citation under § 1619.1(d)(2)(I). If multiple safety devices listed in § 1619.1(d)(2)(A) through (d)(2)(J) are missing, consider issuing a separate citation for each of the missing safety devices.
- f. § 1619.1(d)(3): Consider a citation for violation of this standard under the following circumstances:
- if a device or devices listed in §§ 1619.1(d)(2)(A) through (d)(2)(J) is not functioning and the equipment is being operated;
 - if a device ceases to function, and the operator does not stop operations; group this citation with § 1509(a);
 - if a device ceases to function, the operator stops operations in a safe manner, but then the employer does not take equipment out of service and resumes operations before the device is working properly;
 - if a device ceases to function and the operator stops operations in an unsafe manner. Generally, when operations have been stopped and it is determined that doing so created a hazardous condition, this provision would not be cited by itself because it is more likely that another applicable provision of Title 8 CCR Subchapter 4 was violated. Therefore, a grouped citation could be considered. For example, a provision under § 1616.3, Working Area Control, could have been violated. Consider grouping citations for violations of § 1619.1(d)(3) and the applicable requirement of § 1616.3.

The AVD of the citation should list the specific safety device(s) in § 1619.1(d)(2)(A) through (d)(2)(J) not functioning.

Even if multiple devices on one piece of equipment are not functioning properly in violation of this standard, only one citation under § 1619.1(d)(3) may be issued.

- g. § 1616.1(g): Consider citing § 1616.1(g) if proper tag-out procedures are not followed when a safety device is missing or is not functioning properly.
11. § 1619.1(e): The operational aids requirement of § 1615.2 does not apply to tower cranes. Section 1619.1(e) contains the requirements for operational aids that are applicable to tower cranes:
- § 1619.1(e)(2): The operational aids in §§ 1619.1(e)(5) through (e)(6) are mandatory on tower cranes.

- § 1619.1(e)(3): Operations must not begin unless devices in this section are in proper working order or a temporary alternative measure is used. More protective alternatives recommended by the manufacturer must be followed.
- § 1619.1(e)(4): If a device stops working, the operator must safely stop operations until temporary alternative measures are implemented or the device is working properly.
- § 1619.1(e)(5)(M): When citing the employer for failure to implement the temporary alternative measure, group with § 1509(a).
- § 1616.1(j): This section contains requirements for when equipment adjustments or repairs are needed, including when operational aids in § 1619.1(e)(5) are missing. Under § 1616.1(j)(1), the operator must inform each person designated to receive notice of necessary repairs, including the next operator, in writing, of the needed repair. Under § 1616.1(j)(2), the employer must also notify affected employees. See section on Operation and the Authority to Stop in this directive for additional guidance regarding citations for violations of the requirements of § 1616.1.

Inspection Guidance

- a. Verify that operational aids are present on the equipment and functional. The equipment listed in § 1619.1(e)(5) can be used as a checklist. Ask the operator to point out the devices listed.

Note that three of the operational aids are only required on equipment manufactured after November 8, 2011 (hoist drum lower limiting device under § 1619.1(e)(5)(D), hook radius indicators on hammerhead tower cranes under § 1619.1(e)(5)(I) 2., and load indicating devices under § 1619.1(e)(5)(N)).

If an operational aid is missing or not functioning, determine if a proper temporary alternative measure is in use.

- b. Observe and note whether the tower crane is operated without the operational aid or temporary alternative measure.
- c. If a tower crane is being operated with a temporary alternative measure, ask the employer about the date that the operational aid ceased to function properly, the temporary alternative measure that was put in place, and when replacement parts were ordered. (such as an order confirmation)
 - Verify that the temporary alternative measure in place meets the applicable requirements in §1619.1(e)(5) or those of the manufacturer, if the manufacturer's requirements are more protective.
 - Verify that the procedures in § 1616.1(j) are also followed.

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- d. If the tower crane is not observed in operation, but an operational aid listed in §1619.1(e)(5) is missing and no temporary alternative measure is properly in place, determine:
- when the equipment was last operated;
 - whether inspections required by § 1613.1 were conducted;
 - whether proper tag-out procedure under § 1616.1(g) has been followed;
 - when the operational aid was removed;
 - when repair is scheduled to occur, or when replacement aid was ordered and is scheduled to arrive; if a replacement part is not available, the substitution of a device that performs the same function would not be subject to § 1610.6 manufacturer or RPE approval.
- e. If a device malfunction is observed, note whether the operator ceases operations and how they are stopped. See guidance concerning whether the operator “safely stopped operations” as discussed in this directive under § 1619.1(d), Safety Devices.
- f. If a wind speed device is not used, ask the employer and operator who determined that wind was not a factor. Verify that the individual who made the determination meets the definition of a competent person for that task and if possible, ask for a description of how the determination was made.

Citation Policy

- g. § 1619.1(e)(2): If an operational aid listed in §1619.1(e)(5) is missing and no temporary alternative measure is properly in place, consider a citation for violation of § 1619.1(e)(2). For example, if there is not an anti two-blocking device and no temporary alternative measure is in place, consider a citation of § 1619.1(e)(2).
- h. § 1619.1(e)(3): If a device listed in §1619.1(e)(5) is not functioning, no temporary alternative measure is properly in place and the equipment is being operated, consider a citation of § 1619.1(e)(3). If the device stops working and the operator does not safely stop, group this citation with § 1610.1(f).
- i. § 1619.1(e)(2) through (3): For citations under both of these standards:
- The AVD of the citation should list the specific missing or nonfunctioning operational aid(s) noted in §1619.1(e)(5)
 - In addition, if a temporary alternative measure has been established, but not successfully implemented, the AVD should list the specific temporary alternative measure that the employer attempted to use and explain why it was inadequate.
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- Even if multiple aids on one piece of equipment are not present or not functioning on a particular tower crane, only one citation under § 1619.1(e)(2) and one citation under § 1619.1(e)(3) or may be issued.
- j. § 1619.1(e)(4): Consider a citation of this standard if: (1) a device ceases to function, and the operator does not stop operations; (2) the operator ceases operations in an unsafe manner; or (3) the operator safely ceases operations, but resumes them without implementing a temporary alternative measure. Group this citation with § 1508(a).
- Generally, when operations have been stopped and it is determined that doing so created a hazardous condition, this provision would not be cited by itself because it is more likely that another applicable provision of Title 8 CCR Subchapter 4 was violated. Therefore, a grouped citation could be considered. For example, a provision under § 1616.3, Working Area Control, could have been violated if the load is left suspended over employees. Consider grouping citations for violations of § 1619.1(e)(4) and the applicable requirement of § 1616.3.
- Where the inspection reveals the operator halted operations upon discovery of the deficiency, but then resumed operations, then this provision may be grouped along with § 1619.1(e)(3).
- k. § 1619.1(e)(2) or (e)(3) and § 1619.1(e)(5): If the employer is operating equipment with a temporary alternative measure properly in place, but the applicable time limit established by § 1619.1(e)(5) has lapsed, consider a citation for violation of the time limit.
- The citation should group § 1619.1(e)(2) for missing operational aids or § 1619.1(e)(3) for nonfunctioning operational aids with §1619.1(e)(5) depending on the operational aid that is missing or not functioning.
 - The AVD should list the specific provision in §§ 1619.1(e)(5)(A) through (e)(5)(H) requiring the missing or non-functioning operational aid and the corresponding temporary alternative measure used.
 - If there are multiple operational aids in disrepair for more than 7 days, only one citation should be issued.
- l. § 1616.1(f): If proper tag-out procedures are not followed, consider a citation for §1616.1(g).
- m. § 1616.1(j): If proper notification procedures are not followed when an operational aid under § 1619.1(d)(2) is missing or is not functioning properly, consider a citation for violation of this standard.
12. § 1619.1(f)(1): The inspection requirements of sections 1613.1 and 1613.10 apply to tower cranes, except that “assembly” is replaced by “erection.” See the Inspections and Wire Rope Inspections sections in this directive for additional guidance regarding citations for violations of requirements of § 1613.1 and 1613.10.
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Citation Policy

- a. § 1619.1(f)(1) and 1613.1: When considering a citation for violation of a requirement listed under § 1613.1, cite the provision or provisions within those standards containing the most specific applicable requirements. Because § 1619.1(f)(1) amends § 1613.1, each citation under § 1613.1 involving tower cranes should be grouped with § 1619.1(f)(1).
13. § 1619.1(f)(2): Components are often damaged during shipping to a jobsite. This paragraph establishes the following requirements for a pre-erection inspection:
- Under § 1619.1(f)(2)(A), before each crane component is erected, it must be examined by a qualified person to determine whether components are damaged or worn.
 - Under § 1619.1(f)(2)(B), if the qualified person determines that a component is damaged/worn enough to create a safety hazard, the component must not be erected until it is repaired or replaced and re-inspected by a qualified person.
 - Under § 1619.1(f)(2)(C), if the qualified person determines that the component should be monitored, it must be checked at monthly inspections and documented.

Inspection Guidance

- a. In the opening conference, ask the employer if a pre-erection inspection was done.
- b. Ask who conducted the inspection and verify if that person is qualified.
- c. If, during pre-erection inspection, the qualified person determined that something should be monitored, ask to see records of the monthly review of this issue.

Citation Policy

- d. § 1619.1(f)(2)(A): If no pre-erection inspection was conducted, or the pre-erection inspection was not conducted by a qualified person, consider a citation of this standard.
 - e. § 1619.1(f)(2)(B): If a qualified person determined that damage presented a safety hazard and the component was erected without repair or without re-inspection, consider a citation of this standard.
 - f. § 1619.1(f)(2)(C): If a qualified person determined that a component should be monitored during the pre-erection inspection, and the employer is not checking this during monthly inspections, consider a citation of this standard.
14. § 1619.1(f)(3) through (f)(5): This section specifies supplemental requirements for the post-erection inspection, the monthly inspection and the annual inspection.

Inspection Guidance

- a. Ask for monthly and annual inspection reports for crane and wire rope. Shift inspection reports are not required to be written, but check if they are available.
- b. Ask who conducted the required inspections and verify if that person is competent/qualified. If the person who conducted the inspection is on site, verify that the specific items listed were checked during the inspection. If there is a deficiency in one of the items listed for inspection, ask whether or not that item was checked during the appropriate inspection.

Citation Policy

- c. § 1619.1(f)(3) through (f)(5): If an item which should have been included in the inspection was not inspected, consider a citation for violation of the specific provision. If multiple items were not addressed, consider separate citations for each violation. Multiple citations under § 1619.1(f)(3), (f)(4) or (f)(5) may be grouped for penalty purposes. For example, if the post-erection inspection was not conducted in accord with the manufacturer's instructions as required by § 1619.1(f)(3)(B), consider a citation of that specific requirement. If, however, in addition to this violation, the load test did not use properly certified weights in violation of § 1619.1(f)(3)(A), citations of both provisions may be issued separately or grouped.

II. § 1610.8 Derricks, Supplemental Requirements

Introduction: Section 1619.2 addresses the supplemental requirements for derricks, both temporarily and permanently mounted. Most requirements of this section apply to all derricks; however, some are only applicable to a particular type of derrick. In this section of the directive, the Inspection Guidance and Citation Policies for those general requirements are discussed.

1. § 1619.2(a): All sections in Article 15 apply to derricks unless stated otherwise.

Citation Policy

- a. § 1619.2(a): When requirements in other sections of Article 15 are not met that are applicable to derricks, consider citations of those applicable provisions. Section 1619.2(a) must not be cited because it merely notifies the employer of the scope of Article 15 requirements that are applicable to derricks.

Derrick: powered equipment consisting of a mast or equivalent member that is held at or near the end by guys or braces (with or without a boom) and its hoisting mechanism. The mast or load is moved by the hoisting mechanism and operating ropes.

- Derricks include A-frame, basket, breast, Chicago boom, gin pole (except when used for erection of communication towers), guy, shearleg, and stiffleg derricks, as well as variations of such equipment.

- Gin poles used to erect communication towers are not covered by Article 15 (1610.1(c)(12)).

2. General Requirements that Apply to All Derricks.

All sections of Article 15 (other than 1619.2) apply to derricks unless specified otherwise.

Under section 1619.2 the following general requirements apply to all derricks as well:

- § 1619.2(b): Operation-procedures information on load chart contents and its location on the worksite.

- § 1619.2(c)(1): General derrick strength and welding requirements.
- § 1619.2(d)(1): Load anchoring data developed by the manufacturer or by a qualified person.
- § 1619.2(e) through (q).

Inspection Guidance

- a. Determine through interviews whether the derrick has been taken out of service. If, so verify that the boom has been secured in accord with one of the methods specified under § 1619.2(m)(2).
- b. Observe the operation of the derrick, ask the employer, and use information obtained from interviews, to verify:
 - the type of derrick used at the jobsite.
 - the manufacturing date of the derrick and its capacity. For equipment manufactured after November 8, 2011, ask the operator whether the equipment has a load weight/capacity device listed in § 1619.2(f)(3)(A), and verify whether the device is functional. Ask the operator locate the device on the derrick.
 - the derrick is being used safely.
 - the qualifications of the operator.
 - that operation procedures from the manufacturer or employer are available to the operator

Enforcement of § 1616.1(b) with Derricks

Section 1616.1(a) requires that the employer comply with all manufacturer procedures for operations. Section 1616.1(b)(2) provides that, if these procedures are unavailable, a qualified person may develop procedures, and under § 1616.1(b)(3), procedures related to capacity must be developed and signed by an RPE who is familiar with the equipment.

In operations using derricks, the qualified person may or may not be employed by the employer. Because many derricks are custom-built, it is essential for derrick operators, inspectors, maintenance personnel and hoisting crew to be able to access information developed by a qualified person to assure safe use of the derrick.

- where the load charts are located.
- that the information specified in § 1619.2(b)(2) are on the load chart.
- that anchoring data developed by the manufacturer or a qualified person was used.

- that the operational aids listed in § 1615.2(d) (except as modified by § 1619.2(f)(1)) and §§ 1619.2(f)(2) and (f)(3) are present on the equipment and that they are functioning properly. Ask the operator to locate the aides on the derrick.
- derrick anchorages (including the structure to which the derrick is attached) were approved by a qualified person.
- that a qualified person determined if any special testing was needed of any rock or hairpin anchorages that were used.

Hairpin anchor: a hairpin-shaped, guy-supporting anchor that is placed in footings or walls before concrete is poured and is held in place by the cured concrete.

Rock anchor: an anchoring device inserted in a hole drilled into rock or concrete. The device is secured in the hole to withstand a predetermined load.

- if the derrick has had any repairs or modifications that would affect its capacity or safe use.
 - that guys, if used, have been inspected for proper tensioning.
 - that the operator and employees have been trained in their duties regarding the safe use of the derrick.
- c. Ask for and review the monthly and annual inspection documentation to verify that the required inspections have been completed by a person meeting the requirements of either a competent or qualified person as required to conduct the inspection.
- d. If the derrick is newly-installed, reinstalled, needed special testing of rock or hairpin anchors, or has undergone repairs or modifications that affect the capacity or safety of the derrick, ask for and review available documentation of any required load testing to verify that the tests were conducted and the derrick's safety was evaluated by a qualified person.
- e. During interviews, identify the individual who ensured that the derrick was designed and constructed in accord with § 1619.2(c)(1)(A). If possible, verify the qualifications of that person.
- f. Inspect the guy derrick and verify through interview that anchoring data was developed by the manufacturer or a qualified person and that information was used in accord with § 1619.2(d).
- g. If there are observed deficiencies in the welds of the derrick's load sustaining members, refer to ANSI/AWS D14.3-94 and AWS D1.1M:2002 and any other applicable guidance to verify that the employer ensured the safety of those welds in accord with section 1619.2.

- h. Determine by inspection of the derrick and interviews of the employer and operator whether swingers and hoists are suitable for the derrick used and properly anchored.
- i. If a base mounted drum hoist is used, inspect the derrick to verify the drum hoist's compliance with incorporated provisions of ASME B30.7-2001.
- j. If power failure of the derrick is observed or has occurred, determine by observation and interview of the operator whether the requirements of § 1619.2(j)(1)-(j)(2) were met. Verify:
 - when operations stopped and under what conditions. (See discussion in this compliance directive of "safely stop" in Citation Policy for § 1615.1 and 1615.2.);
 - that the brakes and locking devices were set; and
 - that the clutch and power controls were moved to the off position.

Citation Policy

- k. § 1619.2(b) through (q): Unless otherwise specified under the citation policies of this and other sections that follow, when requirements of § 1619.2(b) through (q) have not been met, consider citations of the specific provisions.
- l. § 1619.2(b)(1): This provision must not be cited because it merely notifies the employer of the scope of § 1616.1, Operations, requirements that are applicable to derricks.
- m. § 1619.2(e)(2): When a base-mounted drum hoist does not meet the requirements of ASME B30.7-2001 as referenced in this provision, consider a citation of § 1619.2(e)(2). The AVD must describe the provisions of ASME B30.7-2001 that were not met.
- n. § 1619.2(f)(1): This provision must not be cited because it merely notifies the employer of the scope of § 1615.2, Operational Aids, requirements that are applicable to derricks. If requirements of § 1615.2 were not met, consider citations of those specific provisions.
- o. § 1619.2(f)(2): In operations involving derricks, if there is no functioning boom angle indicator and neither § 1619.2(f)(2)(A) nor § 1619.2(f)(2)(B) is satisfied, consider a citation of § 1619.2(f)(2).
- p. § 1619.2(f)(3)(A): For derricks manufactured after November 10, 2011, consider a citation of § 1619.2(f)(3)(A) if there is no load weight/capacity device, or the device is not functioning and no temporary alternative measure is in place.
- q. § 1619.2(f)(3)(B): For equipment manufactured after November 10, 2011, consider a citation for violation of § 1619.2(f)(3)(B) if the load weight/capacity device is not working properly, more than 30 days has elapsed since the device was missing or dysfunctional, and the 7-day allowance for ordered parts has passed.

- r. § 1619.2(f)(3)(A) and (B): If a load weight/capacity device is not functioning, no temporary alternative measure is in place and the 30-day requirement of § 1619.2(f)(3)(B) has lapsed, consider a citation grouping both provisions rather than citing each provision separately.
 - s. § 1619.2(j): Consider a citation of this standard if the derrick's power fails but the operator does not stop operations. Group this citation with § 1509(a).
3. Requirements of § 1619.2 that only apply to guy derricks.
- § 1619.2(c)(2), Construction of guy derricks
 - § 1619.2(d)(2), Anchoring and guying
 - § 1619.2(m)(2)(C), Securing the boom to the mast

Inspection Guidance

- a. Determine through interviews whether the derrick has been taken out of service. If, so verify that the boom has been secured in accord with one of the methods specified under § 1619.2(m)(2).
- b. Use the inspection guidance provided in bullets 1 and 2, above, for general requirements that are applicable to guy derricks.
- c. Inspect the guy derrick and verify that: the mast base is anchored and guys are secured to the ground or firm anchorage in accord with the requirements of § 1619.2(d); and the derrick is supported by at least 6 guys.
- d. If there are less than 6 guys or the guys are unequal, ask the employer or operator who made the determination the guys were sufficient to support the derrick and, if possible, document how that determination was made.
- e. When there are questions regarding the construction of the guy derrick, ask for and review any information that the employer has from the manufacturer or a qualified person regarding specifications of the derrick. Verify that the employer has the information required by § 1619.2(c)(2)(B).

Citation Policy

- f. § 1619.2(c)(2) through (d)(2): When requirements of §§ 1619.2(c)(2) or (d)(2) have not been met, consider citations for violations of the specific provisions.
- g. § 1619.2(m)(2)(C): Even though this provision is specific to guy derricks, compliance with § 1619.2(m)(2)(C) is but 1 of 4 options for securing the boom of a guy derrick when taken out of service for 30 days or more, consider a citation of § 1619.2(m)(2) when none of the options have been met.

4. Requirements of § 1619.2 that only apply to Stiffleg Derricks.

- § 1619.2(c)(3): Construction of Stiffleg Derricks
- § 1619.2(d)(3): Anchoring and guying
- § 1619.2(m)(2)(D): Securing the boom to a stiffleg

Inspection Guidance

- a. Use the inspection guidance provided in bullets 1 and 2, above, for general requirements that are applicable to stiffleg derricks.
- b. Inspect the stiffleg derrick to verify that: the derrick is supported by at least two stifflegs and a base as required by § 1619.2(c)(3); and the mast base/stifflegs are anchored and designed in accord with the requirements of §1619.2(d)(3).

Citation Policy

- c. § 1619.2(c)(3) through (d)(3): When requirements of §§ 1619.2(c)(3) or (d)(3) have not been met, consider citations for violations of the specific provisions.
- d. § 1619.2(m)(2)(D): Even though this provision is specific to stiffleg derricks, compliance with § 1619.2(m)(2)(D) is but 1 of 4 options for securing the boom of a stiffleg derrick when taken out of service for 30 days or more, consider a citation of § 1619.2(m)(2) when none of the options have been met.

5. Requirements of § 1619.2 that only apply to Gin Pole Derricks.

- § 1619.2(c)(4): Construction of Gin Pole Derricks

Inspection Guidance

- a. Inspect the gin pole derrick, observe its operation, and through interviews, verify whether the derrick was used in an unstable position and that the gin pole and its anchorage meets the requirements of § 1619.2(c)(4)(B) and (c)(4)(C).

Citation Policy

- b. § 1619.2(c)(4): When requirements of §§ 1619.2(c)(4) have not been met, consider citations for violations of its specific provisions.

6. Requirements of § 1619.2 that only apply to Chicago Boom Derricks.

- § 1619.2(c)(5): Construction of Chicago Boom Derricks

Inspection Guidance

- a. Through observation of the derrick's operation or based on information obtained from interviews, verify that the fittings on the boom and support structure allows the boom to lift, lower and swing left and right the load without the boom or the fittings becoming unattached or unseated. When there are questions regarding the safety of the design of the derrick, ask the employer or operator to describe how compliance with the requirements of § 1619.2(c)(5) was verified and who made that determination.

Citation Policy

- b. § 1619.2(c)(5): When requirements of § 1619.2(c)(5) have not been met, consider citations of its specific provisions.

JJ. § 1619.3 Floating Cranes/Derricks and Land Cranes/Derricks on Barges Supplemental Requirements

The requirements of this section primarily address the safety of the methods of flotation that are used to support a crane. The other sections of Article 15 cover the crane and where referenced in this section may be replaced or supplemented by the requirements of § 1619.3. This section does not apply to barges when the jacks are deployed to the sea, lake, or river bed and the barge is fully supported.

Jacks and Spuds

Jacks are long steel members that hold a floating vessel rigidly to a specific location relative to the sea bed.

Spuds are long steel members that prevent a floating vessel from moving in a specific direction. Unlike a vessel on jacks, one restrained by studs remains floating on the water.



Barge with cranes held aloft on jacks.

Photo credit: Wikipedia commons, Author: Dbrouse.

http://en.wikipedia.org/wiki/File:NewCarissa_dismantled_by_KarlissaA_and_B_July_2008_panorama_merge.jpg

Section 1619.3 is divided into three parts.

- Paragraphs (a) through (k) of § 1619.3 apply to both cranes and derricks unless otherwise specified.

- Paragraph (m) of § 1619.3 applies only to floating cranes/derricks.
- Paragraph (n) of § 1619.3 applies only to land cranes/derricks on barges, pontoons, vessels, or other means of flotation.

1. General Requirements that Apply to both Cranes on Barges and Floating Cranes.

Inspection Guidance

- a. By observation, through interviews, and/or a review of its operations procedures/related documents, determine whether the crane is a floating crane/derrick or a land crane/derrick used on a barge. Making this distinction is necessary because there are requirements of § 1619.3 that are specific to only floating crane/derrick or to only land crane/derrick on a barge, pontoon, vessel or other means of flotation.

Waterway Jurisdiction

Cal/OSHA's jurisdiction over work activities performed over water depends on several factors, including the location of the vessel/barge. For further guidance regarding jurisdictional issues, consult the Senior Safety Engineer Regional.

- b. When possible, observe the hoisting operation, documenting and taking video/pictures of the instances and conditions when there are any indications that the safety of the operation may be compromised due to the lack of buoyancy and instability of the means of flotation. For example, when it is evident during the hoisting operation that equipment may be overloaded or the means of flotation appears to be taking on water, listing badly, or sitting hazardously low in the water.
- c. When there are concerns about the safety of the means of flotation or the hoisting operation being performed, ask for and review (with the assistance of a Regional Senior Safety Engineer, if needed) any information available from the employer regarding any hazardous condition observed. Interview the employer, operator, and lift director (if any) to confirm that required equipment specifications were developed by the manufacturer or a qualified person and have been made available by the employer. If necessary and possible, contact the manufacturer or the qualified individual to discuss any concerns about the observed conditions.
- d. Inspect the area on the barge/means of flotation for hazardous areas in which a person can be struck, pinched, or crushed when the equipment is operated and are demarcated by one of the methods allowed under § 1619.3(c), Work Area Control. If one of the options allowed for work area control has been implemented, verify and document which option the employer selected.

A qualified person (floating cranes/derricks) is a qualified person whose expertise is with the respect to vessel/flotation devices.

Note: Due to the limited space available for equipment on the decks of barges and other means of flotation, the requirements of § 1616.4, Keeping Clear of the Load, do not apply to hoisting jobs performed with equipment covered by § 1619.3.

- e. Through interviews and observation of hoisting activities performed by employees, verify that employees were trained to understand the struck-by, crush/pinch-by hazards and the methods used to demarcate those areas.
- f. Ask for and review any required documentation of inspections to verify that the inspections were conducted and documented in accord with § 1619.3(h).

Purpose of § 1619.3(h)

Inspections required by § 1619.3(h) ensure the safety of the means of attachment and flotation for floating cranes/derricks or land cranes/derricks on barges or other means of flotation. The inspection requirements of § 1619.3(h) are supplemental to those of § 1613.1, which ensure the safety of the crane/derrick and the hoisting activity performed. Mating a crane to a new method of flotation does not automatically trigger the need for a new four year inspection of the flotation device.

- g. Every four years, the internal portion of the barge, pontoons, vessels, or other means of flotation must be surveyed for deficiencies by a:
 - marine engineer;
 - marine architect;
 - licensed surveyor; or
 - other qualified persons who has expertise with respect to vessels/flotation devices.

Through interviews and review of the inspection records, verify the qualifications of the individual who conducted the required four-year inspection.

Four-Year Inspection Start Dates

One four year inspection must be conducted before November 10, 2014 unless the floating crane/derrick or land crane on a barge or other means of flotation was first put into service after November, 8, 2010. Under such circumstances, at least one four year inspection of that equipment must be conducted four years from the date the equipment was put into service after.

- h. During inspection record reviews, look for descriptions in the required documents of any apparent deficiencies monitored during annual inspections or observed during the four-year inspection. Verify via the document review and interviews that the safety of the apparent deficiencies was evaluated by the surveyor or other qualified persons specified in § 1619.3(h)(5)(A).

- i. If a deficiency is observed in one of the requirements listed in § 1619.3(h)(2), and the vessel is still in service, interview the employer, operator, maintenance personnel, or inspector (if available) to determine if a competent person considered the safety implications of the deficiency.

If a competent person has made a determination, confirm the identity of the competent person and obtain and document a description of the reasons why the deficiency was not a safety hazard.

This information only has to be documented by the employer when the competent person has determined that the deficiency must be tracked on the monthly inspection records. If the employer has documented this information, obtain a copy of it and review it to confirm the employer's compliance with § 1619.3(h)(3).

- j. Through interviews, visual inspection of the crane/derrick, review of inspection records, and observation of hoisting activities:
 - verify that required safety devices are on the equipment and function properly. If necessary, ask the operator to show where the devices are located on the equipment.
 - verify that required operational aids are on the equipment and function properly. If necessary, ask the operator to show where the aids are located on the equipment, noting that:
 - Load weighing devices are not required when dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket, and pile-driving work is performed with this equipment.
 - Anti two-blocking devices are only required when personnel are hoisted or loads are hoisted over an occupied cofferdam or shaft. Document when personnel are hoisted or when loads are hoisted over a cofferdam or shaft.
- k. Observe the jobsite and worksite activities to determine whether the work performed is likely to require the use of a diver and crane/derrick. If so, interview the employer and operator to confirm whether or not a diver has or is being used to perform the job. If a diver is being used at the time of the compliance inspection, observe operations to verify the employer's compliance with the requirements of Title 8 CCR Subchapter 7, Articles 152 and 153. For example, note and document:
 - when the diver is in the water;
 - where the operator is and what he or she is doing when the diver is in the water;
 - whether the operator has a clear line of sight to the diver, and whether a tender was used;
 - any other jobs performed by the crane/derrick when working with a diver;

- who is giving the operator signals and how those signals are being communicated; and
 - how much the crane/derrick is allowed to move around on its means of flotation.
- l. Determine if the crane/derrick has a cab and verify that the procedures for operation of the equipment, including operating speed, load charts, etc., have been made accessible to the operator in accord with § 1616.1 (with a cab) or § 1619.3(g) (without a cab). If necessary, have the operator or employer show you where the procedures are located.

Citation Policy

- m. § 1619.3(c) through (k): Unless specified otherwise under this Citation Policy section, when requirements of § 1619.3(b) through (k) have not been met, consider citations of the specific requirements.
- n. § 1619.3(a): This paragraph should not be cited as it is only informational and clarifies the scope of Article 15's requirements as they pertain to floating crane/derricks or land cranes/derricks on barges or other means of flotation.
- o. § 1619.3(b): Paragraph (b) of § 1619.3 should not be cited because it is only informational and clarifies that §§ 1619.3(c) through (k) apply to both floating crane/derricks or land cranes/derricks on barges or other means of flotation.
- p. § 1619.3(c): When the employer:
 - did not meet the requirements of § 1616.3, Work Area Control, consider citations of applicable requirements of § 1616.3. Section 1619.3(c)(1) only references the requirements of § 1616.3. Therefore, § 1619.3(c)(1) should not be cited for these violations.
 - has not met the requirements of one of the two options for work area control specified by § 1619.3(c)(2), consider a citation of § 1619.3(c)(2). (i.e., used control lines, warning lines, barriers, or a combination of warning signs and markings)

The AVD should specify how the employer's implementation of the applicable provisions of paragraph § 1619.3(c)(2) were deficient.

- q. § 1619.3(d): Paragraph (d) of § 1619.3 should not be cited as it only informs the employer that § 1616.4 does not apply to floating crane/derricks or land cranes/derricks on barges or other means of flotation.
- s. § 1619.3(e): If a device (or devices) required by § 1619.3(e) was:
 - missing from the equipment, consider citations for violations of applicable provisions of §§ 1619.3(e)(1) through (e)(3).
 - not working properly, consider a citation of § 1615.1(b).

t. § 1619.3(f): When the equipment was operated without:

- operational aids required by §§ 1619.3(f)(1) and (f)(2), consider a citation of § 1615.2(a).
- an operational aid required by § 1619.3(f) that was not functioning and no temporary alternative measure was implemented, consider a citation of § 1615.2(b).

Note: For citations of §§ 1615.2(a) and (b), refer to § 1615.2, Operational Aids, in this directive for additional guidance.

- The AVD of the citation should list the specific missing or nonfunctioning operational aid(s) noted in paragraphs (f) of § 1619.3.
- If a temporary alternative measure has been established, but not implemented correctly, the AVD should describe the temporary alternative measure that the employer attempted to use and explain why it was inadequate.

Even if multiple operational aids on one piece of equipment are not on the equipment or are not functioning, only one citation should be issued for § 1615.2(a). §1619.3(g).

u. When the equipment:

- has a cab and the operating procedures and load charts are not readily available in the cab at all times, consider a citation of § 1616.1(c). Section 1619.3(g) shall not be cited when the crane/derrick has a cab.
- has no cab, and the operating procedures are not readily available on board the vessel or the load charts are not posted at the operator's station, or on the equipment if the operator's station is moveable, consider citations of applicable provisions of § 1619.3(g).

v. § 1619.3(h): When required inspections of means of flotation and crane/derrick attachment:

- have not been conducted or were not conducted by a competent or qualified person as specified by 1613.1, consider citations of specific provisions of § 1613.1.
- have been conducted but apparent deficiencies exist in the items that must be inspected in accord with § 1613.1, consider citations of specific inspection provisions of § 1613.1.
- have been conducted but apparent deficiencies exist in the supplemental items regarding the means of flotation and crane/derrick attachment that must be inspected, consider citations of specific inspection provisions of § 1619.3.
- have not been documented or made available in accord with applicable inspection provisions of § 1613.1, consider citations of § 1619.3, and the AVD of the citation should describe the provisions of § 1613.1 that were violated.

w. § 1619.3(k): When a means of flotation is used

- within the manufacturer's specifications and limitations to support equipment covered by Article 15 and the means of flotation cannot withstand environmental, operational, and transit loads at worksite consider a citation for § 1619.3(k)(1).
- to support equipment covered by Article 15 and the manufacturer's specifications or limitations are exceeded for environmental, operational, and in-transit loads, consider a citation for § 1619.3(k)(2).
- to support equipment covered by Article 15, the specifications or limitations (unavailable from the manufacturer but developed by a qualified person) are exceeded for environmental, operational, and in-transit loads, consider a citation for § 1619.3(k)(3).

2. § 1619.3(m): Requirements that are Specific to Floating Cranes and Derricks

The requirements of § 1619.3(m) are applicable to the use of equipment designed by the manufacturer or employer for marine use only by permanent attachment to its means of flotation.

Inspection Guidance

- a. Through interviews, visual inspections of the floating equipment, and review of any available information from the manufacturer or employer, determine whether the crane/derrick is permanently attached to its means of flotation.
- b. Ask to see the manufacturer's load chart to verify the availability of the information and that the chart includes considerations for minimum wind speeds.
- c. If the equipment is employer made, obtain the documents required by § 1619.3(m)(4) (i.e., load charts, maximum allowable list and trim, and equipment stability verification) that ensures compliance with paragraphs (m)(1) through (m)(3) of § 1619.3. Verify that the documentation was signed by a registered professional engineer with respect to the design of that type of floating equipment.
- d. When the observed design and structural integrity of the means of flotation are questionable, ask the employer to provide any information available to verify compliance with the requirements of § 1619.3(m)(5) such as any available equipment design or relevant maintenance manuals. If necessary, the manufacturer or Regional Maritime Coordinator may need to be consulted.

Citation Policy

- e. § 1619.3(m): When equipment covered by Article 15 is designed to be permanently attached to its means of flotation by the manufacturer or employer and the employer did not meet the requirements of § 1619.3(m), consider citations of the applicable provisions of § 1619.3(m).

3. § 1619.3(n): Requirements that are Specific to Land Cranes/Derricks Used on Barges, Pontoons,

Vessels, or Other Means of Flotation.

The requirements of § 1619.3(n) are applicable to the use of land cranes/derricks used on a means of flotation. This section:

- requires the modification of load charts to account for maritime conditions and reduction in the lifting capacity of the equipment;
- specifies limits for the leveling of the land crane/derrick and its means of flotation; and
- specifies four options for securing/attaching the land crane/derrick to its means of flotation.

Inspection Guidance

- a. Through interviews, visual inspection of the floating equipment, and review of any available information from the manufacturer or employer:
 - determine if the floating equipment is a mobile auxiliary crane or a land crane/derrick that is not permanently attached to its means of flotation. Confirm this determination during interviews with individuals such as the employer, operator, maintenance personnel, or equipment inspectors (if available).
 - verify that the rated capacity was modified by a qualified person to address the maritime factors specified in §§ 1619.3(n)(1) and (n)(2) and its availability on the equipment.
 - verify that the employer meets the list/trim and buoyancy requirements specified in §§ 1619.3(n)(3) and (4).
 - verify the employer's compliance with § 1619.3(n)(5). For example, ask the employer or operator to describe how the land crane is physically attached to its means of flotation and use the documentation and interviews to verify this information. If necessary, when the means of attachment are in question, contact the Regional Maritime Coordinator.
 - verify that the employer has documented an alternate attachment plan and can demonstrate that the means of physically attaching an auxiliary crane to its means of flotation meets the requirements of § 1619.3(n)(6). Only under those circumstances are the requirements of § 1619.3(n)(4), Physical attachment, not required for the use of an auxiliary crane on a means of flotation.
 - verify that the means of attachment allowed by §§ 1619.3(n)(5) and (n)(6) were designed by a marine engineer, a registered professional engineer, or qualified person familiar with the floating equipment's design.
- b. When there are concerns about the structural sufficiency of the means of flotation due to an incident that is observed or reported, or if an apparent deficiency is observed, it may be necessary to contact the Regional Maritime Coordinator for assistance, or (if possible) the marine engineer/registered professional engineer who designed the attachment system.

Citation Policy

- c. § 1619.3(n): Unless otherwise specified in the citation policy of this section, when requirements of § 1619.3(n) are not met, consider citations of the specific requirements of § 1619.3(n).
- d. § 1619.3(n)(1)(C): When a land crane/derrick is used on a means of flotation and the employer did not meet the requirements of § 1619.3(n)(3) through (n)(4), consider a citation for § 1619.3(n)(1)(C) Describe in the AVD the provisions of § 1619.3(n)(3) and (n)(4) that were not met.
- e. § 1619.3(n)(5): Consider a citation of § 1619.3(n)(5) when the railing, cabling, corraling, or attachment system used to secure a land crane/derrick on its means of flotation does not meet the requirements of one of the options described in § 1619.3(n)(5)(A) through (n)(5)(D) or the exception provided under § 1619.3(n)(6), for floating auxiliary cranes.

If the employer attempted to use one of the options or the exception allowed under § 1619.3(n)(5) but there was some deficiency in its implementation, the AVD of the citation must describe the option implemented and how it was deficient.

- f. § 1619.3(n)(5)(E): When the employer attempted to use one of the options or the exception allowed under § 1619.3(n)(5), and there was some deficiency in its implementation, or the option was not developed by a marine engineer/registered professional engineer, consider citing § 1619.3(n)(5).
- g. § 1619.3(n)(6): When an auxiliary crane is used on the deck of a floating crane/derrick and the employer cannot demonstrate implementation of a plan and procedures that meet the requirements of § 1619.3(n)(6), consider a citation for § 1619.3(n)(5).

If an employer made efforts to meet the requirements of § 1619.3(n)(6) but there was some deficiency in its implementation, the AVD for the violation of § 1619.3(n)(5) must describe the provisions under § 1619.3(n)(6) that the employer failed to satisfy.

KK. § 1619.4 Overhead and Gantry Cranes

This section clarifies what standards apply to overhead and gantry cranes used in construction. Overhead and gantry cranes have requirements based on the type of installation.

- 1. § 1619.4(a): Permanently Installed Overhead and Gantry Cranes.

Article 15 does not apply to permanently installed overhead and gantry cranes used in construction. Instead, the substantive requirements of Title 8 CCR Subchapter 7, Article 92 (Cranes (Except Boom-type Mobile Cranes)) apply.

Inspection Guidance

Overhead and gantry cranes: This term includes overhead/bridge cranes, semigantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels or other means.

- a. First, determine whether an overhead or gantry crane is permanently installed as part of the facility. Permanently installed overhead and gantry cranes are considered an irremovable part of the property and are primarily used in general industry but may, in rare situations, be used for construction activities. They are generally not easy to assemble or disassemble and are usually physically fastened to a building.

On the other hand, most overhead and gantry cranes used for construction activities are not permanently installed. They tend to be easier to assemble or disassemble. For example, if an employer merely attaches the base of a gantry crane to a concrete slab for use in constructing the building, it is not permanently installed.

When the overhead or gantry crane is permanently installed, refer to Title 8 CCR Subchapter 7, Article 92 and the interpretative materials on that standard for guidance and citation policy.

Citation Policy

- b. Title 8 CCR Subchapter 7, Article 92 and 1619.4(a): If an employer fails to satisfy the requirements of Title 8 CCR Subchapter 7, Article 92 in a construction operation involving a permanently installed overhead or gantry crane, consider a citation under the applicable provision(s) of that standard. Group each applicable citation for a violation of Title 8 CCR Subchapter 7, Article 92 with a citation for § 1619.4(a).
2. § 1619.4(b): Overhead and Gantry Cranes That Are Not Permanently Installed in a Facility

For overhead and gantry cranes used in construction not permanently installed in a facility, § 1619.4(b) lists the applicable requirements from Article 15, § Title 8 CCR Subchapter 7, Article 92, and ASME standards incorporated by reference.

- § 1619.4(b)(2)(A): All sections of Article 15 apply, except: § 1615.1 (Safety devices), § 1615.2 (Operational aids), § 1616.5 (a) through(c) (Free fall and controlled load lowering), § 1619.1 (Tower cranes), § 1619.2 (Derricks), 1694 (Sideboom cranes).
- § 1619.4(b)(2)(B): This section specifies the portions of § Title 8 CCR Subchapter 7, Article 92 applicable to non-permanently installed overhead and gantry cranes (see § 1619.4(b)(2)(B) for a list of applicable sections), and modifies some of those requirements. Title 8 CCR Subchapter 7, Article 92 which incorporates by reference design and construction requirements for overhead and gantry cranes from ANSI B30.2.0-1967, applies only to equipment manufactured before September 28, 1986.
- § 1619.4(b)(2)(C)2.: Several sections of ASME B30.2-2005 apply to equipment manufactured on or after July 7, 2011 (see § 1619.4(b)(2)(C)2. for a list of applicable sections). These ASME sections discuss foundations and anchorages, crane runways, welded construction of cranes, service platforms, bumpers, rail sweeps, hoist control braking, lifting magnets, drums, ropes, hooks, and warning devices.

Inspection Guidance

- a. If the employer is using a non-permanently installed overhead or gantry crane, verify the equipment's date of manufacture to determine whether Title 8 CCR Subchapter 7, Article 92 or the ASME provisions listed in § 1619.4(b)(2)(C) applies. Ask to examine any documentation the employer has that includes the equipment's date of manufacture.
- b. Refer to the applicable sections in this directive, Title 8 CCR Subchapter 7, Article 92 and available guidance, and if applicable, incorporated ASME provisions for guidance on whether the standards applicable to non-permanently installed overhead and gantry cranes have been met.

Citation Policy

- c. Article 15: If the employer violates a Article 15 standard applicable to non-permanently installed overhead and gantry cranes, consider a citation under the applicable provision of that standard.
- d. Title 8 CCR Subchapter 7, Article 92 and 1619.4(b)(2)(B): If the employer violates Title 8 CCR Subchapter 7, Article 92 as incorporated by § 1619.4(b)(2)(B) in a construction operation, consider a citation under the applicable provision of Title 8 CCR Subchapter 7, Article 92. Group each applicable citation for a violation of Title 8 CCR Subchapter 7, Article 92 with a citation for § 1619.4(b)(2)(B)
- e. 1619.4(b)(2)(C)1: If the employer violates the ANSI B30.2.0-1967 requirements incorporated by reference in Title 8 CCR Subchapter 7, Section 4884 in a construction operation involving a non-permanently installed overhead or gantry crane manufactured before September 28, 1986, consider a citation under § 4884. Group each applicable citation for a violation of 4884 with a citation for § 1619.4(b)(2)(C)1. List the applicable ANSI provision(s) violated in the AVD.
- f. § 1619.4(b)(2)(C)2.: Consider a citation under § 1619.4(b)(2)(C) if the employer has violated one of the ASME standards incorporated by reference in this standard. List the specific ASME provision(s) violated in the AVD.

LL. § 1619.5 Dedicated pile drivers—Supplemental Requirements

Dedicated pile drivers are included in the list of specific equipment covered by Article 15 in § 1610.1(a), even though pile drivers are not always traditional cranes. Pile drivers were included in Article 15 due to certain mechanical similarities that present hazards similar to those associated with traditional cranes. In addition to the requirements of Article 15, pile-driving equipment continues to be covered by CISO Article 12(Pile driving equipment) in cases where the equipment in question is not designed to function exclusively as a pile driver. Note that vibratory pile drivers are not dedicated as they can be used to extract piles.

Dedicated pile driver: a machine that is designed to function exclusively as a pile driver. These machines typically have the ability to both hoist the material that will be pile-driven and to pile drive that material. Dedicated pile drivers include, but are not limited to, hydraulic and diesel hammers, post pounders, and other similar equipment. § 1610.3.

1. § 1619.5(a): Section 1619.5 addresses the supplemental requirements for dedicated pile drivers, as defined in § 1610.3. All sections in Article 15 apply to dedicated pile drivers except those exempted in §§ 1619.5(b) through (d).

Inspection Guidance

- a. Request documentation such as the manufacturer's specifications or operating manual to determine whether the equipment is designed to function exclusively as a pile driver. If the equipment is a dedicated pile driver, only consider citations for violations under the applicable provisions of Article 15. If the equipment has other uses, including, but not limited to continuous flight augering or drilling, then only violations of the applicable provisions of CISO Article 12, should be considered.

Citation Policy

- b. Where there is a failure to meet requirements under Article 15 in operations involving a dedicated pile driver, consider citations under the specific section or sections violated, but do not cite to § 1619.5(a).
2. § 1619.5(b): This section exempts requirements under § 1615.2(d)(3) (Anti two-blocking device).

Citation Policy

- a. § 1615.2: In operations involving a dedicated pile driver, if there is a failure to meet requirements under § 1615.2 other than § 1615.2(d)(3), cite to the specific section or sections violated, but not § 1619.5(b), except as provided below in the citation policy for § 1619.5(c).
3. § 1619.5(c): This section limits requirements under § 1615.2(e)(4) (load weighing and similar devices) to dedicated pile drivers manufactured after November 8, 2011.

Section 1615.2 contains the requirements for operational aids which are required on equipment covered by Article 15. Section 1615.2(e)(4) contains requirements for load weighing and similar devices for equipment manufactured after March 29, 2003 with a rated capacity over 6,000 pounds, and for articulating cranes manufactured after November 8, 2011. The requirements of § 1615.2(e)(4) are therefore only applicable to dedicated pile drivers with a rated capacity over 6,000 pounds manufactured after July 7, 2012. See the Safety Devices and Operational Aids sections in this directive for additional guidance regarding citations of § 1615.2(e)(4).

Inspection Guidance

- a. If the employer is using a dedicated pile driver, verify the date of manufacture for the equipment and the rated capacity. Ask the employer for any documentation which includes this information.
- b. For dedicated pile drivers manufactured after July 7, 2012 with a rated capacity over 6,000 pounds, determine whether the equipment has at least one of the devices required by § 1615.2(e)(4) (load weighing device, load moment (or rated capacity) indicator, or load

moment (or rated capacity) limiter), or whether a temporary alternative measure is properly in place consistent with § 1615.2(b) and (e).

Citation Policy

- c. § 1619.5(c): For dedicated pile drivers manufactured on or before November 8, 2011, citations should not be issued for failure to meet the requirements under § 1615.2 related to the equipment required in § 1615.2(e)(4). For dedicated pile drivers manufactured after July 7, 2012, consider a citation grouping § 1619.5(c) with:
- § 1615.2(a) for failure to have the operational aid required in § 1615.2(e)(4);
 - § 1615.2(b) for operating the equipment when the equipment required in § 1615.2(e)(4) is not functioning properly and a temporary alternative measure is not in place; or
 - § 1615.2(a) or (b) and § 1615.2(e) for failing to replace non-functioning or missing equipment in § 1615.2(e)(4) as required by § 1615.2(e) within the 30 calendar day time frame.

When grouping citations, consider the most specific applicable provision or provisions in § 1615.2 with § 1619.5(c). Review and apply the citation policy provided in the Safety Devices and Operational Aids sections in this directive for additional guidance regarding citations for the requirements of § 1615.2.

4. § 1619.5(d): This section exempts requirements under § 1610.4 (design, construction, and testing), except §§ 1610.4(d) and (e).

Citation Policy

- a. § 1610.4(d) and (e): In operations involving a dedicated pile driver, when considering a citation for failure to meet requirements under §§ 1610.4(d) and (e), cite to the specific section or sections violated, but not to § 1619.5(d). Citations should not be issued for operations involving a dedicated pile driver for non-compliance with other requirements in §1610.4.

MM. § 1694 Sideboom Cranes—Supplemental Requirements

1. § 1694(b): Section 1694 addresses the supplemental requirements for sideboom cranes, as defined in § 1610.3. All sections in Article 15 apply to sideboom cranes except for § 1610.5 (Ground conditions), § 1615.1 (Safety devices), §1615.2(a)(2)(A) (Operational aids), and § 1618.1 (Operator qualification and certification).

Sideboom Crane: a track-type or wheel-type tractor having a boom mounted on the side of the tractor, used for lifting, lowering or transporting a load suspended on the load hook. The boom or hook can be lifted or lowered in a vertical direction only.

The limited requirements for sideboom cranes in Article 15, compared to the requirements for other types of cranes, reflect the specific construction and limited functions of a sideboom crane. Sideboom cranes are limited in capacity and require relatively simple operation.

Inspection Guidance

- a. Although operators do not have to be certified under § 1618.1, they must be certified in accordance with 5006.1 and trained in accordance with § 1618.4(c), and operator qualification requirements under ASME B30.14-2004, section 14-3.1.2 incorporated by § 1694(c)(10). If there are doubts about the operator's qualifications, verify that the operator satisfies the requirements of B30.14-2004 §14-3.1.2.

Citation Policy

- b. When considering a citation for failure to meet requirements under Article 15 in operations involving a sideboom crane, consider citations under the specific section or sections violated, but not under § 1694(b).
5. § 1694(c): Section 1616.5 (Free fall and controlled load lowering) applies to sideboom cranes, except that the requirements of § 1616.5(a)(2)(A) are excluded, and sideboom cranes in which the boom is designed to free fall (i.e., live booms) are only permitted if they were manufactured before November 8, 2010. The prohibition in § 1616.5(a)(2)(A) applies to equipment manufactured on or after October 31, 1984. See the Free Fall of the Boom and Controlled Load Lowering section in this directive for additional inspection guidance regarding citations for requirements under § 1616.5.

Inspection Guidance

- a. If the employer is using a sideboom crane with a boom that is designed to free fall, verify the date of manufacture for the equipment. Ask the employer to examine any documentation which includes this information.

Citation Policy

- b. § 1616.5(b) and § 1694(c): If the employer is using a sideboom crane that is designed to free fall that is manufactured after November 8, 2010, and the employer has not satisfied one or more of the requirements listed in §§ 1616.5(b)(1) through (4), consider a citation. Because § 1694(b) replaces the requirements of § 1616.5(a)(2)(A), § 1694(c) and the requirement in §§ 1616.5(b)(1) through (4) that was violated should be grouped. Cite to the most specific applicable provision in §§ 1616.5(b)(1) through (4).

If an employer is using a sideboom crane manufactured prior to July 7, 2012 and none of the circumstances described in § 1616.5(a)(1) are present, do not cite §§ 1616.5(b)(1) through (4)

Review and apply the citation policy provided in the Free Fall of the Boom and Controlled Load Lowering section in this directive for additional inspection guidance regarding citations for requirements under § 1616.5.

3. § 1694(c): Sideboom cranes mounted on wheel or crawler tractors must also meet the requirements of ASME B30.14-2004 listed at § 1694(c).

Inspection Guidance

- a. To evaluate compliance with this provision, consult ASME B30.14-2004 standards and applicable guidance materials.

Citation Policy

- b. § 1694(d): Consider a citation for violation of this section if the employer has not complied with one of the applicable ASME requirements incorporated in this standard. When considering a citation, cite to the provision or provisions in §§ 1694(d)(1) through (12) containing the most specific applicable requirements. For example, for a violation of an incorporated ASME standard in ASME 14-1.7.6, General Requirements—Clutch and Brake Protection, which is incorporated at § 1694(c)(8), cite the employer for a violation of § 1694(d)(8). List the specific ASME provision or provisions violated in the AVD.

Each provision in §§ 1694(d)(1) through (12) incorporates a section or portion of a section of ASME provisions. It is possible that the employer may have violated multiple provisions within one of these incorporated ASME sections. If so, consider only one citation, under the provision of § 1694(d)(1) through (12) which incorporates the violated ASME section, but list each ASME provision that the employer violated in the AVD.

If the employer has violated ASME provisions under different ASME sections that are incorporated into §§ 1694(d)(1) through (12) under different standards, consider citations for each standard. For example, for a violation of ASME standard 14-1.7.6, General Requirements—Clutch and Brake Protection which is incorporated at § 1694(d)(8), and a violation of ASME standard 14-3.1.3, Operator Qualifications, which is incorporated at § 1694(d)(10), consider citations of § 1694(d)(8) and § 1694(d)(10).

NN. § 1610.8. Equipment With a Rated Hoisting/Lifting Capacity of 2,000 Pounds or Less

This section specifies the requirements for employers using equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less. These provisions cover equipment that is designed and built by the employer, as well as manufactured equipment.

1. § 1610.8(a): Section 1610.8(a) lists the other sections in Article 15 which apply to this equipment. All sections of Article 15 apply, except:
 - § 1611.2 (Assembly/Disassembly – General requirements)
 - § 1611.3 (Assembly/Disassembly – Additional requirements for dismantling of booms and jibs)
 - § 1613.1 (Inspections)- The employer must only comply with (c): post assembly inspection.
 - § 1615.1 (Safety devices)
 - § 1615.2 (Operational aids)

- § 1616.1 (Operation)
- § 1616.3 (Work area control)
- § 1616.4(c)(3) (Qualified rigger)
- § 1618.1 (Operator qualification and certification)
- § 1618.2 (Signal person qualifications)
- § 1618.3 (Qualification of maintenance and repair employees)
- § 1618.4 (Training)
- § 1616.6 (Hoisting personnel)
- § 1610.4 (Design, construction and testing)
- § 1619.5 (Dedicated pile drivers)
- § 1694 (Sideboom cranes)

Inspection Guidance

- a. Before proceeding with an inspection related to these provisions, determine the rated capacity of the crane/derrick. Request documentation, such as a manufacturer's manual, to verify the capacity. Ensure that any load charts are consistent with this capacity. If the crane or derrick has a rated capacity of 2,000 pounds or less, the requirements of § 1610.8 apply, as well as the sections of Article 15 listed in § 1610.8(a).
- b. Refer to the applicable sections in this directive for guidance on whether the standards applicable to this equipment, listed in § 1610.8(a), have been met.

Citation Policy

- c. Article 15: For the Article 15 provisions listed in § 1610.8(a) that are applicable to equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less, when the provisions are not met, consider citations under the provision within that standard containing the most specific applicable requirement.
2. § 1610.8(b): This section contains requirements for assembly and disassembly of equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less. Under § 1610.8(b)(1), employers must comply with the requirements of § 1610.8(b)(2) through (3) in addition to the requirements of § 1611.1, Assembly/disassembly—selection of manufacturer or employer procedures and § 1611.4, Assembly/disassembly—employer procedures. See the applicable sections of this directive for additional guidance regarding citations for violations of

requirements of § 1611.1 and § 1611.4. Under § 1610.8(b)(2), election of components and configuration of equipment which affect the capacity or safe operation of the equipment must comply with one of the following:

- manufacturer's instructions, recommendations, limitations and specifications;
- if the manufacturer's instructions are unavailable, the written approval of an RPE who is familiar with the type of equipment; or
- the equipment modification requirements of § 1610.6. See Inspection Guidance and Citation Policy provided in the Modifications section in this directive for additional guidance regarding violations of requirements of § 1610.6.
- In addition, a post-assembly inspection must be completed after an assembly in accordance with the requirements of § 1613.1(c) § 1610.8(b)(2)(B). See inspection guidance and citation policy for § 1613.1(c) in this directive for additional guidance regarding citations under § 1613.1(c).

Finally, under § 1610.8(b)(3), the employer must also comply with any manufacturer prohibitions during assembly and disassembly.

Inspection Guidance

- a. Determine what instructions or approval processes were followed during assembly in the selection of components and the configuration of the equipment.
- b. Request manufacturer instructions and other written material from the manufacturer. Determine whether the employer complied with the instructions and prohibitions listed in these documents.
- c. Verify by interview with the employer, operator, and other personnel that manufacturer prohibitions were complied with during the assembly or disassembly.
- d. If an RPE gave written approval for the selection of components or configuration of the equipment, interview personnel to determine whether manufacturer instructions were available. This can include physical written instructions or instructions accessible electronically through use of an on-site computer. If the instructions were unavailable, ask why.
- e. When the manufacturer's instructions, recommendations, limitations, and specifications are unavailable:
 - Request to review the written RPE approval and examine the documentation for consistency with the components and/or configuration.
 - If possible, verify the RPE's credentials. Interview the employer, operator, or if possible, the RPE to verify whether the RPE was familiar with the equipment.

- f. If the employer followed the modification requirements of § 1610.6, determine whether those requirements were followed.
- Ensure that written approval was obtained from the manufacturer or an RPE who is a qualified person with respect to the equipment involved, consistent with § 1610.6.
 - Ensure that load chart procedures, instruction manuals, and instruction plates/tags/decals are revised as necessary in accord with any modification.
- g. Determine whether a post-assembly inspection was conducted and whether the inspection requirements of § 1613.1(c) for a post-assembly inspection have been met. Request documentation of the inspection.
- If it appears that the manufacturer's or RPE's instructions under § 1610.6(a) have not been complied with, ask the employer whether those aspects were inspected, and if so, why they were not followed.
 - Refer to §§ 1613.1-1613.9, Inspections, in this directive for guidance related to the requirements of § 1613.3(a).

Citation Policy

- h. § 1611.1 and § 1611.4: When considering a citation under § 1611.1 or § 1611.4 for equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less, consider citations under the provision or provisions within that standard containing the most specific applicable requirements. Do not cite § 1610.8(b)(1). Noncompliance under § 1610.8(b)(2) through (3) should be cited under those standards as discussed below.
- i. § 1610.8(b)(2)(A): Consider a citation for violation of § 1610.8(b)(2)(A) if the selection of components or configuration of equipment violates both § 1610.8(b)(2)(A)1. and § 1610.8(b)(2)(A)2.
- If this is a modification which did not satisfy the requirements of § 1610.6 (Modifications) incorporated by § 1610.8(b)(2)(A)2., consider a citation which groups the violation under § 1610.6 with § 1610.8(b)(2)(A).
- j. § 1613.1(c) and § 1610.8(b)(2)(B): Consider a citation grouping § 1613.1(c) (Post-assembly inspection) and § 1610.8(b)(2)(B) if the employer failed to complete a post-assembly inspection at all or failed during that inspection to ensure compliance with § 1610.6(b)(2)(A).
- k. § 1613.1(c): If the employer completed a post-assembly inspection that ensured compliance with § 1610.6(b)(2)(A), but that inspection did not satisfy specific inspection requirements under § 1613.1(c), consider a citation of the provision within § 1613.1(c) containing the most specific requirements that the employer failed to satisfy. Do not consider a citation under § 1610.8(b)(2)(B) in this situation.

1. § 1610.8(b)(3): Consider a citation of this standard if the employer failed to comply with applicable manufacturer prohibitions. List the prohibitions which the employer failed to comply with in the AVD.

3. § 1610.8(c)(1-2): Section 1610.8(c) contains requirements for operation of equipment with a maximum capacity of 2,000 pounds or less. Under § 1610.8(c)(1), the employer must comply with all manufacturer procedures, including procedures for use with attachments. If the manufacturer's procedures are not available, the employer must develop procedures in accord with the requirements in § 1610.8(c)(2)(A) through (C):
 - The employer must develop and ensure compliance with all procedures necessary for safe operation.
 - The procedures must be developed by a qualified person.
 - Employer-developed capacity procedures must be signed by an RPE familiar with the equipment.

Inspection Guidance

- a. Determine what operating procedures, if any, the employer is following. If the operating procedures are employer-developed, determine why the employer did not use manufacturer's operating procedures or whether these were unavailable.
- b. Read the procedures and determine by observation and interview whether operations appear consistent with these procedures. If procedures are not in writing, ask the employer and/or operator to explain what the operating procedures are.
- c. Verify that the operator understands the procedures to be followed and that the employer is enforcing these procedures.
- d. If the operating procedures were developed by the employer, rather than the manufacturer, determine:
 - who was responsible for developing the operating procedures;
 - who was responsible for developing the procedures for operational controls;
 - what were that person's qualifications, experience, and authority;
 - whether that person meets the definition of a qualified person;
 - whether procedures related to capacity are in writing and signed by an RPE; and
 - whether the RPE was familiar with the equipment and what the RPE's experience was. If possible, verify the RPE's credentials.

Citation Policy

- e. § 1610.8(c)(1): Consider a citation of this standard if the employer is not following the manufacturer's operating procedures. This includes circumstances in which the employer is following employer-developed operating procedures, even though the manufacturer's operating procedures are available.
- f. § 1610.8(c)(2): If the manufacturer's operating procedures are unavailable and:
 - § 1610.8(c)(2)(i), if the employer has not developed or ensured compliance with all procedures necessary for the safe operation of the equipment or attachments, consider a citation of this provision;
 - § 1610.8(c)(2)(B), if the procedures for operational controls were not developed by a qualified person, consider a citation of this provision; or
 - § 1610.8(c)(2)(C), if the capacity procedures were not developed and signed by an RPE who was familiar with the equipment, consider a citation of this provision.

Consider grouping multiple citations under § 1610.8(c)(2)(A-C) for penalty purposes, where appropriate.

- 4. § 1610.8(c)(3): The employer must ensure that the load chart is available at the control station, and that procedure documents listed in § 1610.8(c)(3)(B) are readily available for the operator's use. If rated capacities are only available electronically, and they become unavailable due to electronic failure, the operator must immediately cease operations or follow safe shut-down procedures until this information is restored.

Inspection Guidance

- a. Verify that the load chart is located at the control station.
- b. Verify that the documentation listed in § 1610.8(c)(3)(B) is readily available to the operator. Use § 1610.8(c)(3)(B) as a checklist, and ask the operator to point out the location of each of the items.
- c. Determine whether rated capacities are available electronically. If electronic failure occurred, determine by observation and interview whether operations were ceased in accord with § 1610.8(c)(3)(B).

Citation Policy

- d. § 1610.8(c)(3)(A): Consider a citation of this provision if the load chart is unavailable or not located at the control station.
 - e. § 1610.8(c)(3)(B): Consider a citation of this provision if any of the documentation listed is unavailable or is not readily available to the operator. Consider only one citation under this
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standard, even if multiple items listed are unavailable or not readily available. Note the specific deficiency in the AVD.

- f. § 1610.8(c)(3)(C): Consider a citation of this provision if rated capacities are only electronically available, they become unavailable because of electronic failure, and the employer fails to cease operations immediately or with safe shut-down procedures, or resumes operations before the rated capacity information is available.
5. § 1610.8(d): This section contains two requirements for safety devices and operational aids on equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less. These provisions apply in place of the requirements of § 1615.1 and 1615.2. Sections 1615.1 and 1615.2 specifically exclude equipment with a capacity of 2,000 pounds or less.
- Under § 1610.8(d)(1), all safety devices and operational aids that are part of the original equipment must be maintained in accordance with the manufacturer's procedures. Note that this requirement applies to anti two-block devices if it is part of the original equipment for equipment manufactured **on or before** November 8, 2011.
 - Equipment manufactured **after** November 8, 2011 must have an anti two-block device meeting the requirements of § 1615.2(d)(3) or must be designed so that if a two-block situation occurs, no damage or load failure will occur. See § 1615.2, Safety Devices and Operational Aids, in this directive for additional guidance regarding the application of § 1615.2(d)(3). Follow the citation policy in this section for anti-two block devices used with equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less.

Inspection Guidance

- a. Review the manufacturer's procedures and determine safety devices must be on the equipment, and whether these devices are being maintained in accord with manufacturer's procedures.
- b. Ask the operator to point out all safety devices that are listed in the manufacturer's procedures.
- c. Verify the date of manufacture for the equipment to determine whether § 1610.8(d)(2) applies. Ask the employer for any documentation which includes this information.
- d. If the equipment is manufactured after November 8, 2011, ask the operator or employer to point out the anti-two block device or to explain what measures are in place to mitigate a two-block situation. Ask for manufacturer documentation and confirm that the device meets the requirements of this section, and, if applicable, § 1615.2(d)(3).

Citation Policy

- e. § 1610.8(d)(1): Consider a citation of this standard if a safety device or operational aid that is part of the equipment is not being maintained in accord with the manufacturer's procedures. The AVD should specify the device or devices which are not being properly maintained.

- f. § 1610.8(d)(2): Consider a citation of this standard if equipment with a maximum capacity of 2,000 pounds or less manufactured after November 8, 2011 has no anti two-block device and is not designed so that if a two-block situation occurred, no damage or load failure would occur.
- g. § 1615.2(d)(3)(A-C) and § 1610.8(d)(2): Consider a citation grouping these standards if equipment with a maximum capacity of 2,000 pounds or less manufactured after November 8, 2011 had an anti two-block device listed under § 1615.2(d)(3), but the device was not working, and the proper temporary alternative measure was not in place, or was in place but it is seven calendar days after the deficiency occurred and the exception in § 1615.2(d) for ordered parts does not apply. Consider a citation grouping § 1610.8(d)(2) with the provision containing the most specific requirements in § 1615.2(d)(3)(A) through (C).
6. § 1610.8(e): This section contains training requirements which apply in place of the requirements of § 1618.1, Operator Qualification and Certification. Under § 1610.8(e), employers must train each operator on the safe operation of the type of equipment being used.

Inspection Guidance

- a. Determine if the operator has been properly trained by the employer.
- Observe operations and interview the operator to see whether the operator has knowledge and understanding of the equipment. For example, ask the operator to demonstrate her or his ability to use the operator's manual, load chart, and other written materials in the cab. Ask questions about the equipment and the functions being performed.
 - Interview the operator to determine whether he or she was trained and what the training included.
 - Ask the employer for the training program for operators. If there is no written program, interview the employer to determine whether the program is adequate to meet the requirements of this section.

Citation Policy

- b. § 1610.8(e): Consider a citation of this standard if the employer did not train each operator on the safe operation of the equipment being used.
7. § 1610.8(f): This section contains training requirements which apply in place of the requirements of § 1618.2, Signal person qualifications. Under § 1610.8(f), employers must train each signal person in proper signal use.

Inspection Guidance

- a. Determine if there are indications that the signal person may not have been properly trained by the employer.

- If operations are ongoing, observe whether the signal person appears to understand how the crane and load will move in response to various signals that the signal person gives.
 - Interview the signal person to determine whether he or she was trained and what that training involved, including what kinds of signals he or she was trained to give. Interview the operator to ensure that the operator understood the signals being given.
- b. Ask the employer for the training program for signal persons. If there is no written program, interview the employer to determine whether the program is adequate to meet the requirements of this section.

Citation Policy

- c. § 1610.8(f): Consider a citation of this standard if the employer did not train each signal person in the proper use of signals.
8. § 1610.8(h): Equipment must be inspected in accord with manufacturer procedures.

Inspection Guidance

- a. Review the manufacturer's procedures to determine what inspections, if any, are required. Interview personnel to determine whether inspections are being conducted and with what frequency. Request all inspection records.

Citation Policy

- b. § 1610.8(h): Consider a citation of this standard if the manufacturer procedures require certain inspections, and the employer has failed to perform them.
9. § 1610.8(j): Equipment with a maximum rated hoisting/lifting capacity of 2,000 pounds or less may not be used to hoist personnel.

Inspection Guidance

- a. Determine whether equipment is being used to hoist personnel.

Citation Policy

- b. § 1610.8(j): Consider a citation for violation of this standard if the equipment covered by this standard is being used to hoist personnel.
10. § 1610.8(k): The employer must ensure that the equipment is designed by a qualified engineer. The purpose of this provision is to ensure that if the employer builds a small crane or derrick, that the design of such cranes is sufficient to protect employees.

Inspection Guidance

- a. Determine by interview and observation whether equipment was designed by a qualified engineer. Documentation from the manufacturer should provide evidence that a qualified engineer designed the equipment. If equipment is designed and built at the jobsite, ask the employer for evidence that a qualified engineer designed the equipment.

Citation Policy

- b. § 1610.8(k): Consider a citation of this standard if the equipment covered by this standard was not designed by a qualified engineer.
-

Appendix A – Reference Documents

The following resources may be helpful to understanding and enforcing the standard.

Sling Safety. This document describes the various sling types and includes information regarding the design of a type and its usage.

www.osha.gov/doc/outreachtraining/htmlfiles/slings.html

Crane Inspection: Mobile Crane Inspection Guidelines for OSHA Compliance Officers

www.osha.gov/SLTC/cranehoistsafety/mobilecrane/mobilecrane_4.html

OSHA Cranes and Derricks Website.

- Federal Register Notice for Final Rule
- Frequently Asked Questions
- Fact Sheets
- Small Entity Compliance Guide
- Standard Interpretations

www.osha.gov/cranes-derricks/index.html

Appendix B — Sample Crane Inspection Questionnaire

(Courtesy of OSHA Region VI (revised))

MOBILE CRANE INSPECTION CHECKLIST

Annual Inspection Report (1613.6) Periodic Inspection Report (1613.5)

Ground Condition Survey (1610.5) Crane Installation Plan (Cribbing)

Load Chart and Manual Available (1616.1(c)) Load Chart Location: _____

Qualified Rigger (1616.4(c)(2)/1611.2(r)(1)) Name: _____

Qualified Signalmen (1618.2) Name: _____

Certified/Qualified Operator (1618.1) Name: _____

PPE for Rigger: _____ PPE for Signal: _____

CRANE SET-UP

Overhead Power Lines (1612.1-1612.4) Voltage: _____ Distance: _____

Outriggers Extended _____ % Extended: _____

Boom Length: _____ Boom Angle: _____

Crane Level (141412(d)) Jib Used: _____

RIGGING/WIRE ROPE

Wire Rope Inspection (1613.10) Rigging Inspection (5043)

Wire Rope Type (1614): _____ Rigging Used: _____

Defective/damaged rigging or wire rope used: _____

How long in use: _____

Defect/damage occurred when: _____

LOAD INFORMATION

Rigger/Signalmen

Crane Operator

of Lifts: _____

of Lifts: _____

Weights lifted: 1) _____

Weights lifted: 1) _____

2) _____

2) _____

3) _____

3) _____

4) _____

4) _____

5) _____

5) _____

Verify weights of lifts from Trucking Manifests, Weights/Specification on equipment, etc.

Check load charts and determine if lifts done in accord with Manufacturer’s specs (include weight of rigging and all attachments used during lifts)

CRANE EQUIPMENT

Anti Two-block device (1615.2(d)(3))

Load Weighing Device (1615.2(e)(4))

Hydraulic Oil Leaks (1613.4(a)(3))

Damaged components/parts (1613.4)

Level Indicator(1615.1(a)(1))

Boom Angle Indicator (1615.2(d)(1)(i)(A))

Description of Safety Devices:

Damaged/defective Devices:

Devices out of service:

Date of damage/defect:

Sketch of Crane Set-up with Unloading and Landing Area