**STANDARDS PRESENTATION**
**TO**
**CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD**

PROPOSED STATE STANDARD,
TITLE 8, DIVISION 1, CHAPTER 4

Proposal to Consolidate Construction Safety Orders, Article 15
(Cranes and Derricks in Construction), into
General Industry Safety Orders Group 13
(Cranes and Other Hoisting Equipment).

**WORK-IN-PROGRESS DRAFT Form 9**
containing revisions made at:
Advisory Committee #1 (Sep 9-10, 2014)
Subcommittee (Jan 21, 2015)
Advisory Committee #2 (Mar 25-26, 2015)

[Note: Refer to AC and SC minutes for changes made]

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Subchapter 4. Construction Safety Orders
Article 12. Pile Driving and Pile Extraction

Amend Section 1600 as follows:

§1600. Pile Driving.
***
(g) Sheet Pile Access.
(1) If an employee is required to go aloft on sheet piling, the employee shall use an aerial device or ladder.
(A) Employee(s) shall not ride the hammer, crane load block or overhaul ball.
(B) A crane suspended personnel platform may be used for access if used in accordance with Section ~~1616.6(p)~~ 5004.
***
Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Add new section 1600.2 as follows:

§1600.2. Dedicated pile drivers.
(a) The provisions of General Industry Safety Orders, Group 13, apply to dedicated pile drivers, except as specified in this section.

(b) Section 4924(d) (Anti-two-blocking device) does not apply. [AC2 change]

(c) Section 4924(b) (Load weighing and similar devices) applies only to dedicated pile drivers manufactured after July 7, 2011. [AC2 change]

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 4. Construction Safety Orders
Article 15. Cranes and Derricks in Construction

Repeal Article 15 in its entirety. Reviewed 9/9/14

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Subchapter 4. Construction Safety Orders
Article 28. Miscellaneous Construction Tools and Equipment

Modify Section 1694 as follows:

§1694. Sideboom Cranes.
(a) Sideboom cranes mounted on wheel or crawler tractors and manufactured prior to July 7, 2011 shall meet the requirements of SAE J 743 DEC80.

(b) Effective July 7, 2011, and until [effective date] the provisions of ~~this~~ Construction Safety Orders, Article 15 apply, except Section 1610.5 (Ground conditions), Section 1615.1 (Safety devices), Section 1615.2 (Operational aids), and Section 1618.1 (Operator Qualification and Certification). On or after [effective date], the provisions of General Industry Safety Orders, Group 13, apply except §4991.1 (Ground conditions), §5017 (Safety devices), ~~§5018 (Operational aids)~~, and §§5006 through 5006.2 (Operator qualification and certification). [5018 deleted by AC2]

(c) Section 4928.1 ~~1616.5~~ (Free fall and controlled load lowering) applies, except Section 4928.1(a)(2)(A) ~~1615.5(a)(2)(A)~~. Sideboom cranes in which the boom is designed to free fall (live boom) are permitted only if manufactured prior to July 7, 2011.

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Subchapter 5. Electrical Safety Orders
Group 2. High-Voltage Electrical Safety Orders
Article 37. Provisions for Preventing Accidents Due to Proximity to Overhead Lines

Amend Section 2946 with new subsections (e) and (f) as follows:

§2946. Provisions for Preventing Accidents Due to Proximity to Overhead Lines. [Reviewed 3/25/15]

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(e) A person shall be designated to observe clearance of the equipment and give timely warning for all operations where ~~it is~~ site conditions or crane configurations make it difficult for the operator to maintain the desired clearance by visual means.
(f) Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other section of these Safety Orders even if such device is required by law or regulation.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 1. General Physical Conditions and Structures Orders
Article 1. Definitions

§3207. Definitions.

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Certified Safety Professional or CSP…

Reviewed 9/9/14
Competent Person. One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Court…

***

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13, Cranes and Other Hoisting Equipment.

Add new Section 4880 to read as follows:

§4880**.** Scope. Reviewed 9/10/14 & 1/21/15
(a) The Orders in this Group shall apply to derricks, cranes, and boom-type excavators, but they shall not apply to aerial devices designed and used for positioning personnel (See Article 24). *[relocated from §4884(a)]*

(1) This standard applies to power operated equipment that can hoist, lower and horizontally move a suspended load with or without attachments. Such equipment includes, but is not limited to: Articulating boom 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 raise or lower by means of a hoist and horizontally move a suspended load; industrial cranes (such as carry deck cranes); cranes being used as dedicated pile drivers; service/mechanic trucks with a hoisting device; a crane on a monorail; tower cranes (such as a fixed jib, i.e., "hammerhead boom", luffing boom and self-erecting); pedestal cranes; portal cranes; overhead/bridge and gantry cranes; straddle cranes; side boom cranes; derricks; and variations of such equipment. However, items listed in subsection (c) of this section are excluded from the scope of this standard.

(b) Attachments. This standard applies to equipment included in subsection (a) of this section when used with attachments. Such attachments, whether crane-attached or suspended 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.

(c) Exclusions. Group 13 does not cover:

(1) Machinery included in section (a) of this section while it has been converted or adapted for a non-hoisting/lifting use. Such conversions/adaptations include, but are not limited to, power shovels, excavators and concrete pumps.
(2) Power shovels and excavators (except as prescribed by Article 94), wheel loaders, backhoes, loader backhoes, track loaders. This machinery is also excluded when used with chains, slings or other rigging to lift suspended loads.
(3) Automotive wreckers and tow trucks when used to clear wrecks and haul vehicles.
(4) Digger derricks when used for augering holes for poles carrying electric and telecommunication lines, placing and removing the poles, and for handling associated materials to be installed on or removed from the poles.

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(A) Digger derricks used in work subject to the Electrical Safety Orders shall comply with Section 2940.7 of those Safety Orders.
(B) Digger derricks used in construction work for telecommunication service (as defined in the Telecommunication Safety Orders) shall comply with those Safety Orders.
(5) Machinery originally designed as vehicle-mounted aerial devices (for lifting personnel) and self-propelled elevating work platforms.
(6) Telescopic/hydraulic gantry systems.
(7) Stacker cranes.
(8) Powered industrial trucks (forklifts), except when configured to raise or lower by means of a hoist and horizontally move a suspended load.
(9) Mechanic's truck with a hoisting device when used in activities related to equipment maintenance and repair.
(10) Multi-purpose machines or industrial trucks (forklifts) hoisting by use of a come-along or chainfall.
(11) Dedicated drilling rigs.
(12) Gin poles when used for the erection of communication towers.
(13) Anchor handling or dredge related operations with a vessel or barge using an affixed A-frame.
(14) Unpowered, rolling material lifts with hand-powered winches (roustabouts).
(15) Helicopter cranes.

(d) All sections of Group 13 apply to the equipment within the scope of this standard unless specified otherwise.

(e) For work covered by the High-Voltage Electrical Safety Orders, compliance with those Orders is deemed compliance with §5003.1 through §5003.4 and §5010.4.

(f) Section 4991.1 does not apply to cranes designed for use on railroad tracks, when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213, and that comply with applicable Federal Railroad Administration requirements. See Exception to §4991.1.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Add new Section 4881 to read as follows:

§4881. General. Reviewed 9/10/14
(a) Posted warnings. Posted warnings required by Group 13 as well as those ~~originally~~ supplied with the equipment by the manufacturer shall be maintained in legible condition.

(b) All exhaust pipes, turbochargers, and charge air coolers shall be insulated or guarded where inadvertent contact by employees (except for maintenance and repair employees) is possible in the performance of normal duties.

(c) Load hooks ~~(including latched and unlatched types)~~, ball assemblies and load blocks shall be of sufficient weight to overhaul the line from the highest hook position for boom or boom and jib lengths and the number of parts of the line in use.

(d) Hook and ball assemblies, load blocks. [Relocated from 5050]
(1) Hook and ball assemblies and load blocks on mobile cranes shall be marked with their rated capacity and weight.
(2) ~~Latching Hooks~~. Hook and ball assemblies and load blocks shall be equipped with latches. Exception: Hooks without latches, or with latches removed or disabled, shall not be used unless a qualified person has determined that it is safer to hoist and place the load without latches (or with the latches removed/tied-back).

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 4882 to read as follows:

§4882. Supplemental General Requirements ~~for Cranes in Construction~~ Reviewed 9/10/14
(a) Cabs. Equipment with cabs shall meet the following requirements:
(1) Cabs shall be designed with a form of adjustable ventilation and method for clearing the windshield (when provided) for maintaining visibility and air circulation. Examples of means for adjustable ventilation may include an air conditioner or window that can be opened (for ventilation and air circulation); examples of means for maintaining visibility may include heater (for preventing windshield icing), defroster, fan, windshield wiper.
(2) Cab doors (swinging, sliding) must be designed to prevent inadvertent opening or closing while traveling or operating the machine. Swinging doors adjacent to the operator shall open outward. Sliding operator doors shall open rearward.
(3) Windows (if provided) or other openings.

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(A) ~~The cab shall have~~ Windows or other openings shall be provided in front and on both sides of the operator with visibility forward and to either side. Forward vertical visibility shall be sufficient to give the operator a view of the boom point at all times.
(B) Windows may have sections designed to be opened or readily removed. Windows with sections designed to be opened shall be designed so that they can be secured to prevent inadvertent closure.
(C) Windows shall be of safety glass or material with similar optical and safety properties, which introduce no visible distortion or otherwise obscure visibility that interferes with the safe operation of the equipment.
(4) A clear passageway shall be provided from the operator's station to an exit door on the operator's side.
(5) Areas of the cab roof that serve as a workstation for rigging, maintenance or other equipment-related tasks shall be capable of supporting 250 pounds. ~~without permanent distortion.~~

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 4883 to read as follows:

§4883. Equipment with a rated hoisting/ lifting capacity of 2,000 pounds or less.
The following sections specify requirements for employers using equipment with a maximum rated hoisting/ lifting capacity of 2,000 pounds or less.
(a) The employer using this equipment shall comply with the following provisions of Group 13: §§4880-4881 (Scope & General); §4885 (Definitions); §4991.1 (Ground conditions); §5010 (Assembly/disassembly—selection of manufacturer or employer procedures); §5010.3 (Assembly/disassembly—employer procedures); §§5003.1, 5003.2, 5003.3, 5003.4, and 5010.4 (Power line safety); §5031.2 (Post-assembly); §§5036-5037 (Wire rope); §5008(c) (Authority to stop operation); §§5001 through 5001.2 (Signals); §5011 (Fall protection); §5002 (Keeping clear of the load) (except for §5002(c)(3) (qualified rigger)); §4928.1 (Free fall and controlled load lowering); §4994 (Multiple crane/derrick lifts—supplemental requirements); §4884.1 (Equipment modifications); §§ 4965, 4965.1, 4966, 4968-4968.2 (Tower cranes); §§ 4959 through 4962.1, 5006, 5020, 5022, and 5023 (Derricks); Article 97.1 (Floating cranes/derricks and land cranes/derricks on barges); Article 92.1 (Overhead & gantry cranes).
(b) Assembly/disassembly.
(1) In addition to compliance with §§5010 (Assembly/disassembly—selection of manufacturer or employer procedures) and 5010.3 (Assembly/disassembly—employer procedures), the employer shall also comply with §4883(b)(2)-(3).
(2) Components and configuration. The employer shall ensure that:

(A) The selection of components, and the configuration of the equipment, that affect the capacity or safe operation of the equipment complies with either the:

(i) Manufacturer instructions, recommendations, limitations, and specifications. When these documents and information are unavailable, a certified agent familiar with the type of equipment involved must approve, in writing, the selection and configuration of components; or

(ii) Approved modifications that meet the requirements of §4884.1 (Equipment modifications).

(B) Post-assembly inspection. Upon completion of assembly, the equipment is inspected to ensure that it is in compliance with subsection (b)(2)(A) (see §5031.2 for post-assembly inspection requirements).

(3) Manufacturer prohibitions. The employer shall comply with applicable manufacturer prohibitions.

(c) Operation – procedures.

(1) The employer shall comply with all manufacturer procedures applicable to the operational functions of the equipment, including its use with attachments.

(2) Unavailable operation procedures. The employer shall:

(A) When the manufacturer's procedures are unavailable, develop, and ensure compliance with, all procedures necessary for the safe operation of the equipment and attachments.

(B) Ensure that procedures for the operational controls are developed by a qualified person.

(C) Ensure that procedures related to the capacity of the equipment are developed and signed by a certified agent familiar with the equipment.

(3) Accessibility. The employer shall ensure that:

(A) The load chart is available to the operator at the control station;

(B) Procedures applicable to the operation of the equipment, recommended operating speeds, special hazard warnings, instructions, and operator's manual are readily available for use by the operator.

(C) When rated capacities are available at the control station only in electronic form and a failure occurs that makes the rated capacities inaccessible, the operator immediately ceases operations or follows safe shut-down procedures until the rated capacities (in electronic or other form) are available.

(d) Safety devices and operational aids.

(1) The employer shall ensure that safety devices and operational aids that are part of the original equipment are maintained in accordance with manufacturer procedures.

(2) Anti-two-blocking. The employer shall ensure that equipment covered by this section manufactured more than one year after July 7, 2012 have either an anti-two-block device that meets the requirements of §4924(d), or is designed so that, in the event of a two-block situation, no damage or load failure will occur (for example, by using a power unit that stalls in response to a two-block situation). [Ed note: 5018 deleted by AC2]

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(e) Operator qualifications. Section 5006 shall apply to operation of equipment with a rated hoisting/ lifting capacity of 2,000 pounds or less.
(f) Inspections. The employer shall ensure that equipment is inspected in accordance with manufacturer procedures.
(g) Hoisting personnel. Equipment covered by this section shall not be used to hoist personnel.
(h) Design. The employer shall ensure that the equipment is designed by a qualified engineer.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 4884 as follows:

§4884. ~~Scope~~ Standards Incorporated by Reference. Reviewed 9/10/14
(a) ~~The Orders in this Group shall apply to derricks, cranes, and boom-type excavators, but they shall not apply to aerial devices designed and used for positioning personnel (See Article 24).~~ Cranes and derricks shall be designed, constructed, and installed in accordance with the following standards which are hereby incorporated by reference. Unless specified otherwise in this Group, these requirements apply to equipment that has a manufacturer-rated hoisting/lifting capacity of more than 2,000 pounds.

(b) Hammerhead tower cranes manufactured on or before June 23, 1999:
(1) Hammerhead tower cranes manufactured prior to September 28, 1986, shall be designed, constructed, and installed in accordance with American National Standards Institute (ANSI) B30.3-1975, Hammerhead Tower Cranes, which is hereby incorporated by reference.
(2) Hammerhead tower cranes manufactured on September 28, 1986 through May 16, 1993, shall be designed, constructed, and installed in accordance with ANSI/American Society of Mechanical Engineers (ASME) B30.3-1984, Hammerhead Tower Cranes, which is hereby incorporated by reference.
(3) Hammerhead tower cranes manufactured after May 16, 1993 through June 23, 1999, shall be designed, constructed and installed in accordance with ASME B30.3-1990, Hammerhead Tower Cranes, which is hereby incorporated by reference. Note: See Section 4884(c)(1)(B) for standards pertaining to hammerhead tower cranes manufactured after June 23, 1999.

(c)(1)(A) Cranes and derricks manufactured on or after September 28, 1986, through June 23, 1999, shall be designed, constructed and installed in accordance with the following applicable American National Standards Institute (ANSI) and/or American Society of Mechanical Engineers (ASME) standards or those listed in subsection (c)(1)(B):
B30.2-1983, Overhead and Gantry Cranes (Top Running Bridge Multiple Girder)
B30.4-1981, Portal, Tower and Pillar Cranes
B30.5-1982, Crawler, Locomotive and Truck Cranes
B30.6-1977, Derricks

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B30.7-1977, Base Mounted Drum Hoists
B30.8-1982, Floating Cranes and Floating Derricks
B30.11-1980, Monorails and Underhung Cranes
B30.13-1977, Controlled Mechanical Storage Cranes
B30.17-1980, Overhead and Gantry Cranes (Top Running Bridge, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)

(B) Cranes and derricks manufactured after June 23, 1999 and before July 7, 2011 shall be designed, constructed and installed in accordance with the following applicable American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) standards which are hereby incorporated by reference:
B30.2-1996, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)
B30.3-1996, Construction Tower Cranes (includes Hammerhead Tower Cranes)
B30.4-1996, Portal, Tower and Pedestal Cranes
B30.5-1994, Mobile and Locomotive Cranes
B30.6-1995, Derricks
B30.7-1994, Base Mounted Drum Hoists
B30.8-1993, Floating Cranes and Floating Derricks
B30.11-1993, Monorails and Underhung Cranes
B30.13-1996, Storage/Retrieval (S/R) Machines and Associated Equipment
B30.17-1992, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist)

(2) Articulating boom cranes manufactured after May 16, 1993 shall conform to these regulations and be provided with a permanently attached metal label stating that the equipment has been designed and constructed in accordance with ASME/ANSI B30.22-1987, and B30.22a-1988 Addenda, Articulating Boom Cranes, herein incorporated by reference, or has been approved as required by the provisions of Section 3206 of these orders.

(d) Cranes and derricks manufactured on or after July 7, 2011 until [effective date] shall be designed, constructed and installed in accordance with the following applicable American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) standards which are hereby incorporated by reference:
ASME B30.2–2005, Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist), issued Dec. 30, 2005 (“ASME B30.2–2005”).
B30.3-1996, Construction Tower Cranes (includes Hammerhead Tower Cranes) *[Ed note: feds did not update]*
B30.4-1996, Portal, Tower and Pedestal *[Ed note: feds did not update]*

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ASME B30.5–2004, Mobile and Locomotive Cranes, issued Sept. 27, 2004 ("ASME B30.5–2004").
B30.6-1995, Derricks *[Ed note: feds did not update]*
ASME B30.7–2001, Base-Mounted Drum Hoists, issued Jan. 21, 2002 ("ASME B30.7–2001").
B30.8-1982, Floating Cranes and Floating Derricks *[Ed note: feds did not update]*
B30.11-1980, Monorails and Underhung Cranes *[Ed note: feds did not update]*
B30.13-1977, Controlled Mechanical Storage Cranes *[Ed note: feds did not update]*
ASME B30.14–2004, Side Boom Tractors, issued Sept. 20, 2004 ("ASME B30.14–2004").
B30.17-1992, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist).

~~(1) In addition, cranes and derricks manufactured after July 7, 2011 shall be designed, constructed and installed in accordance with the following standards which are hereby incorporated by reference:~~

~~(A) AWS D1.1/D1.1M:2002, Structural Welding Code—Steel, 18th ed., ANSI approved Aug. 31, 2001 ("AWS D1.1/D1.1M:2002").~~
~~(B) ANSI/AWS D14.3–94, Specification for Welding Earthmoving and Construction Equipment, ANSI approved Jun. 11, 1993 ("ANSI/AWS D14.3–94").~~
~~(C) BS EN 13000:2004, Cranes—Mobile Cranes, published Jan. 4, 2006 ("BS EN 13000:2004").~~
~~(D) BS EN 14439:2006, Cranes—Safety—Tower Cranes, published Jan. 31, 2007 ("BS EN 14439:2006").~~
~~(E) ISO 11660–1:2008(E), Cranes—Access, guards and restraints—Part 1: General, 2d ed., Feb. 15, 2008 ("ISO 11660–1:2008(E)").~~
~~(F) ISO 11660–2:1994(E), Cranes—Access, guards and restraints—Part 2: Mobile cranes, 1994 ("ISO 11660–2:1994(E)").~~
~~(G) ISO 11660–3:2008(E), Cranes—Access, guards and restraints—Part 3: Tower cranes, 2d ed., Feb. 15, 2008 ("ISO 11660–3:2008(E)").~~
~~(H) PCSA Std. No. 2, Mobile Hydraulic Crane Standards, 1968 ("PCSA Std. No. 2 (1968)").~~
~~(I) SAE J185 (reaf. May 2003), Access Systems for Off-Road Machines, reaffirmed May 2003 ("SAE J185 (May 1993)").~~
~~(J) SAE J987 (rev. Jun. 2003), Lattice Boom Cranes—Method of Test, revised Jun. 2003 ("SAE J987 (Jun. 2003)").~~
~~(K) SAE J1063 (rev. Nov. 1993), Cantilevered Boom Crane Structures—Method of Test, revised Nov. 1993 ("SAE J1063 (Nov. 1993)").~~

(e) Cranes and derricks manufactured on or after [Effective Date] shall be designed, constructed and installed in accordance with the following applicable American National Standards Institute (ANSI)/American Society of Mechanical Engineers (ASME) standards which are hereby incorporated by reference:

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ASME B30.2–2011, Monorails and Underhung Cranes. *[Ed note: updated per AC request]*
B30.3-2012, Tower Cranes. *[Ed note: updated per AC request]*
B30.4-2010, Portal and Pedestal Cranes *[Ed note: updated per AC request]*
ASME B30.5–2011, Mobile and Locomotive Cranes. *[Ed note: updated per AC request]*
B30.6-2010, Derricks.
ASME B30.7–2011, Base-Mounted Drum Hoists. *[Ed note: updated per AC request]*
B30.8-2010, Floating Cranes and Floating Derricks *[Ed note: updated per AC request]*
B30.11-2010, Monorails and Underhung Cranes. *[Ed note: updated per AC request]*
B30.13-2011, Storage/Retrieval (S/R) Machines and Associated Equipment. *[Ed note: updated per AC request]*
ASME B30.14–2010, Side Boom Tractors. *[Ed note: updated per AC request]*
B30.17-2006, Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist). *[Ed note: updated per AC request]*

(f)~~(d)~~(1) Except as provided in subsection (f)~~(d)~~(2), all cranes and derricks manufactured prior to September 28, 1986, shall conform to this subsection and shall be designed, constructed and installed in accordance with the following applicable ANSI standards:

B30.2-1967, Overhead and Gantry Cranes
B30.4-1973, Portal, Tower, and Pillar Cranes
B30.5-1968, Crawler, Locomotive and Truck Cranes
B30.6-1969, Derricks
B30.15-1973, Mobile Hydraulic Cranes
Exception: Section 15-1.3.2(d) of B30.15-1973, Two-Blocking Damage Prevention Feature.

(2) Cranes manufactured prior to January 15, 1974, shall be modified to comply with applicable regulations in Group 13, Cranes and Other Hoisting Equipment of the General Industry Safety Orders, unless it can be shown during the process of certification that a crane cannot feasibly or economically be modified to comply with any one or more applicable requirements and the crane substantially complies with applicable Group 13 regulations and the ANSI or other design standard to which the crane was manufactured.

(g)~~(e)~~ Cranes and derricks which do not meet the applicable ANSI standards shall be designed, constructed and installed in accordance with the recommendations of a currently registered mechanical or civil engineer.

(h)~~(f)~~ Cranes and derricks shall be operated, tested, inspected and maintained in accordance with these Orders.

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(i)~~(g)~~ All electrically powered cranes and derricks shall also comply with applicable electrical safety orders.

(j) Prototype testing: Cranes manufactured on or after November 8, 2010 shall meet the prototype testing requirements prescribed in 29 CFR 1926.1433(c).

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4884.1 as follows:

§4884.1. Equipment modifications – Mobile and Tower Cranes. Reviewed 9/10/14
(a) Modifications or additions which affect the capacity or safe operation of the equipment are prohibited except where the requirements of subsections (a)(1) or (a)(2) ~~(a)(3), (a)(4), or (a)(5)~~ are met.

(1) Manufacturer review and approval.

(A) The manufacturer approves the modifications/additions in writing.

(B) The load charts, procedures, instruction manuals and instruction plates/tags/decals are modified as necessary to accord with the modification/addition.

(C) The original safety factor of the equipment is not reduced.

~~(2) Manufacturer refusal to review request. The manufacturer is provided a detailed description of the proposed modification/addition, and is asked to approve the modification/addition, but it declines to review the technical merits of the proposal or fails, within 30 days, to acknowledge the request or initiate the review, and all of the following are met:~~

~~(A) A certified agent who is a qualified person with respect to the equipment involved:~~

~~1. Approves the modification/addition and specifies the equipment configurations to which that approval applies, and~~

~~2. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/ addition.~~

~~(B) The original design factor of the equipment is not reduced.~~

~~(3)~~(2) Unavailable manufacturer. The manufacturer is unavailable and the following requirements are met: ~~and the requirements of subsections (a)(2)(A) and (B) are met.~~

(A) A certified agent who is a qualified person with respect to the equipment involved:

1. Approves the modification/addition and specifies the equipment configurations to which that approval applies, and

2. Modifies load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to accord with the modification/ addition.

(B) The original safety factor of the equipment is not reduced.

~~(4) Manufacturer does not complete the review within 120 days of the request. The manufacturer is provided a detailed description of the proposed modification/addition, is asked~~

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~~to approve the modification/addition, agrees to review the technical merits of the proposal, but fails to complete the review of the proposal within 120 days of the date it was provided the detailed description of the proposed modification/addition, and the requirements of subsections (a)(2)(A) and (B) are met.~~

~~(5) Multiple manufacturers of equipment designed for use on marine work sites. The equipment is designed for marine work sites, contains major structural components from more than one manufacturer, and the requirements of sections (a)(2)(A) and (B) are met.~~

~~(b) Modifications or additions which affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response. If the manufacturer rejects the proposal but does not explain the reasons for the rejection in writing, the employer may treat this as a manufacturer refusal to review the request under paragraph (a)(2) of this section.~~

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment
Article 91. Definitions

Add new definitions to Section 4885 as follows:

§4885. Definitions. Reviewed all 9/9/14 (Multi-purpose also re-reviewed 1/21/15)

***

Accessory gear….

A/D director (Assembly/Disassembly director). An individual who meets ~~this subpart's~~ Group 13 requirements for an A/D director, irrespective of the person's formal job title or whether the person is non-management or management personnel.

Angle indicator (Boom)…

***

Articulating Boom Crane. A crane whose boom consists of a series of folding, pin connected structural members, typically manipulated to extend or retract by power from hydraulic cylinders. ~~articulated by hydraulic cylinders, powered by an internal combustion engine or electric motor.~~

Assembly/Disassembly means the assembly and/or disassembly of equipment covered under this standard. With regard to tower cranes, ''erecting and climbing'' replaces the term ''assembly,'' and ''dismantling'' replaces the term ''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.

Assist crane. A crane used to assist in assembling or disassembling a crane.

Attachment. Any device that expands the range of tasks that can be done by the equipment. Examples include, but are not limited to: An auger, drill, magnet, pile-driver, and boom-attached personnel platform.

Audible signal. A signal made by a distinct sound or series of sounds. Examples include, but are not limited to, sounds made by a bell, horn, voice or whistle.
Automatic Crane…

***

Base (Mounting)…

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Blocking (also referred to as ‘‘cribbing’’) is wood or other material used to support equipment or a component and distribute loads to the ground. It is typically used to support lattice boom sections during assembly/disassembly and under outrigger and stabilizer floats.

Boatswain’s chair. A single point adjustable suspension scaffold consisting of a seat or sling (which may be incorporated into a full body harness) designed to support one employee in a sitting position.

Bogie. See “travel bogie.”

Boom. A member section of a crane or derrick, the lower end of which is affixed to a mast, base, carriage, or support, and the upper end supports a hook or other end attachment. The length of the boom shall be taken as the straight line distance between the axis of the foot pin and the axis of the end sheave pin.

Boom (tower cranes): On tower cranes, if the “boom” (i.e., principal horizontal structure) is fixed, it is referred to as a jib; if it is moveable up and down, it is referred to as a boom.

Boom Angle. The angle between the longitudinal centerline of the boom and the horizontal. The boom longitudinal centerline is a straight line between the boom foot pin (heel pin) centerline and boom point sheave pin centerline.

Boom Hoist. A hoist drum and rope reeving system used to raise and lower the boom. The rope system may be all live reeving or a combination of live reeving and pendants.

Boom hoist limiting device. Includes boom hoist disengaging device, boom hoist shut-off, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device, or derricking limiter. This type of device disengages boom hoist power when the boom reaches a predetermined operating angle. It may also set brakes or close valves to prevent the boom from lowering after power is disengaged.

Boom length indicator. Indicates the length of the permanent part of the boom (such as ruled markings on the boom) or, as in some computerized systems, the length of the boom with extensions/attachments.

Boomstop. A structural component ~~device~~ used to limit the angle of the boom at the highest position. Includes but is not limited to structural components such as ~~boom stops,~~ belly straps with struts/standoff, telescoping boom stops, attachment boom stops, and backstops. These devices restrict the boom from moving above a certain maximum angle and toppling over backward.

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Boom suspension system. A system of pendants, running ropes, sheaves, and other hardware which supports the boom tip and controls the boom angle.

Boom-Type Excavator…

***

Buffer…

Builder. The builder/constructor of equipment.

***

Cage…

~~Center of gravity: The center of gravity of any object is the point in the object around which its weight is evenly distributed. If you could put a support under that point, you could balance the object on the support.~~

***

Certified Agent…

Certified welder. A welder who meets ~~nationally~~ recognized certification requirements applicable for the task being performed.

***

Clearance…

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).

Come-along. A mechanical device typically consisting of a chain, strap or cable attached at each end that is used to facilitate movement of materials ~~through leverage~~ by using mechanical advantage.

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. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

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Controller, Spring Return. A controller which when released will return automatically to a neutral position.

Controlling entity. An employer that is a prime contractor, general contractor, construction manager or any other legal entity which has the overall responsibility for the construction of the project – its planning, quality and completion.

Counterweight. A weight used to supplement the weight of the ~~equipment~~ machine in providing stability for lifting working loads. ~~by counterbalancing those loads~~.

Crane. A machine for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. It may be driven manually or by power and may be a fixed or a mobile machine, but does not include stackers, lift trucks, power shovels, backhoes, or excavators. Some of the common types of cranes are defined as follows:
***
(O) Portal Crane (Whirley Type). A gantry crane without trolley motion, which has a boom attached to a revolving crane mounted on a gantry, with the boom capable of being raised or lowered at its head (outer end). Portal cranes may be fixed or mobile.
~~A type of crane consisting of a rotating upperstructure, hoist machinery, and boom mounted on top of a structural gantry which may be fixed in one location or have travel capability. The gantry legs or columns usually have portal openings in between to allow passage of traffic beneath the gantry.~~ *[Consensus to strike proposed federal and retain existing state verbiage]*

***
Crane Runway ~~(see also "Runway").~~ The structure upon which a crane runs, and may be:
(A) A structure consisting of columns, longitudinal bracing and elevated beams, girders, or trusses, for supporting traveling or bridge cranes.
(B) Elevated beams, girders, or trusses in a building or on the side of a building, for supporting traveling cranes.
(C) Surface tracks or rails.
(D) Tracks or rails on walls or trestles.

Crossover point. Location on a wire rope which is spooled on a drum where one layer of rope climbs up on and crosses over the previous layer. This takes place at each flange of the drum as the rope is spooled onto the drum, reaches the flange, and begins to wrap back in the opposite direction.

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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).

Dedicated pile-driver is 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 spotter (power lines): To be considered a dedicated spotter, the requirements of §5001.3 (Signal person qualifications) ~~must~~ shall be met and his/her sole responsibility is to watch the separation between the power line and the 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.~~

***

Designated Person…

~~Directly under the load means a part or all of an employee is directly beneath the load.~~

~~Dismantling includes partial dismantling (such as dismantling to shorten a boom or substitute a different component).~~

Drag Brake…

Drum rotation indicator. A device ~~on a crane or hoist~~ which indicates ~~in which direction and~~ the ~~at what~~ relative speed a particular ~~hoist~~ drum is turning.

***

Dynamic Loading…

Electrical contact occurs when a person, object, or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current.

Emergency Stop Switch…

Employer-made equipment. Floating cranes/derricks designed and built by an employer for the employer's own use.

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Encroachment. Where any part of the crane, load line or load (including rigging and lifting accessories) breaches a minimum clearance distance that these Orders require to be maintained from a power line.

Equipment criteria. ~~means~~ instructions, recommendations, limitations and specifications.

Fall zone. The area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall in the event of an accident.

Flange points. Points of contact between rope and drum flange where the rope changes layers.

Floating cranes/derricks. Equipment designed by the manufacturer (or employer) for marine use by permanent attachment to a barge, pontoons, vessel or other means of flotation.

Free fall (of the load line). 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).

Free surface effect is the uncontrolled ~~transverse~~ movement of liquids in compartments which reduce a vessel's ~~transverse~~ stability.

Hoist. An apparatus for raising or lowering a load by the application of a pulling force, but ~~A mechanical device for lifting and lowering loads by winding a line onto or off a drum~~ does not include a car or platform riding in guides. Some common types of hoists are defined as follows:

***

Hoist Chain. The load bearing chain in a hoist.

Hoisting. The act of raising, or lowering ~~or otherwise moving~~ a load ~~in the air~~ with equipment covered by this standard. As used in this standard, ''hoisting'' can be done by means other than wire rope/hoist drum equipment.

Hoisting Machine. A power operated machine used for lifting or lowering a load, utilizing a drum and wire rope, excluding elevators. This shall include but not be limited to a crane, derrick and cableway.

Hoist Motion…

Include/including means "including, but not limited to."

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Insulating link/device means an insulating device listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7.

Jib…

Jib stop (also referred to as a jib backstop). The same type of device as a boom stop but is for a fixed or luffing jib.

~~Land crane/derrick is equipment not originally designed by the manufacturer for marine use by permanent attachment to barges, pontoons, vessels, or other means of floatation.~~

List means the angle of inclination about the longitudinal axis of a barge, pontoons, vessel or other means of floatation.

Lay…

***

Line Pull, Permissible…

Load ~~(Working). The external load in pounds applied on the hoisting line, including the weight of load attaching equipment such as load blocks, shackles, slings, buckets, and magnets.~~ refers to the object(s) being hoisted and/or the weight of the object(s). Both uses refer to the object(s) and the load-attaching equipment, such as~~, the load block,~~ ropes, slings, shackles, and any other ancillary attachment as defined by the crane/derrick manufacturer.

Load (Working). See "Load."

Load Block (Lower)…

Load Block (Upper)…

Load Moment (or rated capacity) Indicator. ~~A system which aids the equipment operator by sensing (directly or indirectly) the overturning overloading moment on the equipment. i.e., load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and indicates to the operator the percentage of capacity at which the equipment is working. Lights, bells, or buzzers may be incorporated as a warning of an approaching overload condition.~~ A device that automatically monitors radius, load weight, and load rating and warns the crane operator of an overload condition.

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Load Moment (or rated capacity) Limiter. ~~A system which aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment, i.e., load multiplied by radius. It compares this lifting condition to the equipment's rated capacity, and when the rated capacity is reached, it shuts off power to those equipment functions which can increase the severity of loading on the equipment, e.g., hoisting, telescoping out, or luffing out. Typically, those functions which decrease the severity of loading on the equipment remain operational, e.g., lowering, telescoping in, or luffing in.~~ A device that automatically monitors radius, load weight, and load rating and prevents movements of the crane which would result in an overload condition.

Load Rating. ~~The lifting capacity established by the certified agent for various angles and positions.~~ See "Rated Capacity."

Locomotive Crane. A crane mounted on a base or car equipped for travel on a railroad track.

Luffing Jib Limiting Device. ~~Similar to a boom hoist limiting device, except that it limits the movement of the luffing jib.~~ Includes jib hoist disengaging device, jib hoist shut-off, jib hoist disconnect, jib hoist hydraulic relief, jib hoist kick-outs, or automatic jib stop device. This type of device disengages jib hoist power when the jib reaches predetermined operating angles. It may also set-brakes or close valves to prevent the jib from lowering after power is disengaged.

Machine House…

***

Man Trolley…

~~Marine Hoisted Personnel Transfer Device. A device, such as a ''transfer net,'' that is designed to protect the employees being hoisted during a marine transfer and to facilitate rapid entry into and exit from the device. Such devices do not include boatswain's chairs when hoisted by equipment covered by this standard.~~

Marine Worksite. A construction worksite located in, on, under or above the water.

Master Switch…

~~Mobile Crane. A lifting device incorporating a cable suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road.~~

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Molten Metal Handling Crane…

Multi-Purpose Machine. A machine**,** other than a crane or derrick, that is designed to be configured and used in various ways, at least one of which allows it to raise or lower by means of a hoist and horizontally move a suspended load.

Nationally Recognized Accrediting Agency. An organization that, due to its independence and~~-~~expertise, is widely recognized as competent to accredit testing organizations. Examples of such accrediting agencies include, but are not limited to, Institute for Credentialing Excellence (the-National Commission for Certifying Agencies) and the American National Standards Institute. *[Ed note: revisit this definition when we get to 5006.1 – this definition may be unnecessary – see 9/10/14 AC1 discussion]*

Nonconductive. Because of the nature and condition of the materials used, and the conditions of use (including environmental conditions and condition of the material), the object in question ~~has the property of not becoming energized (that is, it has high dielectric properties~~ offers a high resistance to the passage of current under the conditions of use).

Operational Aids. Devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function. ~~These include, but are not limited to, the devices listed in §5018 ("listed operational aids").~~ [AC2 Ed note: 5018 has been deleted. Should we use the B30.5 definition instead?]

Operational Controls. Levers, switches, pedals and other devices for controlling equipment operation.

Operator. A person who is operating the equipment.

Overhead and gantry cranes includes overhead/bridge cranes, semi-gantry, cantilever gantry, wall cranes, storage bridge cranes.~~, launching gantry cranes, and similar equipment, irrespective of whether it travels on tracks, wheels, or other means.~~

Overhead Loads…

Pendant~~s~~. A rope or strand of specified length with fixed end connections.
~~are typically used in a latticed boom crane system to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased. Pendants include both wire and bar types:~~
~~(A) Wire type: A fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together.~~

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~~(B) Bar type: Instead of wire rope, a bar is used.~~

Power lines means electric transmission and distribution lines.

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

Proximity alarm. A device that provides a warning of proximity to a power line and that has been listed, labeled, or accepted by a Nationally Recognized Testing Laboratory in accordance with 29 CFR 1910.7, or approved in accordance with Section 3206.

Qualified evaluator (not a third party). A person employed by the signal person's employer who has demonstrated that he/she is competent in accurately assessing whether individuals meet the Qualification Requirements in these Orders for a signal person.

Qualified evaluator (third party). An entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the Qualification Requirements in these Orders for a signal person.

Qualified rigger. A rigger who meets the criteria for a qualified person.

Radius (Load)…

Range Control Limit Device. A device that can be set ~~by an equipment operator~~ to limit movement of the boom or jib tip to a plane or multiple planes.

Range Control Warning Device. A device that can be set ~~by an equipment operator~~ to warn that the boom or jib tip is at a plane or multiple planes.

Rated Capacity. The maximum working load permitted by the manufacturer under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length, and other parameters of use.

Rated capacity indicator: See load moment indicator.

Rated capacity limiter: See load moment limiter.

Rated Load. The maximum load for which a crane or individual hoist is designed and built by the manufacturer and shown on the equipment nameplate(s) or load capacity chart.

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Reeving. A rope system in which the rope travels around drums and sheaves.

Regenerative. A form of dynamic braking in which the electrical energy generated is fed back into the power system.

Registered Professional Engineer (RPE). A person who is registered as a professional civil, mechanical, or structural engineer by the State of California and is knowledgeable in the structure and use of the equipment.

Repetitive pickup points refer to, when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.

Rope. Refers to wire rope unless otherwise specified.

Running Sheave. A sheave which rotates as the load block is raised or lowered.

Running Wire Rope. A wire rope that travels ~~moves~~ over sheaves or drums.

Runway. A firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane suspended platform. An existing surface may be used as long as it meets these criteria.

Safety Hook. A hook with a safety latch or arrangement to close the throat of the hook, in such manner as to prevent slings or load attachment from accidentally slipping off the hook.

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.

Side Pull. That portion of the hoist pull acting horizontally when the hoist lines are not operated vertically.
***
Span…

Special Hazard Warnings. Warnings of site-specific hazards (for example, proximity of power lines).

Stability (flotation device). The tendency of a barge, pontoons, vessel or other means of flotation to return to an upright position after having been inclined by an external force.

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Standard Method. The protocol illustrated in Section 5001, Plate I, for hand signals.

Standing Rope (Guy). A supporting rope which maintains a constant distance between the points of attachment to the two components connected by the rope.

Structural Competence. The ability of the machine and its components to withstand the stresses imposed by applied loads.

Such as means "such as, but not limited to."

Superstructure: See "Upperworks."

Swinging or Slewing. The act of moving a boom through a horizontal arc.

Switch. A device for making, breaking, or for changing the connections in an electric circuit.

Tagline. A rope (usually fiber) attached to a lifted load for purposes of controlling load spinning and pendular motions or used to stabilize a bucket or magnet during material handling operations.

Tender. An individual responsible for monitoring and communicating with a diver.

Tilt Up or Tilt Down Operation. Raising/lowering a load from the horizontal to vertical or vertical to horizontal.

Track…

***
Travel…

Travel Bogie (tower cranes). An assembly of two or more axles arranged to permit vertical wheel displacement and equalize the loading on the wheels.

Trolley (load). The component of the crane that moves along the jib of a hammerhead tower crane and positions the load radially.

Trolley Travel…

Trim. The angle of inclination about the transverse axis of a barge, pontoons, vessel or other means of floatation.

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Truck (of an overhead, gantry, or locomotive crane)…

***
Two-Block Warning Feature…

Two-Blocking. A condition in which the lower load block or hook assembly comes into contact with the upper load block or boom point sheave assembly. ~~This binds the system and continued application of power can cause failure of the hoist rope or other component.~~

Unavailable procedures. Procedures that are no longer available from the manufacturer, or have never been available, from the manufacturer.

Upperstructure: See Upperworks.

Upperworks. The revolving frame of equipment on which the operating machinery (and many cases the engine) are mounted along with the operator's cab. ~~The counterweight is typically supported on the rear of the upperstructure and the boom or other front end attachment is mounted on the front~~

~~Up to means "up to and including."~~

Wire rope. A flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment

Add new Article 92.1 as follows:

Article 92.1. Supplemental Requirements for Overhead & Gantry Cranes Used in Construction.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4915 as follows:

§4915. Permanently installed overhead and gantry cranes.
The requirements of Article 92, apply to the following equipment when used in construction and permanently installed in a facility: overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4916 as follows:

§4916. Overhead and gantry cranes that are not permanently installed in a facility.
(a) This section applies to the following equipment when used in construction and not permanently installed in a facility: Overhead and gantry cranes, overhead/bridge cranes, semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes, and similar equipment having the same fundamental characteristics, irrespective of whether it travels on tracks, wheels, or other means.

(b) The requirements of Group 13 apply to equipment identified this section as appropriate except the following sections: Sections 4928.1(a) through (c), Article 95 and Article 96.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment
Article 93. Boom-Type Mobile Cranes

Amend Section 4924 as follows:

§4924. Load Safety Devices.
(a) All cranes having a maximum rated capacity exceeding one ton shall be equipped with safety devices as provided herein and as provided in Article 98.2 of these Orders.

Exceptions:

1. Boom-type excavators used in excavation work and all equipment when configured for pile driving or log handling.
2. Articulating boom cranes are exempt from the provisions of subsection (c).
3. Digger derrick trucks designed, built and maintained in accordance with ANSI/ASSE A10.31 standards for "Construction and Demolition Operations - Safety Requirements, Definitions and Specifications for Digger Derricks".

(b) Load weighing and similar devices as prescribed by Section 5018(e)(4). ~~All mobile cranes including truck-mounted tower cranes having either a maximum rated boom length exceeding 200 feet or a maximum rated capacity exceeding 50 tons shall be equipped with a load indicating device or a load moment device, or a device that prevents an overload condition. Only approved devices as defined in the General Industry Safety Orders, Section 3206 shall be used.~~

~~(1) All other mobile cranes manufactured after September 27, 2005, with a maximum rated capacity exceeding 3 tons shall be equipped with a load indicating device, load moment device, or a device that prevents an overload condition.~~

~~Exception: When installed load indicating devices are not functional, a qualified person shall determine load weights until the device is restored to operation.~~

~~(2) Load indicating devices shall be repaired in accordance with the manufacturer's recommendations.~~

***[Ed note: Go back to original verbiage, or use B30.5 definition for Operational Aids? Section 5018 was deleted by AC2]***

(c) Boom angle or radius indicators as prescribed by Section 5018(e)(1).
~~Mobile cranes shall be provided with a boom angle or radius indicator which clearly shows the boom angle in degrees to the operator at all times.~~
~~Exception: When a boom angle or radius indicator is inoperative or malfunctioning, a qualified person shall determine the radius or boom angle by measurement until the indicator is restored to operation.~~~~When a boom angle or radius indicator is inoperative or malfunctioning, a qualified person shall determine the radius or boom angle by measurement until the indicator is restored to operation.~~

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~~(1) Boom angle or radius indicators shall be repaired in accordance with the manufacturer's recommendations.~~

(d) Anti-two-block prevention and warning features as prescribed by Section 5018(d)(3).

~~(1) Telescopic boom cranes manufactured after February 28, 1992, shall be equipped with an anti two-block device or two-block damage prevention feature for all points of two-blocking.~~

~~(2) Lattice boom cranes manufactured after February 28, 1992, shall be equipped with an anti two-block device or a two-block warning feature, which functions for all points of two-blocking.~~

~~Exception: The requirements of subsection (d)(2), do not apply to lattice boom cranes when used for dragline, clamshell (grapple), magnet, and drop ball work. The requirements of subsection (d)(2), do not apply to lattice boom cranes when used for dragline, clamshell (grapple), magnet, and drop ball work.~~

~~(3) Articulating boom cranes manufactured after August 30, 2001, equipped with a load hoisting device (winch) shall be equipped with a two-block damage prevention feature.~~

***[Ed note: Go back to original verbiage, or use B30.5 definition for Operational Aids? Section 5018 was deleted by AC2]***

(e) Spirit levels, or equivalent, shall be provided to indicate the level of the crane fore and aft and across the width.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4928.1 as follows:

§ 4928.1 Free fall and controlled load lowering. *[Ed note: relocated from 5002.1]*

(a) Boom free fall prohibitions.

(1) The use of equipment in which the boom is configured to free fall (live boom) is prohibited in each of the following circumstances:

(A) An employee is in the fall zone of the boom or load.

(B) An employee is being hoisted.

(C) The load or boom is directly over a power line, or over any part of the area extending the Table A of §5003.1 clearance distance to each side of the power line; or any part of the area extending the Table A clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.

Note to (a)(1)(C): Operations in proximity to overhead lines are also subject to Section 2946.

(D) The load is over a shaft, except where there are no employees in the shaft.

(E) The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.

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(F) Lifting operations are taking place in a refinery or tank farm.

(2) The use of equipment in which the boom is configured to free fall (live boom) is permitted only where none of the circumstances listed in subsection (a)(1) are present and:

(A) The equipment was manufactured prior to October 31, 1984; or

(B) The equipment is a floating crane/derrick or a land crane/derrick on a vessel/flotation device.

(b) Preventing boom free fall (Controlled Load Lowering). Where the use of equipment with a boom that is configured to free fall (live boom) is prohibited, the boom shall have a secondary mechanism or device designed to prevent the boom free fall in the event the primary system used to hold or regulate the boom hoist fails, as follows:

(1) Friction drums shall have:

(A) A friction clutch and a braking device, to allow for controlled boom lowering.

(B) A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device).

(2) Hydraulic drums shall have an integrally mounted holding device or internal static brake to prevent hoist movement in the event of hydraulic failure.

(3) Neither clutches nor hydraulic motors shall be considered as a brake or locking device for purposes of this section.

(4) Hydraulic boom hoist cylinders shall have an integrally mounted holding device.

(c) Load line free fall prohibitions. In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

(1) An employee is in the fall zone of the load.

(2) An employee is being hoisted.

(3) The load or boom is directly over a power line, or over any part of the area extending the Table A of §5003.1 clearance distance to each side of the power line; or any part of the area extending the Table A clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.

Note to (c)(3): Operations in proximity to overhead lines are also subject to Section 2946.

(4) The load is over a shaft.

(5) The load is over a cofferdam, except where there are no employees in the fall zone of the load.

(6) Lifting operations are taking place in a refinery or tank farm.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment
Article 94. Hydraulic Cranes and Excavators

Amend Section 4949 as follows:

§4949. Boom Hoist and Supporting Mechanism.

(a) The boom hoist shall be capable of elevating and supporting the boom and 110% of rated load without attention from the operator and allow lowering to rated radius only when under operator's control.

(b) A holding device shall be provided.
(1) On rope boom support machines a ratchet and pawl or other positive locking device shall be provided to prevent unintentional lowering of the boom.
(2) For hydraulic cylinder boom support machines, a holding device (such as load checks) shall be provided to prevent unintentional lowering of the boom.

(c) Minimum ratio of boom hoist drum and sheave pitch diameters to nominal rope diameters shall not be less than 15 to 1.

(d) On a telescoping boom, the retract function shall be capable of controlling 110% of rated load. A holding device (such as load check) shall be provided.

<u>(e) Friction mechanisms. Where friction mechanisms (such as brakes and clutches) are used to control the boom hoist or load line hoist, they shall be:</u>
<u>(1) Of a size and thermal capacity sufficient to control all rated loads with the minimum recommended reeving.</u>
<u>(2) Adjustable to permit compensation for lining wear to maintain proper operation.</u>

<u>(f) Hydraulic load hoists. Hydraulic drums shall have an integrally mounted holding device or internal static brake to prevent load hoist movement in the event of hydraulic failure.</u>

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment
Article 95. Derricks

Add new section 4959 as follows:

§4959. Operation – Procedures.
(a) Section 5008.1 (Operation) applies except for §5008.1(b) (Accessibility of procedures).
(b) Derrick operations shall be supervised by a competent person.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend section 4960 as follows:

§4960. Construction. *[Note: portions of 4960 are proposed to be relocated to 4960(e) and 4960.3]*
~~(a) Derricks shall be guyed and anchored so as to prevent tipping or collapsing.~~
(a) Guy derricks.
(1) The minimum number of guys shall be 6, with equal spacing, except where a qualified person or derrick manufacturer approves variations from these requirements and revises the rated capacity to compensate for such variations.
(2) Guy derricks shall not be used unless the employer has the following guy information from the manufacturer or a qualified person, when not available from the manufacturer:
(A) The number of guys.
(B) The spacing around the mast.
(C) The size, grade, and construction of rope to be used for each guy.
(3) For guy derricks manufactured after December 18, 1970, in addition to the information required in subsection (a)(2), the employer shall have the following guy information from the manufacturer or a qualified person, when not available from the manufacturer:
(A) The amount of initial sag or tension.
(B) The amount of tension in guy line rope at anchor.
(4) The mast base shall permit the mast to rotate freely with allowance for slight tilting of the mast caused by guy slack.
(5) The mast cap shall:
(A) Permit the mast to rotate freely.
(B) Withstand tilting and cramping caused by the guy loads.
(C) Be secured to the mast to prevent disengagement during erection.
(D) Be provided with means for attaching guy ropes.

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(b) ~~Reinforcing steel shall not be used for guy line anchors.~~

(b) Stiffleg derricks.

(1) The mast shall be supported in the vertical position by at least two stifflegs; one end of each shall be connected to the top of the mast and the other end securely anchored.

(2) The stifflegs shall be capable of withstanding the loads imposed at any point of operation within the load chart range.

(3) The mast base shall:

(A) Permit the mast to rotate freely (when necessary).

(B) Permit deflection of the mast without binding.

(4) The mast shall be prevented from lifting out of its socket when the mast is in tension.

(5) The stiffleg connecting member at the top of the mast shall:

(A) Permit the mast to rotate freely (when necessary).

(B) Withstand the loads imposed by the action of the stifflegs.

(C) Be secured so as to oppose separating forces.

(c) Gin pole derricks.

(1) Guy lines shall be sized and spaced so as to make the gin pole stable in both boomed and vertical positions.

Exception: Where the size and/or spacing of guy lines do not result in the gin pole being stable in both boomed and vertical positions, the employer shall ensure that the derrick is not used in an unstable position.

(2) The base of the gin pole shall permit movement of the pole (when necessary).

(3) The gin pole shall be anchored at the base against horizontal forces (when such forces are present).

(d) Chicago boom derricks. The fittings for stepping the boom and for attaching the topping lift shall be arranged to:

(1) Permit the derrick to swing at all permitted operating radii and mounting heights between fittings.

(2) Accommodate attachment to the upright member of the host structure.

(3) Withstand the forces applied when configured and operated in accordance with the manufacturer's/builder's procedures and within its rated capacity.

(4) Prevent the boom or topping lift from lifting out under tensile forces.

(e) Anchoring and guying.

(1) General requirements.

(A) ~~(a)~~ Derricks shall be guyed and anchored so as to prevent tipping or collapsing.

(B) ~~(b)~~ Reinforcing steel shall not be used for guy line anchors.

(C) Load anchoring data developed by the manufacturer or a qualified person shall be used.

(2) Guy derricks.

(A) The mast base shall be anchored.

(B) The guys shall be secured to the ground or other firm anchorage.

(C) The anchorage and guying shall be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular guy slope and spacing specified for the application.

(3) Stiffleg derricks.

(A) The mast base and stifflegs shall be anchored.

(B) The mast base and stifflegs shall be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular stiffleg spacing and slope specified for the application.

(f) Swingers and hoists.

(1) The boom, swinger mechanisms and hoists shall be suitable for the derrick work intended and shall be anchored to prevent displacement from the imposed loads.

(2) Hoists.

(A) Base mounted drum hoists shall meet the requirements of ASME B30.7–2001 which is incorporated by reference.

(B) Load tests for new, repaired and modified hoists. See Article 99 for testing requirements.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4960.1 as follows:

§4960.1. Operational aids.

(a) Not used. ~~Section 5018 (Operational aids) applies, except for §5018(d)(1) (Boom hoist limiting device), §5018(e)(1) (Boom angle or radius indicator), and §5018(e)(4) (Load weighing and similar devices).~~ [5018 deleted by AC2]

(b) Boom angle aid. A boom angle indicator is not required but if the derrick is not equipped with a functioning one, the employer shall ensure that either:

(1) The boom hoist cable shall be marked with caution and stop marks. The stop marks shall correspond to maximum and minimum allowable boom angles. The caution and stop marks shall be in view of the operator, or a spotter who is in direct communication with the operator; or

(2) An electronic or other device that signals the operator in time to prevent the boom from moving past its maximum and minimum angles, or automatically prevents such movement, is used.

(c) Load weight/capacity devices.

(1) Derricks manufactured more than one year after July 7, 2011 with a maximum rated capacity over 6,000 pounds shall have at least one of the following: load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter.

Temporary alternative measures: The weight of the load shall be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method

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recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. This information shall be provided to the operator prior to the lift. See §5008.1(g) for additional requirements.
(2) A load weight/capacity device that is not working properly shall be repaired no later than 30 days after the deficiency occurs.
Exception: If the employer documents that it has ordered the necessary parts within 7 days of the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 days, the repair shall be completed within 7 days of receipt of the parts.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4960.2 as follows:

§4960.2. Post-assembly approval and testing—new or reinstalled derricks.
(a) Anchorages. Anchorages, including the structure to which the derrick is attached (if applicable), shall be approved by a certificating agency.
(b) Functional test. Prior to initial use, new or reinstalled derricks shall be tested in accordance with Section 5020.
(c) Load test. Prior to initial use, new or reinstalled derricks shall be load tested by a certificating agency. The testing shall be done in accordance with the provisions of General Industry Safety Orders, Section 5023.
(1) The test shall consist of:
(A) Hoisting the test load a few inches and holding to verify that the load is supported by the derrick and held by the hoist brake(s).
(B) Swinging the derrick, if applicable, the full range of its swing, at the maximum allowable working radius for the test load.
(C) Booming the derrick up and down within the allowable working radius for the test load.
(D) Lowering, stopping and holding the load with the brake(s).
(2) The derrick shall not be used unless the certificating agency determines that the test has been passed.
(d) Documentation. Tests conducted under this subsection shall be documented. The document shall contain the date, test results and the name of the tester. The document shall be retained until the derrick is re-tested or dismantled, whichever occurs first. All such documents shall be available, during the applicable document retention period, to all persons who conduct inspections in accordance with Articles 99 and 100.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Amend and modify section 4960 to new section 4960.3 as follows:

§4960.3 ~~Construction~~ Securing the boom.
(a) ~~(c)~~ When the boom is being held in a fixed position, dogs, pawls, or other positive holding mechanism on the hoist shall be engaged. ~~When not in use the derrick boom shall:~~
(b) When ~~not in use~~ taken out of service for 30 days or more, the derrick boom shall be secured by one of the following methods:
(1) Be laid down;
(2) Be secured to a stationary member, as nearly under the head as possible, by attachment of a sling to the load block; or
(3) For guy derricks, be hoisted to a vertical position and secured to the mast.
(4) For stiffleg derricks, secured against the stiffleg.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4960.4 as follows:

§4960.4. Inspections. In addition to the requirements in Articles 99 and 100, the following additional items shall be included in the inspections:
(a) Daily: Guys for proper tension.
(b) Annual.
(1) Gudgeon pin for cracks, wear, and distortion.
(2) Foundation supports for continued ability to sustain the imposed loads.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend section 4961 as follows:

§4961. Rated Load Marking.
The chart shall include but not necessarily be limited to the following data:

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(4) Size and construction of the rope ~~may~~ shall be shown either on the rating chart or in the operating manual.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4962.1 as follows:

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§4962.1. Use of winch heads.
(a) Ropes shall not be handled on a winch head without the knowledge of the operator.
(b) While a winch head is being used, the operator shall be within reach of the power unit control lever.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Article 96. Tower Cranes

Amend section 4965 as follows:

§4965. General.

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(h) ~~Cranes mounted on rail tracks shall be equipped with limit switches limiting the travel of the crane on the track, and stops or buffers at each end of the tracks.~~ [Reserved] *[Ed note: relocated to 4968(k)]*

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(k) Signs. The size and location of signs installed on tower cranes shall be in accordance with manufacturer specifications. Where these are unavailable, a certified agent familiar with the type of equipment involved shall approve in writing the size and location of any signs.

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4965.1 as follows:

4965.1. Inspections.
(a) Articles 99 and 100 apply to tower cranes, except that the term “assembly” is replaced by “erection.” Section 5036 (Wire rope – inspection) applies to tower cranes.

(b) Pre-erection inspection. Before each crane component is erected, it shall be inspected by a qualified person for damage or excessive wear.
(1) The qualified person shall pay particular attention to components that will be difficult to inspect thoroughly during shift inspections.
(2) If the qualified person determines that a component is damaged or worn to the extent that it would create a safety hazard if used on the crane, that component shall not be erected on the crane unless it is repaired and, upon reinspection by the qualified person, found to no longer create a safety hazard.
(3) If the qualified person determines that, though not presently a safety hazard, the component needs to be monitored, the employer shall ensure that the component is checked in the monthly inspections. Any such determination shall be documented, and the documentation shall be available to any individual who conducts a monthly inspection.

(c) Post-erection inspection. In addition to the requirements in §5031.2, the following requirements shall be met:

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(1) A load test using certified weights, or scaled weights using a certified scale with a current certificate of calibration, shall be conducted after each erection.
(2) The load test shall be conducted in accordance with sections 344.81, 5022 and the manufacturer's instructions when available. Where the manufacturer's instructions are unavailable, other methods of proof load testing may be submitted for the above where acceptable to the Division.

(d) Monthly. The following additional items shall be included:
(1) Tower (mast) bolts and other structural bolts (for loose or dislodged condition) from the base of the tower crane up or, if the crane is tied to or braced by the structure, those above the upper-most brace support.
(2) The upper-most tie-in, braces, floor supports and floor wedges where the tower crane is supported by the structure, for loose or dislodged components.

(e) Annual. In addition to the items that must be inspected under §5022(d), 5031(c), and 5031.1, all turntable and tower bolts shall be inspected for proper condition and torque.

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend section 4966 as follows:

§4966. Erection, Climbing, Dismantling and Operation.

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(i) Application of assembly and disassembly requirements to tower cranes.
(1) Section 5010 (Assembly/ Disassembly – selection of manufacturer or employer procedures), §5010.1 (Assembly/ Disassembly—general requirements) applies to all assembly and disassembly operations, §5010.2 (Disassembly—additional requirements for dismantling of booms and jibs) applies to both the use of manufacturer procedures and employer procedures, and §5010.3 (Assembly/Disassembly—employer procedures—general requirements), apply to tower cranes (except as otherwise specified), except that the term "assembly/disassembly" is replaced by "erecting, climbing and dismantling," and the term "disassembly" is replaced by "dismantling."
(2) Dangerous areas (self-erecting tower cranes). In addition to the requirements in §5010.1(e), the following shall apply for self-erecting tower cranes: Employees shall not be in or under the tower, jib, or rotating portion of the crane during erecting, climbing and dismantling operations until the crane is secured in a locked position and the competent person in charge indicates it is safe to enter this area, unless the manufacturer's instructions direct otherwise and only the necessary personnel are permitted in this area.

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(3) Foundations and structural supports. Tower crane foundations and structural supports (including both the portions of the structure used for support and the means of attachment) shall be designed by the manufacturer or a certified agent.

(A) The controlling entity shall ensure the tower crane foundations and structural supports are installed in accordance with the manufacturer's or certified agent's instructions.

(B) The controlling entity shall provide a written statement of compliance with subsection (A), above, to the erecting entity prior to erection or jump of the tower crane.

(C) The top of the support/foundation shall be accessible and free of debris, materials and standing water. No materials shall be stored on the support unless approved by a qualified person. The foundation and fasteners shall remain accessible and visible for inspection at all times.

(4) Addressing specific hazards. The requirements in §5010.1(h)(1) through (9) apply. In addition, the A/D director shall address the following:

(A) Foundations and structural supports. The A/D director shall determine that tower crane foundations and structural supports are installed in accordance with their design.

(B) Loss of backward stability. Backward stability before swinging self-erecting cranes or cranes on traveling or static undercarriages.

(C) Wind speed. Wind shall not exceed the speed recommended by the manufacturer or, where manufacturer does not specify this information, the speed determined by a qualified person.

(5) Plumb tolerance. Towers shall be erected plumb to the manufacturer’s tolerance and verified by a qualified person. Where the manufacturer does not specify plumb tolerance, the crane tower shall be plumb to a tolerance of at least 1:500 (approximately 1 inch in 40 feet).

(6) Multiple tower crane jobsites. On jobsites where more than one fixed jib (hammerhead) tower crane is installed, the cranes shall be located such that no crane can come in contact with the structure of another crane. Cranes are permitted to pass over one another.

(7) Climbing procedures. Prior to, and during, all climbing procedures (including inside climbing and top climbing), the employer shall:

(A) Comply with all manufacturer prohibitions.

(B) Have a certified agent verify that the host structure is strong enough to sustain the forces imposed through the braces, brace anchorages and supporting floors.

(8) Counterweight/ballast.

(A) Equipment shall not be erected, dismantled or operated without the amount and position of counterweight and/or ballast in place as specified by the manufacturer or a certified agent familiar with the equipment.

(B) The maximum counterweight and/or ballast specified by the manufacturer or certified agent familiar with the equipment shall not be exceeded.

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Amend section 4968 as follows:

§4968. Safety Devices.
Section 5017 does not apply to tower cranes. All tower cranes shall have the following safety devices:

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(h) Boom stops on luffing boom type tower cranes.

(i) Jib stops on luffing boom type tower cranes if equipped with a jib attachment.

(j) Trolley end stops shall be provided at both ends of travel of the trolley (travel bogie).

(k) Cranes mounted on rail tracks shall be equipped with limit switches limiting the travel of the crane on the track, and stops or buffers at each end of the tracks.

(l) Integrally mounted check valves on all load supporting hydraulic cylinders.

(m) Hydraulic system pressure limiting device.

(n) The following brakes, which must automatically set in the event of pressure loss or power failure, are required:
(1) A hoist brake on all hoists.
(2) Swing brake.
(3) Trolley brake.
(4) Rail travel brake.

(o) Emergency stop switch at the operator's station.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4968.1 as follows:

4968.1 Safety Devices - Proper operation required.
Operations shall not begin unless the devices listed in section 4968 are in proper working order. If a device stops working properly during operations, the operator shall safely stop operations. The equipment shall be taken out of service, and operations shall not resume until the device is again working properly. See §5008.1(e). Alternative measures are not permitted to be used.

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Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4968.2 as follows:

4968.2. Operational Aids.
(a) Not used. ~~Section 5018 does not apply to tower cranes.~~ [Ed note: 5018 deleted by AC2]

(b) The devices listed in this section ("operational aids") are required on all tower cranes covered by this subpart, unless otherwise specified.

(c) Operations shall not begin unless the operational aids are in proper working order, except where the employer meets the specified temporary alternative measures. More protective alternative measures specified by the tower crane manufacturer, if any, shall be followed. See §5008.1(g) for additional requirements.

(d) If an operational aid stops working properly during operations, the operator shall safely stop operations until the temporary alternative measures are implemented or the device is again working properly.

(e) Category I operational aids and alternative measures. Operational aids listed in this subsection that are not working properly shall be repaired no later than 7 calendar days after the deficiency occurs. Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, the repair shall be completed within 7 calendar days of receipt of the parts.

(1) Trolley travel limiting device. The travel of the trolley shall be restricted at both ends of the jib by a trolley travel limiting device to prevent the trolley from running into the trolley end stops.
(2) Boom hoist limiting device. The range of the boom must be limited at the minimum and maximum radius.
(3) Anti-two-blocking device. The tower crane shall be equipped with a device which automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) shall prevent such damage at all points where two-blocking could occur.
(4) Hoist drum lower limiting device. Tower cranes manufactured after July 7, 2012 shall be equipped with a device that prevents the last 2 wraps of hoist cable from being spooled off the drum.
(5) Load moment limiting device. The tower crane shall have a device that prevents moment overloading.

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(6) Hoist line pull limiting device. The capacity of the hoist shall be limited to prevent overloading, including each individual gear ratio if equipped with a multiple speed hoist transmission.
(7) Rail travel limiting device. The travel distance in each direction shall be limited to prevent the travel bogies from running into the end stops or buffers.
(8) Boom hoist drum positive locking device and control. The boom hoist drum shall be equipped with a control that will enable the operator to positively lock the boom hoist drum from the cab.
Temporary alternative measures: The device shall be manually set when required if an electric, hydraulic or automatic control is not functioning.
(9) Boom angle or hook radius indicator.
(A) Luffing boom tower cranes must have a boom angle or radius indicator readable from the operator's station. *[Ed note: proposed mod per Brad Closson email 6/15/15]*
(B) Hammerhead tower cranes manufactured after July 7, 2012 must have a hook radius indicator readable from the operator's station.
(10) Trolley travel deceleration device. The trolley speed shall be automatically reduced prior to the trolley reaching the end limit in both directions.
(11) Boom hoist deceleration device. The boom speed shall be automatically reduced prior to the boom reaching the minimum or maximum radius limit.
(12) Load hoist deceleration device. The load speed shall be automatically reduced prior to the hoist reaching the upper limit.
(13) Wind speed indicator. A device shall be provided to display the wind speed and shall be mounted above the upper rotating structure on tower cranes. On self-erecting cranes, it shall be mounted at or above the jib level.
Temporary alternative measures: Use of wind speed information from a properly functioning indicating device on another tower crane on the same site, or a qualified person estimates the wind speed.
(14) Load indicating device. Cranes manufactured after July 7, 2012 shall have a device that displays the magnitude of the load on the hook. Displays that are part of load moment limiting devices that display the load on the hook meet this requirement.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
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Add new Article 97.1 as follows:

Article 97.1. Floating Cranes / Derricks and Land Cranes/Derricks on Barges.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.0 as follows:

§4988.0. Purpose.
This Article contains supplemental requirements for floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation (i.e., vessel/flotation device).

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.1 as follows:

§4988.1. Scope. The sections of this Article apply to floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation, unless specified otherwise. The requirements of this section do not apply when using jacked barges when the jacks are deployed to the river, lake, or sea bed and the barge is fully supported by the jacks.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.2 as follows:

§4988.2. General requirements. The requirements in sections 4988.3 through 4988.8 apply to both floating cranes/ derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Add new section 4988.3 as follows:

§4988.3. Work area control.
(a) The requirements of §4993.1 (Work area control) apply, except for §4993.1(a)(2)(B).

(b) The employer shall either:
(1) Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas; or
(2) Clearly mark the hazard areas by a combination of warning signs (such as, "Danger—Swing/Crush Zone") and high visibility markings on the equipment that identify the hazard areas. In addition, the employer shall train each employee to understand what these markings signify.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.4 as follows:

§4988.4. Additional safety devices. In addition to the safety devices listed in §5017, the following safety devices are required:
(a) Barge, pontoon, vessel or other means of flotation list and trim device. The safety device shall be located in the cab or, when there is no cab, at the operator's station.

(b) Positive equipment house lock.

(c) Wind speed and direction indicator. A competent person shall determine if wind is a factor that needs to be considered; if wind needs to be considered, a wind speed and direction indicator shall be used.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.5 as follows:

§4988.5. Operational aids.
(a) An anti-two-block device is required only when hoisting personnel or hoisting over an occupied cofferdam or shaft.
~~(b) Section 5018(e)(4) (Load weighing and similar devices) does not apply to dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket, and pile driving work performed under this section.~~ [5018 deleted by AC2]

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Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.6 as follows:

§4988.6. Accessibility of procedures applicable to equipment operation.
If the crane/derrick has a cab, the requirements of §5008.1(b) apply. If the crane/derrick does not have a cab, the employer shall ensure that:
(a) Rated capacities (load charts) are posted at the operator's station. If the operator's station is moveable (such as with pendant-controlled equipment), the load charts are posted on the equipment.

(b) Procedures applicable to the operation of the equipment (other than load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, shall be readily available on board the vessel/flotation device.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.7 as follows:

§4988.7. Inspections.
In addition to meeting the requirements of Articles 99 and 100 for inspecting the crane/derrick, the employer shall inspect the barge, pontoons, vessel or other means of flotation used to support a floating crane/derrick or land crane/derrick, and ensure that:
(a) Shift. For each shift inspection, the means used to secure/attach the equipment to the vessel/flotation device is in proper condition, including wear, corrosion, loose or missing fasteners, defective welds, and (when applicable) insufficient tension.

(b) Monthly. For each monthly inspection:
(1) The means used to secure/attach the equipment to the vessel/flotation device is in proper condition, including inspection for wear, corrosion, and, when applicable, insufficient tension.
(2) The vessel/flotation device is not taking on water.
(3) The deck load is properly secured.
(4) The vessel/flotation device is watertight based on the condition of the chain lockers, storage, fuel compartments, and hatches.
(5) The firefighting and lifesaving equipment is in place and functional.

(c) The shift and monthly inspections are conducted by a competent person, and:

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(1) If any deficiency is identified, an immediate determination is made by a qualified person whether the deficiency constitutes a hazard.
(2) If the deficiency is determined to constitute a hazard, the vessel/flotation device is removed from service until the deficiency has been corrected.

(d) Annual. External vessel/flotation device inspection. For each annual inspection:
(1) The external portion of the barge, pontoons, vessel or other means of flotation used is inspected annually by a qualified person who has expertise with respect to vessels/flotation devices and the inspection includes the following items:
(A) The items identified in subsection (a) (Shift) and (b) (Monthly) of this section.
(B) Cleats, bitts, chocks, fenders, capstans, ladders, and stanchions, for significant corrosion, wear, deterioration, or deformation that could impair the function of these items.
(C) External evidence of leaks and structural damage; evidence of leaks and damage below the waterline may be determined through internal inspection of the vessel/flotation device.
(D) Four-corner draft readings.
(E) Firefighting equipment for serviceability.
(2) Rescue skiffs, lifelines, work vests, life preservers and ring buoys are inspected for proper condition.
(3) If any deficiency is identified, an immediate determination is made by the qualified person whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly inspections.
(A) If the qualified person determines that the deficiency constitutes a hazard, the vessel/flotation device is removed from service until it has been corrected. See requirements in §5008.1(e).
(B) If the qualified person determines that, though not presently a hazard, the deficiency needs to be monitored, the deficiency is checked in the monthly inspections.

(e) Four-year: internal vessel/flotation device inspection. For each four-year inspection:
(1) A marine engineer, marine architect, licensed surveyor, or other qualified person who has expertise with respect to vessels/flotation devices surveys the internal portion of the barge, pontoons, vessel, or other means of flotation.
(2) If the surveyor identifies a deficiency, an immediate determination is made by the surveyor as to whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly or annual inspections, as appropriate.
(A) If the surveyor determines that the deficiency constitutes a hazard, the vessel/flotation device is removed from service until it has been corrected.
(B) If the surveyor determines that, though not presently a hazard, the deficiency needs to be monitored, the deficiency is checked in the monthly or annual inspections, as appropriate.

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(f) Documentation. The monthly and annual inspections required in subsections (b) and (d) are documented in accordance with sections 5031(b)(3)(C) and 5031(c)(8) respectively, and that the four-year inspection required in subsection (e) is documented in accordance with §5031(c)(8), except that the documentation for that inspection shall be retained for a minimum of 4 years. All such documents shall be made available, during the applicable document retention period, to all persons who conduct inspections in accordance with Articles 99 and 100.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.8 as follows:

§4988.8. Manufacturer's specifications and limitations.
(a) The employer shall ensure that the barge, pontoons, vessel, or other means of flotation shall be capable of withstanding imposed environmental, operational and in-transit loads when used in accordance with the manufacturer's specifications and limitations.

(b) The employer shall ensure that the manufacturer's specifications and limitations with respect to environmental, operational, and in-transit loads for a barge, pontoon, vessel, or other means of flotation are not exceeded or violated.

(c) When the manufacturer's specifications and limitations are unavailable, the employer shall ensure that the specifications and limitations established by a qualified person with respect to environmental, operational and in-transit loads for the barge, pontoons, vessel, or other means of flotation are not exceeded or violated.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.9 as follows:

§4988.9. Floating cranes/derricks. For equipment designed by the manufacturer (or employer) for marine use by permanent attachment to barges, pontoons, vessels or other means of flotation:
(a) Load charts.
(1) The employer shall not exceed the manufacturer load charts applicable to operations on water. When using these charts, the employer shall comply with all parameters and limitations (such as dynamic and environmental parameters) applicable to the use of the charts.
(2) The employer shall ensure that load charts take into consideration a minimum wind speed of 40 miles per hour.
(b) The employer shall ensure that the requirements for maximum allowable list and maximum

allowable trim as specified in Table M1 of this section are met.

TABLE M1

| Rated Capacity | Maximum Allowable List (degrees) | Maximum Allowable Trim (degrees) |
|---|---|---|
| Equipment designed for marine use by permanent attachment (other than derricks): | | |
| 25 tons or less | 5 | 5 |
| Over 25 tons | 7 | 7 |
| Derricks designed for marine use by permanent attachment: | | |
| Any rated capacity | 10 | 10 |

(c) The employer shall ensure that the equipment is stable under the conditions specified in Tables M2 and M3 of this section. (Note: Freeboard is the vertical distance between the water line and the main deck of the vessel.)

TABLE M2

| Operated at | Wind speed (mph) | Minimum freeboard (ft.) |
|---|---|---|
| Rated capacity | 60 | 2 |
| Rated capacity plus 25% | 60 | 1 |
| High boom, no load | 60 | 2 |

TABLE M3

| Operated at | Wind speed (mph) |
|---|---|
| For backward stability of the boom: High boom, no load, full back list (least stable condition) | 90 |

(d) If the equipment is employer-made, it shall not be used unless the employer has documents demonstrating that the load charts and applicable parameters for use meet the requirements of subsections (a) through (c). Such documents shall be signed by a registered professional engineer who is a qualified person with respect to the design of this type of equipment (including the means of flotation).

(e) The employer shall ensure that the barge, pontoons, vessel or other means of flotation used:
(1) Are structurally sufficient to withstand the static and dynamic loads of the crane/derrick when

operating at the crane/derrick's maximum rated capacity with all planned and actual deck loads and ballasted compartments.
(2) Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free-surface effect.
(3) Have access to void compartments to allow for inspection and pumping.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 4988.10 as follows:

§4988.10. Land cranes/derricks. For land cranes/derricks used on barges, pontoons, vessels or other means of flotation, the employer shall ensure that:
(a) The rated capacity of the equipment (including but not limited to modification of load charts) applicable for use on land is reduced to:
(1) Account for increased loading from list, trim, wave action, and wind.
(2) Be applicable to a specified location(s) on the specific barge, pontoons, vessel or other means of flotation that will be used, under the environmental conditions expected and encountered.
(3) The conditions required in subsections (c) and (d) are met.

(b) The rated capacity modification required in subsection (a) is performed by the equipment manufacturer, or a qualified person who has expertise with respect to both land crane/derrick capacity and the stability of vessels/flotation devices.

(c) For list and trim.
(1) The maximum allowable list and the maximum allowable trim for the barge, pontoon, vessel or other means of flotation shall not exceed the amount necessary to ensure that the conditions in subsection (d) are met. In addition, the maximum allowable list and the maximum allowable trim shall not exceed the least of the following: 5 degrees, the amount specified by the crane/derrick manufacturer, or, when, an amount is not so specified, the amount specified by the qualified person.
(2) The maximum allowable list and the maximum allowable trim for the land crane/derrick shall not exceed the amount specified by the crane/derrick manufacturer, or, when, an amount is not so specified, the amount specified by the qualified person.

(d) For the following conditions:
(1) All deck surfaces of the barge, pontoons, vessel or other means of flotation used are above water.
(2) The entire bottom area of the barge, pontoons, vessel or other means of flotation used is

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submerged.

(e) Physical attachment, corralling, rails system and centerline cable system meet the requirements in Option (1), Option (2), Option (3), or Option (4) of this section, and that whichever option is used also meets the requirements of subsection (e)(5).

(1) Option (1) – Physical attachment. The crane/derrick is physically attached to the barge, pontoons, vessel or other means of flotation. Methods of physical attachment include crossed-cable systems attached to the crane/derrick and vessel/flotation device, bolting or welding the crane/derrick to the vessel/flotation device, strapping the crane/derrick to the vessel/flotation device with chains, or other methods of physical attachment.

(2) Option (2) – Corralling. The crane/derrick is prevented from shifting by installing barricade restraints (i.e., a corralling system). Employers shall ensure that corralling systems do not allow the equipment to shift by any amount of shifting in any direction.

(3) Option (3) – Rails. The crane/derrick shall be prevented from shifting by being mounted on a rail system. Employers shall ensure that rail clamps and rail stops are used unless the system is designed to prevent movement during operation by other means.

(4) Option (4) – Centerline cable system. The crane/derrick is prevented from shifting by being mounted to a wire rope system. The employer shall ensure that the wire rope system meets the following requirements:

(A) The wire rope and attachments are of sufficient size and strength to support the side load of crane/derrick.

(B) The wire rope is attached physically to the vessel/flotation device.

(C) The wire rope is attached to the crane/derrick by appropriate attachment methods (such as shackles or sheaves) on the undercarriage, and that the method used will allow the crew to secure the crane/derrick from movement during operation and to move the crane/derrick longitudinally along the vessel/flotation device for repositioning.

(D) Means are installed to prevent the crane/derrick from passing the forward or aft end of the wire rope attachments.

(E) The crane/derrick is secured from movement during operation.

(5) The systems/means used to comply with Option (1), Option (2), Option (3), or Option (4) of this section are designed by a marine engineer, registered professional engineer familiar with floating crane/derrick design, or qualified person familiar with floating crane/ derrick design.

Exception for subsection (e):
For mobile auxiliary cranes used on the deck of a floating crane/derrick, the requirement specified by subsection (e) to use Option (1), Option (2), Option (3), or Option (4) does not apply when the employer demonstrates implementation of a plan and procedures that meet the following requirements:

(1) A marine engineer or registered professional engineer familiar with floating crane/derrick design develops and signs a written plan for the use of the mobile auxiliary crane.

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(2) The plan is designed so that the applicable requirements of this section are met despite the position, travel, operation, and lack of physical attachment (or corralling, use of rails or cable system) of the mobile auxiliary crane.
(3) The plan specifies the areas of the deck where the mobile auxiliary crane is permitted to be positioned, travel, and operate, and the parameters and limitations of such movements and operation.
(4) The deck is marked to identify the permitted areas for positioning, travel, and operation.
(5) The plan specifies the dynamic and environmental conditions that must be present for use of the plan.
(6) If the dynamic and environmental conditions in requirement (5) are exceeded, the mobile auxiliary crane shall be attached physically or corralled in accordance with Option (1), Option (2) or Option (4) of subsection (e).

(f) The barge, pontoons, vessel or other means of flotation used:
(1) Are structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all anticipated deck loads and ballasted compartments.
(2) Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free surface effect.
(3) Have access to void compartments to allow for inspection and pumping.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Subchapter 7. General Industry Safety Orders
Group 13. Cranes and Other Hoisting Equipment
Article 98. Operating Rules

Amend Section 4991 as follows:

§4991. Travel. [Reviewed 3/25/15]
(a) The travel of boom-type equipment and cranes ~~or boom-type excavators~~ shall be controlled so as to avoid collision with persons, material, and equipment. The cabs of units (of the revolving type) traveling under their own power shall be turned so as to provide the least obstruction to the operator's vision in the direction of travel, unless receiving signals from someone with an unobstructed view.
(b) In transit, the following additional precautions for mobile cranes shall be exercised:
(1) The boom shall be carried in line with the direction of motion and the superstructure shall be secured against rotation, except when negotiating turns when there is an operator in the cab, or when the boom is supported on a dolly.
(2) The empty hook, headache ball, or block shall be lashed or otherwise restrained so that it cannot swing freely.
(c) Traveling with a load is prohibited if the practice is prohibited by the equipment manufacturer.
(d) Where traveling with a load, the employer shall ensure that:
(1) A competent person supervises the operation, determines if it is necessary to reduce rated capacity, and makes determinations regarding load position, boom location, ground support, travel route, overhead obstructions, and speed of movement necessary to ensure safety.
Exception to subsection (d)(1): Marine terminal operations regulated by Article 14 of these Orders.
(2) For equipment with tires, tire pressure specified by the ~~crane~~ equipment manufacturer for traveling with a load shall be maintained.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 4991.1 as follows:

§4991.1. Ground conditions. [Reviewed 9/10/14]
(a) Definitions.
(1) "Ground conditions" means the ability of the ground to support the equipment (including slope, compaction, and firmness).
(2) "Supporting materials." Blocking, mats, cribbing, marsh buggies (in marshes/wetlands), or similar supporting materials or devices.

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(b) The equipment shall not be assembled or used unless ground conditions are firm, drained, and graded to a sufficient extent so that, in conjunction (if necessary) with the use of supporting materials, the equipment manufacturer's specifications for adequate support and degree of level of the equipment are met. The requirement for the ground to be drained does not apply to marshes/wetlands.

(c) The controlling entity shall:

(1) Ensure that ground preparations necessary to meet the requirements in subsection (b) are provided.

(2) Inform the user of the equipment and the operator regarding ~~of~~ the location of hazards beneath the equipment set-up area (such as voids, tanks, utilities) if those hazards are identified in documents (such as site drawings, as-built drawings, and soil analyses) that are in the possession of the controlling entity (whether at the site or off-site) or the hazards are otherwise known to that controlling entity.

(d) If there is no controlling entity for the project, the requirement in subsection (c)(1) shall be met by the employer that has authority at the site to make or arrange for ground preparations needed to meet subsection (b).

(e) If the A/D director or the operator determines that ground conditions do not meet the requirements in subsection (b), that person's employer shall have a discussion with the controlling entity regarding the ground preparations that are needed so that, with the use of suitable supporting materials/devices (if necessary), the requirements in subsection (b) can be met.

Exception: This section does not apply to cranes designed for use on railroad tracks when used on railroad tracks that are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213 and that comply with applicable Federal Railroad Administration requirements.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 4994 as follows:

§4994. Hoisting. [Reviewed 3/25/15]

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b) Outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the certified agent for that crane.

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(5) When a crane is equipped with stabilizers, the stabilizers shall be used in accordance with American Society of Mechanical Engineers (ASME) B30.22-2010, Section 22-3.2.4, and/or B30.5-2011, Section 5-1.2, which are incorporated herein by reference. ~~For construction industry outrigger and stabilizer use requirements, see Construction Safety Orders, Section 1611.2(q).~~

***

(c) The brakes shall be tested each time a load is 90% or more of ~~approaching~~ the rated load as configured ~~is handled~~ by raising the load a few inches and applying the brakes. ~~The operator shall test the brakes each time a load that is 90% or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90% or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.~~

***

(f) Multiple crane/derrick lifts – Supplemental requirements for construction.

(1) Plan development. Before beginning a crane/derrick operation in which more than one crane/derrick will be supporting the load, the operation shall be planned. The planning shall meet the following requirements:

(A) The plan shall be developed by a qualified person.

(B) The plan shall be designed to ensure that the requirements of these Orders are met.

(C) Where the qualified person determines that engineering expertise is needed for the planning, the employer shall ensure that it is provided.

(2) Plan implementation.

(A) The multiple-crane/derrick lift shall be directed by a person (lift director) who meets the criteria for both a competent person and a qualified person.

(B) The lift director shall review the plan in a meeting with all workers who will be involved with the operation.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 4999 as follows:

§ 4999 Handling Loads.

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(b) Size of Load. A crane, derrick, or hoist shall not be loaded beyond the rated capacity ~~or safe working load whichever is smaller~~, except for test purposes. In all operations where the weight of the load being handled is unknown and may approach the rated capacity, there shall be a qualified person (rigger) assigned to determine the weight ~~magnitude~~ of the load, unless the crane or derrick is equipped with a load weighing device. The operator shall not make any lift

under these conditions until informed of such weight by the qualified person (rigger) assigned to that operation.

(1) Additional for mobile cranes and derricks in construction: In all operations where the weight of the load being handled is unknown and may approach the rated capacity, the operator shall verify that the load is within the rated capacity of the equipment by at least one of the following methods:

(A) The weight of the load shall be determined from a source recognized by the industry (such as the load's manufacturer), or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight), or by other equally reliable means. ~~In addition, when requested by the operator,~~ This information shall be provided to the operator prior to the lift; or

(B) The operator may begin hoisting the load to determine, using a load weighing device, load moment indicator, rated capacity indicator, or rated capacity limiter, if it exceeds 75 percent of the maximum rated capacity at the longest radius that will be used during the lift operation. If it does, the operator shall not proceed with the lift until he/she verifies the weight of the load in accordance with subsection (b)(1)(A).

*[Ed note: 4999(b) modified post-AC based on committee discussions; may require more work]*

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(i) Holding the Load.

(1) When a load of any kind is to be suspended for a period of time exceeding normal lifting operations ~~any considerable time~~, the drum holding mechanism shall be used in addition to the brake which shall also be applied.

(2) Cranes, hoists, or derricks shall not be left unattended while the load is suspended unless the load is suspended over water, a barricaded area, or is blocked up or otherwise supported from below during repairs or emergency.

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(k) On ~~truck~~ wheel-mounted cranes, no loads shall be lifted over the front area except as permitted by the manufacturer or approved by a ~~the~~ certified agent ~~agency~~.

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Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5001 as follows:

§5001. Signals – General requirements.

(a) A signal person shall be provided when the point of operation is not in full and direct view of the operator unless a signaling or control device is provided for safe direction of the operator.

(1) Supplemental requirements for mobile cranes, a signal person shall be provided if:

(A) ~~(2)~~ when the equipment is traveling, the view in the direction of travel is obstructed.

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(B) ~~(3)~~ if, due to site specific safety concerns, either the operator or the person handling the load determines that it is necessary.

(b) Only qualified persons shall be permitted to give signals.
EXCEPTION: A stop signal may be given by any person.

(c) Types of signals. Signals to operators shall be by hand, voice, or audible.

(d) Hand Signals. ~~Signal systems other than manual shall be protected against unauthorized use, breakage, weather or obstruction which will interfere with safe operation. In the event of any known malfunction, an alternate signal system shall be used or all motion shall be stopped.~~

(1) ~~(c)~~ A uniform signal system shall be used on all operations and if hand signals are used, they shall be clearly understood by the operator. (Note: For recommended hand signals, see Plate I.)

(A)

EXCEPTION: Where an operation or use of an attachment is not covered in the Standard Method, nonstandard hand signals may be used in accordance with subsection (d)(2).

(2) Non-standard hand signals. When using non-standard hand signals, the signal person, operator, and lift director (where there is one) shall contact each other prior to the operation and agree on the non-standard hand signals that will be used.

(e) There shall be conspicuously posted in the vicinity of the hoisting operations, a legible chart depicting and explaining the system of signals used.

(f) New signals. Signals other than hand, voice, or audible signals may be used where: ~~the employer demonstrates that:~~

(1) The new signals provide at least equally effective communication as voice, audible, or Standard Method hand signals, or

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

(g) Suitability. The signals used (hand, voice, audible, or new), and means of transmitting the signals to the operator (such as direct line of sight, video, radio, etc.), shall be appropriate for the site conditions.

(h) During operations requiring signals, the ability to transmit signals between the operator and signal person shall be maintained. If that ability is interrupted at any time, the operator shall safely stop operations requiring signals until it is reestablished and a proper signal is given and understood.

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(1) ~~(d)~~ Signal systems other than manual shall be protected against unauthorized use, breakage, weather or obstruction which will interfere with safe operation. In the event of any known malfunction, an alternate signal system shall be used or all motion shall be stopped.

(i) If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator shall safely stop operations. Operations shall not resume until the operator and signal person agree that the problem has been resolved.

(j) All directions given to the operator by the signal person must be given from the operator's direction perspective.

(k) Communication with multiple cranes/derricks. Where a signal person(s) is in communication with more than one crane/ derrick, a system shall be used for identifying the crane/derrick each signal is for, as follows:
(1) for each signal, prior to giving the function/direction, the signal person shall identify the crane/derrick the signal is for, or
(2) shall use an equally effective method of identifying which crane/derrick the signal is for.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5001.1 as follows:

§5001.1. Signals – Radio, Telephone or other Electronic Transmission Of Signals.
(a) The device(s) used to transmit signals shall be tested on site before beginning operations to ensure that the signal transmission is effective, clear, and reliable.

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

(c) The operator's reception of signals shall be by a hands-free system.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5001.2 as follows:

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§5001.2. Signals – Voice Signals – Additional Requirements.
(a) Prior to beginning operations, the operator, signal person and lift director (if there is one), shall contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers need not meet again to discuss voice signals unless another worker is added or substituted, or there is confusion about the voice signals, or a voice signal is to be changed.
(b) Each voice signal shall contain the following three elements, given in the following order: (1) function (such as hoist, boom, etc.) and direction; (2) distance and/or speed; (3) function and stop command.
(c) The operator, signal person and lift director (if there is one), shall be able to effectively communicate in the language used.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5001.3 as follows:

§5001.3. Signal Person Qualifications (for Cranes and Derricks in Construction).
(a) The employer of the signal person shall ensure that each signal person meets the qualification requirements [subsection (c)] prior to giving any signals. This requirement shall be met by using either Option (1) or Option (2) of this section.
(1) Option (1) – Third party qualified evaluator. The signal person has documentation from a third party qualified evaluator [see section 4885, Qualified Evaluator (third party)], showing that the signal person meets the qualification requirements [see subsection (c)].
(2) Option (2) – Employer's qualified evaluator. The employer's qualified evaluator [see section 4885, Qualified Evaluator (not a third party)], assesses the individual and determines that the individual meets the qualification requirements [see subsection (c)] and provides documentation of that determination. An assessment by an employer's qualified evaluator under this option is not portable – other employers are not permitted to use it to meet the requirements of this section.
(3) The employer shall make the documentation for whichever option is used available at the site while the signal person is employed by the employer. The documentation shall specify each type of signaling (e.g. hand signals, radio signals, etc.) for which the signal person meets the requirements of paragraph (c) of this section.

(b) If subsequent actions by the signal person indicate that the individual does not meet the qualification requirements [see subsection (c)], the employer shall not allow the individual to continue working as a signal person until re-training is provided and a reassessment is made in

accordance with subsection (a) that confirms that the individual meets the qualification requirements.

(c) Qualification Requirements. Each signal person shall:
(1) Know and understand the type of signals used. If hand signals are used, the signal person shall know and understand the Standard Method for hand signals.
(2) Be competent in the application of the type of signals used.
(3) Have a basic understanding of equipment operation and limitations, including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.
(4) Know and understand the relevant requirements of §5001 through §5001.3.
(5) Demonstrate that he/she meets the requirements in subsections (c)(1) through (4) through an oral or written test, and through a practical test.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5002 as follows:

§5002. Overhead Loads.
(a) Operations shall be conducted and the job controlled in a manner that will avoid exposure of employees to the hazard of overhead loads. Wherever loads must be passed directly over workers, occupied work spaces or occupied passageways, safety type hooks or equivalent means of preventing the loads from becoming disengaged shall be used.
~~NOTE: Employees should not work in the area directly beneath a suspended load.~~

(b) While the operator is not moving a suspended load, no employee shall be within the fall zone.
Exceptions:
(1) Employees engaged in hooking, unhooking or guiding a load, or
(2) Employees engaged in the initial attachment of the load to a component or structure; or
(3) Employees operating a concrete hopper or concrete bucket, or
(4) Oiler or assistant to the operator.

(c) When employees are engaged in hooking, unhooking, or guiding the load, or in the initial connection of a load to a component or structure and are within the fall zone, all of the following criteria shall be met:
(1) The materials being hoisted shall be rigged to prevent unintentional displacement.
(2) Hooks with self-closing latches or their equivalent shall be used.
(3) The materials shall be rigged by a qualified rigger.

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(d) Receiving a load. Only employees needed to receive a load are permitted to be within the fall zone when a load is being landed.

(e) During a tilt-up or tilt-down operation:
(1) No employee shall be directly under the load.
(2) Only employees essential to the operation are permitted in the fall zone (but not directly under the load). An employee is essential to the operation if the employee is conducting one of the following operations and the employer can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:
(A) Physically guide the load;
(B) closely monitor and give instructions regarding the load's movement; or
(C) either detach it from or initially attach it to another component or structure (such as, but not limited to, making an initial connection or installing bracing).
Notes:
1. Boom free fall is prohibited when an employee is in the fall zone of the boom or load.
2. Load line free fall is prohibited when an employee is directly under the load; see §4928.1.

NOTE: Authority and reference cited: Section 142.3, Labor Code.

~~Add new Section 5002.1 as follows:~~

~~§5002.1. Free Fall and Controlled Load Lowering.~~ *[Ed note: relocated to 4928.1]*
~~(a) Boom free fall prohibitions.~~
~~(1) The use of equipment in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:~~
~~(A) An employee is in the fall zone of the boom or load.~~
~~(B) An employee is being hoisted.~~
~~(C) The load or boom is directly over a power line, or over any part of the area extending the Table A of §5003.1 clearance distance to each side of the power line; or any part of the area extending the Table A clearance distance to each side of the power line is within the radius of vertical travel of the boom or the load.~~
~~Note to (a)(1)(C): Operations in proximity to overhead lines are also subject to Section 2946.~~
~~(D) The load is over a shaft, except where there are no employees in the shaft.~~
~~(E) The load is over a cofferdam, except where there are no employees in the fall zone of the boom or the load.~~
~~(F) Lifting operations are taking place in a refinery or tank farm.~~
~~(2) The use of equipment in which the boom is designed to free fall (live boom) is permitted only where none of the circumstances listed in paragraph (a)(1) of this section are present and:~~
~~(A) The equipment was manufactured prior to October 31, 1984; or~~

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~~(B) The equipment is a floating crane/derrick or a land crane/derrick on a vessel/flotation device.~~

~~(b) Preventing boom free fall. Where the use of equipment with a boom that is designed to free fall (live boom) is prohibited, the boom hoist must shall have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:~~

~~(1) Friction drums must have:~~

~~(A) A friction clutch and, in addition, a braking device, to allow for controlled boom lowering.~~

~~(B) A secondary braking or locking device, which is manually or automatically engaged, to back-up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device).~~

~~(2) Hydraulic drums must shall have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure.~~

~~(3) Neither clutches nor hydraulic motors must be considered brake or locking devices for purposes of this subpart section.~~

~~(4) Hydraulic boom cylinders must have an integrally mounted holding device.~~

~~(c) Preventing uncontrolled retraction.~~

~~Hydraulic telescoping booms shall have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.~~ *[Ed note: covered by §4949(d)]*

~~(d) Load line free fall. In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:~~

~~(1) An employee is directly under the load.~~

~~(2) An employee is being hoisted.~~

~~(3) The load is directly over a power line, or over any part of the area extending the Table A of §5003.1 clearance distance to each side of the power line; or any part of the area extending the Table A of §5003.1 clearance distance to each side of the power line is within the radius of vertical travel of the load.~~

~~Note to (d)(3): Operations in proximity to overhead lines are also subject to Section 2946.~~

~~(4) The load is over a shaft.~~

~~(5) The load is over a cofferdam, except where there are no employees in the fall zone of the load.~~

~~Exception: Cranes configured to prohibit free fall.~~

~~Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

*[Ed note: section 5002.1 relocated to 4928.1]*

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Add new Section 5003.1 as follows:

§ 5003.1. Power Line Safety (Up to 350kV) – Equipment Operations. [Reviewed 3/25/15]
(a) Hazard assessments and precautions inside the work zone. Before beginning equipment operations, the employer shall:
(1) Identify the work zone by either:
(A) Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries, or
(B) Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius.
(2) Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, the employer must meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:
(A) Option (1) – De-energize and ground. Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the worksite.
(B) Option (2) – 20 foot clearance. Ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.
(C) Option (3) - Table A clearance.
1. Determine the line's voltage and the minimum approach distance permitted under Table A.
2. Determine if any part of the equipment, load line or load (including rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Table A. If so, then the employer must follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum approach distance.
(b) Preventing encroachment/electrocution. Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements shall be met:
(1) Conduct a planning meeting with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s), and the steps that will be implemented to prevent encroachment/electrocution.
(2) If tag lines are used, they shall be non-conductive.
(3) Erect and maintain an elevated warning line, barricade, or line of signs, in view of the operator, equipped with flags or similar high-visibility markings, at 20 feet from the power line (if using Option (2) of this section) or at the minimum approach distance under Table A (if using Option (3) of this section). If the operator is unable to see the elevated warning line, a

dedicated spotter shall be used as described in subsection (b)(4)(A) in addition to implementing one of the measures described in subsections (b)(4)(B) and (C).

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

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

1. Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to: A clearly visible line painted on the Ground, a clearly visible line of stanchions, a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
2. Be positioned to effectively gauge the clearance distance.
3. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
4. Give timely information to the operator so that the required clearance distance can be maintained.

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

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

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

(d) Operations below power lines.

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

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

(A) The work is covered by Title 8 High-Voltage Electrical Safety Orders.

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

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

(D) The employer demonstrates that compliance with paragraph (d)(1) of this section is infeasible and meets the requirements of §5003.3.

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(e) When working where a hazardous electrical charge is induced in the equipment or materials being handled, the transmitter or other source shall be de-energized or one of the following precautions shall be taken:

(1) The equipment shall be electrically grounded and if tag lines are used they shall be non-conductive;

(2) A non-conductive insulating link shall be used between the hook and the load; or

(3) A non-conductive hoisting rope shall be used.

(f) Training.

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

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

1. Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground.
2. The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion, or other emergency that necessitates leaving the cab.
3. The safest means of evacuating from equipment that may be energized.
4. The danger of the potentially energized zone around the equipment (step potential) and the methods for emergency evacuation in an energized condition.
5. The need for crew in the area to avoid approaching or touching the equipment and the load.
6. Safe clearance distance from power lines.

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

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

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

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

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

(3) Training under this section shall be administered in accordance with §3203.

(g) Devices originally designed by the manufacturer for use as: A safety device (see §5017), operational aid, or a means to prevent power line contact or electrocution, when used to comply with this section, shall meet the manufacturer's procedures for use and conditions of use.

TABLE A—MINIMUM CLEARANCE DISTANCES

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| Voltage (nominal, kV, alternating current) | Minimum clearance distance (feet) |
|---|---|
| up to 50 | 10 |
| over 50 to 175 | 15 |
| over 175 to 350 | 20 |
| over 350 to 550 | 27 |
| over 550 to 1,000 | 45 |
| over 1,000 | (as established by the utility owner/ operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution). |

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

*[Ed Notes:*
1. *Although Table A is similar to 2946 Table 2, Table A is referenced numerous times throughout this standard, and it would be difficult (not impossible) to replace with a cross-reference to 2946 Table 2. Furthermore, 2946 Table 2 does not apply below 600V.*
2. *For 175kV-350kV, 2946 limits MAD to 21' which is more protective.]*

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5003.2 as follows:

§ 5003.2. Power Line Safety (Over 350kV). [Reviewed 3/25/15]
The requirements of §5010.4 and §5003.1 apply to power lines over 350 kV except:
(a) For power lines at or below 1000 kV, wherever the distance ''20 feet'' is specified, the distance ''50 feet'' shall be substituted; and
(b) For power lines over 1000 kV, the minimum clearance distance shall be established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5003.3 as follows:

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§ 5003.3. Power Line Safety (All Voltages) – Equipment Operations Closer Than the Table A Zone. [Reviewed 3/25/15]
(a) Equipment operations in which any part of the equipment, load line, or load (including rigging and lifting accessories) is closer than the minimum approach distance under Table A of § 5003.1 to an energized power line is prohibited except as permitted by the High-Voltage Electrical Safety Orders.
(b) Except where overhead electrical distribution and transmission lines have been de-energized and visibly grounded, the operation, erection, or handling of tools, machinery, apparatus, supplies, or materials, or any part thereof, over ~~energized overhead~~ ~~high-voltage~~ power lines is prohibited.
Exception to (b): Tower cranes equipped with limit switches or other systems that automatically control slew, trolley and boom travel to prevent moving any portion of the load or load line within a horizontal proximity to power lines closer than the minimum clearances set forth in Table A.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5003.4 as follows:

§ 5003.4. Power Line Safety - While Traveling Under or Near Power Lines with No Load. [Reviewed 3/25/15]
(a) This section establishes procedures and criteria that shall be met for equipment traveling under or near a power line ~~on a construction site~~ with no load. Equipment traveling ~~on a construction site~~ with a load is governed by §§ 5003.1, 5003.2 or 5003.3, whichever is appropriate, and §4991.
Exception: When traveling under the conditions set forth in Section 4991(b), the requirements of Section 5003.4 do not apply.
(1) The provisions of Electrical Safety Orders, Group 2, Article 37, shall also apply to any work in proximity to overhead power lines where more protective.
(b) The employer shall ensure that:
(1) The boom/mast and boom/mast support system are lowered sufficiently to meet the requirements of this section.
(2) The clearances specified in Table T of this section are maintained.
(3) The effects of speed and terrain on equipment movement (including movement of the boom/mast) are considered so that those effects do not cause the minimum clearance distances specified in Table T of this section to be breached.
(4) Dedicated spotter. If any part of the equipment while traveling will get closer than 20 feet to the power line, the employer shall ensure that a dedicated spotter who is in continuous contact with the driver/operator is used. The dedicated spotter shall:

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(A) Be positioned to effectively gauge the clearance distance.
(B) Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator.
(C) Give timely information to the operator so that the required clearance distance can be maintained.

(5) Additional precautions for traveling in poor visibility. When traveling at night, or in conditions of poor visibility, in addition to the measures specified in subsections (b)(1) through (4) of this section, the employer shall ensure that:
(A) The power lines are illuminated or another means of identifying the location of the lines is used.
(B) A safe path of travel is identified and used.

Table T—Minimum Clearance Distances While Traveling With No Load

| Voltage (nominal, kV, alternating current) | While traveling—minimum clearance distance (feet) |
|---|---|
| up to 0.60 | 4 |
| over .60 to 50 | 6 |
| over 50 to 345 | 10 |
| over 345 to 750 | 16 |
| Over 750 to 1,000 | 20 |
| Over 1,000 | (as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution). |

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5004 as follows:

§5004. Crane or Derrick Suspended Personnel Platforms.

***

(d) Operational Criteria.

***

(3) Load and boom hoist ~~drum~~ brakes, swing brakes, and operator actuated secondary braking and locking devices such as pawls or dogs or automatic secondary brakes shall be engaged when the occupied personnel platform is in a stationary working position.
(4) The crane shall be uniformly level within one percent of level grade, and located on firm footing. Cranes equipped with outriggers or stabilizers shall have them all fully deployed and locked following manufacturer's specifications, insofar as applicable, when hoisting employees.
(5) Capacity:
(A) Use of suspended personnel platforms. The total weight of the loaded personnel platform and related rigging shall not exceed 50 percent of the rated capacity for the radius and configuration of the crane or derrick, except during proof testing.
(B) Use of boom-attached personnel platforms. The total weight of the loaded personnel platform shall not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.
(C) Hoisting personnel without a personnel platform. When hoisting personnel without a personnel platform pursuant to section (k)(10) Exceptions, the total load (including the hook, load line, rigging and any other equipment that imposes a load) shall not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.
(8) Proper operation required. Personnel hoisting operations shall not begin unless the devices listed in this section are in proper working order. If a device stops working properly during such operations, the operator shall safely stop operations. Personnel hoisting operations shall not resume until the device is again working properly. Alternative measures are not permitted. (See §3314 for tag-out and related requirements.)

***

(e) Instruments and Components.
(1) Cranes (except articulating cranes) and derricks with variable angle booms shall be equipped with the following:
(A) A boom angle indicator, readily visible to the operator.
(B) A boom hoist limiting device.

***

(3)(A) An anti-two-block device shall be used which when activated, disengages all crane functions that can cause two-blocking.
(B) When a derrick is used to hoist personnel platforms, limiting devices shall be installed to prevent two-blocking.
Exception: This device is not required when hoisting personnel in pile driving operations. Instead, paragraph (p)(2) of this section specifies how to prevent two-blocking during such operations.
(4) The load line hoist drum shall have a system or device on the power train, other than the hoist brake, which regulates the lowering rate of speed of the hoist mechanism (controlled load lowering).

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NOTE: Free fall of the load line hoist is prohibited the use of equipment in which the boom hoist mechanism can free fall is also prohibited.

(5) Articulating cranes shall be equipped with a properly functioning automatic overload protection device.

(6) Equipment with a luffing jib shall be equipped with:

(A) A jib angle indicator, readily visible to the operator, and.

(B) A jib hoist limiting device.

***

(g) Platform Specifications.

***

(6) In addition to the use of hard hats, employees shall be protected by overhead protection on the personnel platform when employees are exposed to falling objects. The platform overhead protection shall not obscure the view of the operator or platform occupants (such as wire mesh that has up to 1⁄2 inch openings), unless full protection is necessary.

***

(i) Rigging.

(1) When a wire rope bridle is used to connect the personnel platform to the load line, each bridle leg shall be connected to a master link or shackle in such a manner to ensure that the load is evenly divided among the bridle legs.

(2) Hooks and other detachable devices.

(A) Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, or other attachments assemblies or components) shall be:

1. Of a type that can be closed and locked, eliminating the hook throat opening. ~~Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.~~

2. Closed and locked when attached.

(B) Shackles used in place of hooks shall be of the alloy anchor type, with either:

1. A bolt, nut and retaining pin, in place; or

2. Of the screw type, with the screw pin secured from accidental removal.

(C) Where other detachable devices are used, they shall be of the type that can be closed and locked to the same extent as the devices addressed in subsections (i)(2)(A) and (B). Such devices shall be closed and locked when attached.

(3) Rigging hardware (including wire rope, shackles, rings, master links, and other rigging hardware) shall ~~must~~ be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant rope is used, the slings shall be capable of supporting without failure at least ten times the maximum intended load.

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(6) The system used to connect the personnel platform to the equipment shall allow the platform to remain within 10 degrees of level, regardless of boom angle.

(j) Trial Lift, Inspection, and Proof Testing.

(1) A trial lift with the unoccupied personnel platform loaded at least to the anticipated lift weight shall be made from ground level, or any other location where employees will enter the platform, to each location at which the personnel platform is to be hoisted and positioned. This trial lift shall be performed immediately prior to placing personnel on the platform. The operator shall determine that all systems, controls and safety devices are activated and functioning properly; that no interferences exist; ~~and~~ that all configurations necessary to reach those work locations will allow the operator to remain under the 50 percent limit of the hoist's rated capacity, and that the load radius to be used during the lift has been accurately determined. Materials and tools to be used during the actual lift can be loaded in the platform, as provided in section 5004(h)(4) and (5) for the trial lift. ~~A single trial lift may be performed at one time for all locations that are to be reached from a single set up position.~~ Where there is more than one location to be reached from a single set-up position, either individual trial lifts for each location, or a single trial lift, in which the platform is moved sequentially to each location, must be performed; the method selected must be the same as the method that will be used to hoist the personnel.

***

(3) After the trial lift, and just prior to hoisting personnel, the platform shall be hoisted a few inches with the personnel and materials/tools on board and inspected by a qualified person to insure that it is secure and properly balanced. Employees shall not be hoisted unless the following conditions are determined to exist:

(A) Hoist ropes shall be free of kinks and other deficiencies in accordance with §5036(a) through (d) and 5031(a).

(B) Multiple part lines shall not be twisted around each other;

(C) The primary attachment shall be centered over the platform; and

(D) The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly positioned on drums and sheaves.

(4) A visual inspection of the crane or derrick, rigging, personnel platform, and the crane or derrick base support or ground shall be conducted by a qualified person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure. The qualified person shall also confirm that the test weight has been removed upon completion of the trial lift.

(5) Any defects found during inspections which fails to meet a requirement of this standard or otherwise creates a safety hazard shall be corrected before hoisting personnel.

***

(k) Work Practices.

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(1) Employees shall:
(A) Keep all parts of the body inside the platform during raising, lowering, and horizontal movement ~~positioning~~. This provision does not apply to an occupant of the platform when necessary to position the platform or while performing the duties of a signal person.
(B) Not stand, sit on, or work from the top or intermediate rail or toeboard, or use any other means/device to raise their working height.
(C) Not pull the platform out of plumb in relation to the hoisting equipment.
(2) Before employees exit or enter a hoisted personnel platform that is not landed, the platform shall be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe situation.
(A) If the platform is tied to the structure, the operator shall not move the platform until the operator receives confirmation that it is freely suspended.

***

(4) Attendance. ~~The crane or derrick operator shall remain at the controls at all times when the crane engine is running and the platform is occupied~~.
(A) Platforms without controls. Where the platform is not equipped with controls, the equipment operator shall remain at the equipment controls, on site, and in view of the equipment, at all times while the platform is occupied.
(B) Platforms with controls. Where the platform is equipped with controls, all of the following shall be met at all times while the platform is occupied:
1. The occupant using the controls in the platform shall be a qualified person with respect to their use, including the safe limitations of the equipment and hazards associated with its operation.
2. The equipment operator shall be at a set of equipment controls that include boom and swing functions of the equipment, and shall be on site and in view of the equipment.
3. The platform operating manual shall be in the platform or on the equipment.
(5) Environmental conditions. ~~Hoisting of employees shall be promptly discontinued upon indication of any dangerous weather conditions or other impending danger.~~
(A) Wind. When wind speed (sustained or gusts) exceeds 20 mph at the personnel platform, a qualified person shall determine if, in light of the wind conditions, it is safe to lift personnel. If it is not safe, the lifting operation shall not begin (or, if already in progress, shall be terminated).
(B) Other weather and environmental conditions. A qualified person shall determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is safe to lift personnel. If it is not safe, the lifting operation shall not begin (or, if already in progress, shall be terminated).

***

(7) Fall protection.
(A) Except over water, employees occupying the personnel platform shall be provided and use a personal fall arrest ~~body belt/harness~~ system with lanyard appropriately attached to

the lower load block or overhaul ball, or to structural member within the personnel platform capable of supporting a fall impact for employees using the anchorage. When working over water, the requirements of section 1602 of the Construction Safety Orders shall apply.
(B) The fall arrest system, including the attachment point (anchorage) used to comply with subsection (A), shall comply with Article 24 of the Construction Safety Orders.

***

(9) Direct attachment of a personnel platform to a luffing jib is prohibited.
(10) Use of personnel platform. When using equipment to hoist employees, the employees shall be in a personnel platform that meets the requirements of subsections (f) and (g) of this section.
EXCEPTIONS: A personnel platform is not required for hoisting employees:
1. Into and out of drill shafts that are up to and including 8 feet in diameter [see subsection (o) for requirements for hoisting these employees].
2. In pile driving operations [see subsection (p) for requirements for hoisting these employees].
3. Solely for transfer to or from a marine worksite in a marine-hoisted personnel transfer device [see subsection (r) for requirements for hoisting these employees].
4. In storage-tank (steel or concrete), shaft and chimney operations [see subsection (s) for requirements for hoisting these employees].

(*l*) Traveling.
(1) Hoisting of employees while the crane is traveling is prohibited, except for portal, tower and cranes on fixed tracks or railways.
(2) Under any circumstances where a crane would travel while hoisting personnel, the employer shall implement the following procedures to safeguard employees:
(A) Travel shall be limited to the load radius of the boom used during the lift; and
(B) The boom must be parallel to the direction of travel;
(C) A complete trial run shall be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift required by section 5004(j)(1) of these Orders which tests the route of the lift.
(D) Equipment travel shall be restricted to a fixed track or runway.
(E) Where a runway is used, it shall be a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the equipment being used to lift and travel with the personnel platform. An existing surface may be used as long as it meets these criteria.

***

(n) Hoisting personnel near power lines. Hoisting personnel within 20 feet of a power line that is up to 350 kV, and hoisting personnel within 50 feet of a power line that is over 350 kV, is prohibited, except for work covered by the High Voltage Electrical Safety Orders.

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(o) Hoisting personnel in drill shafts. When hoisting employees into and out of drill shafts that are up to and including 8 feet in diameter, all of the following requirements shall be met:

(1) The employee shall be in either a personnel platform or on a boatswain's chair.

(2) If using a personnel platform, subsections (a) through (n) of this section apply.

(3) If using a boatswain's chair:

(A) The following subsections apply: (c), (d)(1), (d)(3)-(d)(4), (d)(5)(A), (d)(5)(C), (f)(1), (f)(2), (h)(1), (h)(3), (h)(4), (h)(5), (i)(2), (i)(6), (j), (k)(4)(A), (k)(5), (k)(6), (k)(8), (m), and (n). Where the terms ''personnel platform'' or ''platform'' are used in these subsections, replace them with ''boatswain's chair.''

(B) A signal person shall be stationed at the shaft opening.

(C) The employee shall be hoisted in a slow, controlled descent and ascent.

(D) The employee shall use personal fall protection equipment, including a full body harness, attached independent of the crane/ derrick.

(E) The fall protection equipment shall meet the applicable requirements of Articles 16 and 24 of these Orders.

(F) The boatswain's chair itself (excluding the personal fall arrest system anchorages), shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load.

(G) No more than one person shall be hoisted at a time.

(p) Hoisting personnel for pile driving operations. When hoisting an employee in pile driving operations, the following requirements shall be met:

(1) The employee shall be in a personnel platform or boatswain's chair.

(2) For lattice boom cranes: Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, or use a spotter who is in direct communication with the operator to inform the operator when this point is reached.

For telescopic boom cranes: Clearly mark the cable (so that it can be easily seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter who is in direct communication with the operator to inform the operator when this point is reached.

(3) If using a boatswain's chair, subsections (o)(3)(A), (C), (D), (E), (F) and (G) shall apply. Where the terms "personnel platform" or "platform" are used in these subsections, substitute "boatswains chair."

Exception: In lieu of personal fall protection attached independent of the crane/derrick per subsection (o)(3)(D), personal fall protection may be independently attached to the lower load block or overhaul ball.

(q) [Reserved.]

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(r) Hoisting personnel for marine transfer. When hoisting employees solely for transfer to or from a marine worksite, the following requirements shall be met:

(1) The employee shall be in either a personnel platform or a marine-hoisted personnel transfer device.

(2) If using a personnel platform, paragraphs (a) through (n) of this section apply.

(3) If using a marine-hoisted personnel transfer device:

(A) The following subsections apply: (c), (d)(1), (d)(3), (d)(4), (d)(5)(A) & (C), (f)(1) through (f)(3), (g)(8), (g)(9), (h)(1), (i)(2), (i)(6), (j), (k)(5) through (k)(8), (*l*), (m), and (n). Where the terms ‘‘personnel platform’’ or ‘‘platform’’ are used in these subsections, replace them with ‘‘marine-hoisted personnel transfer device.’’

(B) The transfer device shall be used only for transferring workers.

(C) The number of workers occupying the transfer device shall not exceed the maximum number it was designed to hold.

(D) Each employee shall wear a U.S. Coast Guard personal flotation device approved for industrial use.

(s) Hoisting personnel for storage-tank (steel or concrete), shaft and chimney operations. When hoisting an employee in storage tank (steel or concrete), shaft and chimney operations, the following requirements shall be met:

(1) The employee shall be in a personnel platform except when the employer can demonstrate that use of a personnel platform is infeasible; in such a case, a boatswain’s chair shall be used.

(2) If using a personnel platform, paragraphs (a) through (n) of this section apply.

(3) If using a boatswain’s chair:

(A) The provisions of subsection (o)(3)(A), (C), (D), (E), (F) and (G) shall apply.

(4) When there is no adequate structure for attachment of required personal fall arrest equipment, the attachment shall be to the lower load block or overhaul ball.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5005 as follows:

§5005. Work Near Transmitter Towers. ~~Notification to the Operators of High-Voltage Lines and Responsibility for Safeguards. (Repealed)~~ [Reviewed 3/25/15]

Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be de-energized or tests shall be made to determine if an electrical charge is induced on the crane. The following precautions shall be taken when necessary to dissipate induced voltages:

(a) The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

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(b) Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews shall be provided with ~~nonconductive~~ insulating poles having large alligator clips or other similar protection to attach the ground cable to the load.
(c) Combustible and flammable materials shall be removed from the immediate area prior to operations.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5006 as follows:

§5006. Crane and Hoisting Equipment Operators – Qualifications.
(a) Only employees authorized by the employer and trained in the safe operation of cranes or hoisting apparatus shall be permitted to operate such equipment.
(b) Trainees may be authorized to operate cranes or hoisting apparatus provided they are under the supervision of a qualified operator.
Exceptions:
1. Mobile and tower cranes in general industry regulated by Section 5006.1.
2. Cranes and derricks in construction regulated by Section 5006.2.

Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend the title of Section 5006.1 as follows:

§5006.1. Mobile Crane and Tower Crane-Operator Qualifications and Certification (for Cranes in General Industry)

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Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 5006.2 as follows:

§5006.2. Operator Qualification and Certification (for Cranes and Derricks in Construction).

(a) Qualifications and Certification. The employer shall ensure that, prior to operating any equipment covered under Group 13, the person is operating the equipment during a training period in accordance with subsection (d) of this section, or the operator is qualified or certified to operate the equipment in accordance with the following:

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(1) When a non-military government entity issues operator licenses for equipment covered under this Article, and that government licensing program meets the requirements of subsections (c)(2) and (b)(1) of this section, the equipment operator shall be licensed by that government entity for operation of equipment within that entity's jurisdiction.
(2) Where subsection (a)(1) of this section is not applicable, the certification or qualification shall comply with subsection (b).
(3) Whenever operator qualification or certification is required under this section, the employer shall provide the qualification or certification at no cost to operators who are employed by the employer on July 7, 2011.

(b) Option (1): Certification by an accredited crane operator certifying entity.
(1) Qualifications. The employer shall only permit operators who have a valid certificate of competency (certificate) issued in accordance with section 5006.1(a) supplemented by the following:
(A) The written examination required by 5006.1(a)(3) shall be supplemented to include:
1. Procedures for preventing and responding to power line contact.
2. Technical knowledge applicable to:
(i) The suitability of the supporting ground and surface to handle expected loads.
(ii) Site hazards.
(iii) Site access.
(B) The “hands-on” practical examination required by 5006.1(a)(4) shall be supplemented to include:
1. The ability to recognize, from visual and auditory observation, the items listed in Section 5031(a) (shift inspection).
2. The application of load chart information.

(2) Certification. Certificates shall be valid for a maximum of five (5) years. An Accredited Certifying Entity shall issue the certificate of competency to operators who successfully demonstrate the qualifications set forth in subsection (b)(1).
(A) An operator will be deemed qualified to operate a particular piece of equipment if the operator is certified under subsection (b) of this section for that type and capacity of equipment or for higher-capacity equipment of that type. If no accredited testing agency offers certification examinations for a particular type and/or capacity of equipment, an operator will be deemed qualified to operate that equipment if the operator has been certified for the type/capacity that is most similar to that equipment and for which a certification examination is available. The operator's certificate shall state the type/capacity of equipment for which the operator is certified.
(B) A certification issued under this option (Option 1) is portable.

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(3) Accredited Certifying Entity. A certifying entity is any organization whose certification program complies with the requirements of section 5006.1(c).

(A) The accredited certifying entity shall have its accreditation reviewed by the nationally recognized accrediting agency at least every three years. [Ed note: See 9/10/14 AC minutes – is there any need to define "Nationally Recognized Accrediting Agency"?]

(4) Re-certification. Crane operators shall re-certify every five (5) years and shall be required to meet all of the qualifications set forth in subsection (b)(1). Operators with at least one-thousand (1,000) hours of documented experience operating the specific type of crane for which re-certification is sought as covered by this section during the immediately preceding certification period and who meet the physical examination, substance abuse, and written examination requirements set forth in sections 5006.1(a)(1)-(a)(3), supplemented by section 5006.2(b)(1)(A) shall not be required to take the "hands-on" examination specified in subsection 5006.2(b)(1)(B) to re-certify.

(5) The accredited certifying entity shall have procedures for operators to re-apply and be re-tested in the event an operator applicant fails a test or is decertified.

(c) Option (2): Licensing by a government entity.

(1) For purposes of this section, a government licensing department/office that issues operator licenses for operating equipment covered by this standard is considered a government accredited crane operator testing organization if the criteria in subsection (c)(2) are met.

(2) Licensing criteria.

(A) The requirements for obtaining the license include passing a physical examination and a substance abuse test as prescribed in section 5006.1(a)(1) and (2), and an assessment, by written and practical tests, of the operator applicant regarding, at a minimum, the knowledge and skills listed in section 5006.1(a)(3) and (4) as supplemented by subsection (b)(1) of this section.

(B) The testing meets industry recognized criteria for written testing materials, practical examinations, test administration, grading, facilities/equipment and personnel.

(C) The government authority that oversees the licensing department/office, has determined that the requirements in subsections (c)(2)(A) and (B) of this section have been met.

(D) The licensing department/office has testing procedures for re-licensing designed to ensure that the operator continues to meet the technical knowledge and skills requirements in sections 5006.1(a)(3) and (4) supplemented by 5006.2(b)(1)(A) and (B).

(3) A license issued by a government accredited crane operator testing organization that meets the requirements of this option:

(A) Meets the operator qualification requirements of this section for operation of equipment only within the jurisdiction of the government entity.

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(B) Is valid for the period of time stipulated by the licensing department/office, but no longer than 5 years.

(d) Pre-qualification/certification training period. An employee who is not qualified or certified under this section is permitted to operate equipment only as an operator-in-training and only where the requirements of this subsection are met.

(1) The employer shall provide each operator-in-training with sufficient training prior to operating the equipment to enable the operator-in training to operate the equipment safely under limitations established by this section (including continuous monitoring) and any additional limitations established by the employer.

(2) The tasks performed by the operator-in-training while operating the equipment shall be within the operator-in-training's ability.

(3) Trainees may be authorized to operate equipment provided they are under the direct supervision of an operator possessing a valid certificate of competency for the type of crane operated by the trainee. The term direct supervision means the supervising operator is in the immediate area of the trainee and within visual sighting distance and able to effectively communicate with the trainee. When performing direct supervision, the supervising operator shall have no other duties other than to observe the operation of the crane by the trainee.

(A) The operator's trainer shall be an employee or agent of the operator-in-training's employer.

(B) For equipment other than tower cranes: The operator's trainer and the operator-in-training shall be in direct line of sight of each other. In addition, they shall communicate verbally or by hand signals. For tower cranes: The operator's trainer and the operator-in-training shall be in direct communication with each other.

(C) The operator-in-training shall not operate the equipment in any of the following circumstances unless the exception stated in subsection (d)(3)(C)5 of this section is applicable:

1. If any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone [see Section 5003.1(a)(1)], could get within 20 feet of a power line that is up to 350 kV, or within 50 feet of a power line that is over 350 kV.
2. If the equipment is used to hoist personnel.
3. In multiple-equipment lifts.
4. If the equipment is used over a shaft, cofferdam, or in a tank farm.
5. In multiple-lift rigging operations, except where the operator's trainer determines that the operator-in-training skills are sufficient for this high-skill work.

(e) Effective Dates and Phase-in.
5006.2(e) Effective Dates and Phase-in.

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(1) Mobile and tower crane operator qualifications and certification (for cranes operating in construction) shall be in accordance with the provisions of General Industry Safety Orders, Section 5006.1 effective June 1, 2005, until July 7, 2015 at which time this section 5006.2 shall be fully applicable.
(2) The provisions of this section (5006.2) are applicable July 7, 2011, except for subsections (a)(2) [operator qualification and certification] and (d) [pre-qualification/certification training] which are applicable effective July 7, 2015.
(3) The following requirements shall apply until July 7, 2015:
(A) The employer shall ensure that operators of equipment covered by this standard are competent to operate the equipment safely.
(B) Where an employee assigned to operate machinery does not have the required knowledge or ability to operate the equipment safely, the employer shall train that employee prior to operating the equipment. The employer shall ensure that each operator is evaluated to confirm that he/she understands the information provided in the training.

EXCEPTIONS TO SECTION 5006.2:
(1) Operator qualification or certification under this section is not required for operation of derricks, side boom cranes or equipment with a maximum manufacturer-rated hoisting/lifting capacity of 2000 pounds or less.
(2) Operator qualification or certification under this section is not required for operation of articulating/knuckle-boom cranes having a boom length of less than 25 feet or a maximum rated load capacity of less than 15,000 pounds when used to deliver material to a construction site.
(3) Operators of electric line trucks (digger derrick trucks) as defined in Section 2700 of the Electrical Safety Orders and regulated by Section 2940.7 of the High Voltage Electrical Safety Orders. This exception does not include mobile truck cranes designed and built in accordance with the American Society of Mechanical Engineers (ASME) B30.5 standards.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend Section 5008 as follows:

§5008. Operating Practices.

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(c) Whenever the operator doubts the safety of a movement, the operator shall have authority ~~be authorized~~ to stop the hoisting operation until a qualified person and the operator determine and agree that safety has been assured.

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NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Add new section 5008.1 as follows:

§5008.1. Operation.
(a) The employer shall comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments.

(b) Accessibility of procedures. The procedures applicable to the operation of the equipment, including rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions, and operator's manual, shall be readily available in the cab at all times for use by the operator.

~~(1) A durable, clearly legible load rating chart shall be provided with each crane and securely affixed in the cab or operator's station easily visible to the operator while at the controls. The chart shall include load ratings and restrictions as specified by the certified agent for specific lengths of components, counterweights, swing, and radii. Where load ratings for cranes are governed by structural competence, the limitation on loading shall be such that no structural member is overstressed, and load rating charts shall be subject to this limitation.~~

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

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

(d) Unavailable operation procedures.

(1) Where the manufacturer procedures are unavailable, the employer shall develop and ensure compliance with all procedures necessary for the safe operation of the equipment and attachments.

(2) Procedures for the operational controls shall be developed by a certified agent.

(3) Procedures related to the capacity of the equipment shall be developed and signed by a certified agent.

(e) Tag-out.

(1) Tagging out of service equipment/functions. Where the employer has taken the equipment out of service, a tag shall be placed in the cab stating that the equipment is out of service and is not to be used. Where the employer has taken a function(s) out of service, a tag shall be placed in a conspicuous position stating that the function is out of service and is not to be used.

(2) Response to ''do not operate''/tagout signs.

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(A) If there is a warning (tag-out or maintenance/do not operate) sign on the equipment or starting control, the operator shall not activate the switch or start the equipment until the sign has been removed by a person authorized to remove it in accordance with the provisions of Section 3314.
(B) If there is a warning (tag-out or maintenance/do not operate) sign on any other switch or control, the operator shall not activate that switch or control until the sign has been removed by a person authorized to remove it in accordance with the provisions of Section 3314.

(f) Storm warning. When a local storm warning has been issued, the competent person shall determine whether it is necessary to implement manufacturer recommendations for securing the equipment.

(g) If equipment adjustments or repairs are necessary:
(1) The operator shall, in writing, promptly inform the person designated by the employer to receive such information and, where there are successive shifts, to the next operator; and
(2) The employer shall notify all affected employees, at the beginning of each shift, of the necessary adjustments or repairs and all alternative measures.

(h) Safety devices and operational aids shall not be used as a substitute for the exercise of professional judgment by the operator.

(i) The competent person shall adjust the equipment and/or operations to address the effect of wind, ice, and snow on equipment stability and rated capacity.

(j) Counterweight/ballast.
(1) The following applies to equipment other than tower cranes:
(A) Equipment shall not be operated without the counterweight or ballast in place as specified by the manufacturer.
(B) The maximum counterweight or ballast specified by the manufacturer for the equipment shall not be exceeded.
(2) Counterweight/ballast requirements for tower cranes are specified in §4966(i)(8).

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5010 as follows: Reviewed 9/10/14

§ 5010. Assembly/Disassembly – Selection of Manufacturer or Employer Procedures.
(a) When assembling or disassembling equipment (or attachments), the employer shall comply with all applicable manufacturer prohibitions and shall comply with either:

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(1) Manufacturer procedures applicable to assembly and disassembly, or
(2) Written employer procedures for assembly and disassembly. Employer procedures may be used only where the employer can demonstrate that the procedures used comply with all provisions of these Safety Orders, including the requirements in §5010.3.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5010.1 as follows:

§ 5010.1. Assembly/Disassembly – General Requirements (applies to all assembly and disassembly operations).
(a) Supervision—competent-qualified person.
(1) Assembly/disassembly shall 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’’).
(2) Where the assembly/disassembly is being performed by only one person, that person shall meet the criteria for both a competent person and a qualified person. For purposes of this standard, that person is considered the A/D director.
(b) Knowledge of procedures. The A/D director shall understand the applicable assembly/ disassembly procedures.
(c) Review of procedures. The A/D director shall review the applicable assembly/disassembly procedures immediately prior to the commencement of assembly/disassembly unless the A/D director understands the procedures and has applied them to the same type and configuration of equipment (including accessories, if any).
(d) Crew instructions.
(1) Before commencing assembly/disassembly operations, the A/D director shall ensure that the crew members understand all of the following:
(A) Their tasks.
(B) The hazards associated with their tasks.
(C) The hazardous positions/locations that they need to avoid.
(2) During assembly/disassembly operations, before a crew member takes on a different task, or when adding new personnel during the operations, the requirements in paragraphs (d)(1)(A) through (d)(1)(C) of this section shall be met.
(e) Protecting assembly/disassembly crew members out of operator view.
(1) Before a crew member goes to a location that is out of view of the operator and is either in, on, or under the equipment, or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member shall inform the operator that he/she is going to that location.

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(2) Where the operator knows that a crew member went to a location covered by paragraph (e)(1) of this section, the operator shall not move any part of the equipment (or load) until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

(f) Working under the boom, jib or other components.

(1) When pins (or similar devices) are being removed, employees shall not be under the boom, jib, or other components.

(g) Capacity limits. During all phases of assembly/disassembly, rated capacity limits for loads imposed on the equipment, equipment components (including rigging), lifting lugs and equipment accessories, shall not be exceeded for the equipment being assembled/ disassembled.

(h) Addressing specific hazards. The A/D director supervising the assembly/disassembly operation shall address the hazards associated with the operation, which include:

(1) Site and ground bearing conditions. Site and ground conditions shall be adequate for safe assembly/disassembly operations and to support the equipment during assembly/disassembly (see § 4991.1 for ground condition requirements).

(2) Blocking material. The size, amount, condition and method of stacking the blocking shall be sufficient to sustain the loads and maintain stability.

(3) Proper location of blocking. When used to support lattice booms or components, blocking shall be appropriately placed to:

(A) Protect the structural integrity of the equipment, and

(B) Prevent dangerous movement and collapse.

(4) Verifying assist crane loads. When using an assist crane, the loads that will be imposed on the assist crane at each phase of assembly/ disassembly shall be verified in accordance with §4999(b) before assembly/disassembly begins.

(5) Boom and jib pick points. The point(s) of attachment of rigging to a boom (or boom sections or jib or jib sections) shall be suitable for preventing structural damage and facilitating safe handling of these components.

(6) Center of gravity.

(A) The center of gravity of the load shall be identified if that is necessary for the method used for maintaining stability.

(B) Where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity shall be used.

(7) Stability upon pin removal. The boom sections, boom suspension systems (such as gantry A-frames and jib struts), and components shall be rigged or supported to maintain stability upon the removal of the pins.

(8) Snagging. Suspension ropes and pendants shall not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).

(9) Struck by counterweights. The potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.

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(10) Boom hoist brake failure. Each time reliance is to be placed on the boom hoist brake to prevent boom movement during assembly/disassembly, the brake shall be tested prior to such reliance to determine if it is sufficient to prevent boom movement. If it is not sufficient, a boom hoist pawl, other locking device/back-up braking device, or another method of preventing dangerous movement of the boom (such as blocking or using an assist crane) from a boom hoist brake failure shall be used.

(11) Loss of backward stability. Backward stability before swinging the upperworks, travel, and when attaching or removing equipment components.

(12) Wind speed and weather. The effect of wind speed and weather on the equipment

(i) [Reserved.]

(j) Cantilevered boom sections. Manufacturer limitations on the maximum amount of boom supported only by cantilevering shall not be exceeded. Where these are unavailable, a certified agent familiar with the type of equipment involved shall determine in writing this limitation, which must not be exceeded.

(k) Weight of components. The weight of each of the components shall be readily available.

(*l*) [Reserved.]

(m) Components and configuration.

(1) The selection of components, and configuration of the equipment, that affect the capacity or safe operation of the equipment shall be in accordance with:

(A) Manufacturer instructions, prohibitions, limitations, and specifications. Where these are unavailable, a certified agent familiar with the type of equipment involved shall approve, in writing, the selection and configuration of components; or

(B) Approved modifications that meet the requirements of §4884.1 (Equipment modifications).

(2) Post-assembly inspection. Upon completion of assembly, the equipment shall be inspected to ensure compliance with paragraph (m)(1) of this section (see §5031.2 for post-assembly inspection requirements).

(n) [Reserved.]

(o) Shipping pins. Reusable shipping pins, straps, links, and similar equipment shall be removed. Once they are removed they shall either be stowed or otherwise stored so that they do not present a falling object hazard.

(p) Pile driving. Equipment used for pile driving shall not have a jib attached during pile driving operations.

(q) Outriggers and Stabilizers. When the load to be handled and the operating radius require the use of outriggers or stabilizers, or at any time when outriggers or stabilizers are used, all of the following requirements shall be met (except as otherwise indicated):

(1) The outriggers or stabilizers shall be either fully extended or, if manufacturer procedures permit, deployed as specified in the load chart.

(2) The outriggers shall be set to remove the equipment weight from the wheels, except for locomotive cranes (see paragraph (q)(6) of this section for use of outriggers on locomotive cranes). This provision does not apply to stabilizers.
(3) When outrigger floats are used, they shall be attached to the outriggers. When stabilizer floats are used, they shall be attached to the stabilizers.
(4) Each outrigger or stabilizer shall be visible to the operator or to a signal person during extension and setting.
(5) Outrigger and stabilizer blocking shall:
(A) Meet the requirements in paragraphs (h)(2) and (h)(3) of this section.
(B) Be placed only under the outrigger or stabilizer float/pad of the jack or, where the outrigger or stabilizer is designed without a jack, under the outer bearing surface of the extended outrigger or stabilizer beam.
(6) For locomotive cranes, when using outriggers or stabilizers to handle loads, the manufacturer's procedures shall be followed. When lifting loads without using outriggers or stabilizers, the manufacturer's procedures shall be met regarding truck wedges or screws.
(r) Rigging. In addition to following the requirements in Article 101 of these Orders and other requirements in this and other standards applicable to rigging, when rigging is used for assembly/disassembly, the employer shall ensure that:
(1) The rigging work is done by a qualified rigger.
(2) Synthetic slings are protected from: Abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression.
(3) Additional requirements for the protection of all types of slings are contained in Article 101 of these Orders.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5010.2 as follows: Reviewed 9/10/14

§ 5010.2. Disassembly – Additional Requirements for Dismantling of Booms and Jibs (applies to both the use of manufacturer procedures and employer procedures).
Note: "Dismantling" includes dismantling for changing the length of booms and jibs.
(a) None of the pins in the pendants are to be removed (partly or completely) when the pendants are in tension.
(b) None of the pins (top or bottom) on boom sections located between the pendant attachment points and the crane/derrick body are to be removed (partly or completely) when the pendants are in tension.

(c) None of the pins (top or bottom) on boom sections located between the uppermost boom section and the crane/derrick body are to be removed (partly or completely) when the boom is being supported by the uppermost boom section resting on the ground (or other support).
(d) None of the top pins on boom sections located on the cantilevered portion of the boom being removed (the portion being removed ahead of the pendant attachment points) are to be removed (partly or completely) until the cantilevered section to be removed is fully supported.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5010.3 as follows:

§ 5010.3. Assembly/Disassembly – Employer Procedures – General Requirements.
(a) When using employer procedures instead of manufacturer procedures for assembly/ disassembly, the employer shall ensure that the procedures:
(1) Prevent unintended dangerous movement, and prevent collapse, of any part of the equipment.
(2) Provide adequate support and stability of all parts of the equipment.
(3) Position employees involved in the assembly/disassembly operation so that their exposure to unintended movement or collapse of part or all of the equipment is minimized.
(b) Qualified person. Employer procedures shall be developed by a qualified person.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5010.4 as follows:

§ 5010.4. Power Line Safety (up to 350kV) – Assembly and Disassembly.
(a) Before assembling or disassembling equipment, the employer shall determine if any part of the equipment, load line, or load (including rigging and lifting accessories) could get, in the direction or area of assembly/ disassembly, closer than 20 feet to a power line during the assembly/disassembly process. If so, the employer shall meet the requirements in Option (1), Option (2), or Option (3) of this section, as follows:
(1) Option (1) – De-energize and ground. Confirm from the utility owner/operator that the power line has been de-energized and visibly grounded at the worksite.
(2) Option (2) – 20 foot clearance.
Ensure that no part of the equipment, load line or load (including rigging and lifting accessories), gets closer than 20 feet to the power line by implementing the measures specified in paragraph (b) of this section.
(3) Option (3) – Table A clearance.

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(A) Determine the line's voltage and the minimum clearance distance permitted under Table A (see §5003.1).

(B) Determine if any part of the equipment, load line, or load (including rigging and lifting accessories), could get closer than the minimum clearance distance to the power line permitted under Table A (see §5003.1). If so, then the employer shall follow the requirements in paragraph (b) of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), gets closer to the line than the minimum clearance distance.

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

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

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

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

The additional measures are:

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

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

2. Be positioned to effectively gauge the clearance distance.

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

4. Give timely information to the operator so that the required clearance distance can be maintained.

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

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

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

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

(c) Assembly/disassembly below power lines prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed

below a power line unless the employer has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line.
(d) Assembly/disassembly inside Table A clearance prohibited. No part of a crane/derrick, load line, or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A (see §5003.1) to a power line unless the employer has confirmed that the utility owner/operator has de-energized and (at the worksite) visibly grounded the power line.
(e) Voltage information. Where Option (3) of this section is used, the utility owner/operator of the power lines shall provide the requested voltage information within two working days of the employer's request.
(f) Power lines presumed energized. The employer shall assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the worksite.
(g) Posting of electrocution warnings. There shall be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and (except for overhead gantry and tower cranes) at least two on the outside of the equipment.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5011 as follows:

§5011. Fall protection – additional/specific requirements for cranes.
(a) Application.
(1) Subsections (b), (c)(3), (e) and (f) apply to all equipment covered by Group 13 except tower cranes.
(2) Subsections (c)(1), (c)(2), (d), and (g), apply to all equipment covered by Group 13.
(3) Subsections (c)(4) and (h) apply only to tower cranes.

(b) Boom walkways.
(1) Equipment manufactured after July 7, 2012 with lattice booms shall be equipped with walkways on the boom(s) if the vertical profile of the boom (from cord centerline to cord centerline) is 6 or more feet.
(2) Boom walkway criteria.
(A) The walkways shall be at least 12 inches wide.
(B) Guardrails, railings and other permanent fall protection attachments along walkways are:
1. Not required.
2. Prohibited on booms supported by pendant ropes or bars if the guardrails/railings/ attachments could be snagged by the ropes or bars.

3. Prohibited if of the removable type (designed to be installed and removed each time the boom is assembled/disassembled).
4. Where not prohibited, guardrails or railings shall be in accordance with Sections 3209 and 3210.

(c) Steps, handholds, ladders, grabrails, guardrails and railings.
(1) Sections 3209 and 3210 (guardrails) do not apply to equipment covered by General Industry Safety Orders, Group 13.
(2) The employer shall maintain in good condition originally-equipped steps, handholds, ladders and guardrails/railings/grabrails.
(3) Equipment manufactured after July 7, 2012 shall be equipped so as to provide safe access and egress between the ground and the operator work station(s), including the forward and rear positions, by the provision of devices such as steps, handholds, ladders, and guardrails/railings/grabrails. These devices shall meet the following criteria:
(A) Steps, handholds, ladders and guardrails/railings/grabrails shall meet the criteria of SAE J185 (May 2003) (incorporated by reference) or ISO 11660–2:1994(E) (incorporated by reference) except where infeasible.
(B) Walking/stepping surfaces, except for crawler treads, shall have slip resistant features/properties (such as diamond plate metal, strategically placed grip tape, expanded metal, or slip-resistant paint).
(4) Tower cranes manufactured after July 7, 2012 shall be equipped so as to provide safe access and egress between the ground and the cab, machinery platforms, and tower (mast), by the provision of devices such as steps, handholds, ladders, and guardrails/railings/ grabrails. These devices shall meet the following criteria:
(A) Steps, handholds, ladders, and guardrails/railings/grabrails shall meet the criteria of ISO 11660–1:2008(E) (incorporated by reference) and ISO 11660–3:2008(E) (incorporated by reference) or SAE J185 (May 2003) (incorporated by reference) except where infeasible.
(B) Walking/stepping surfaces shall have slip-resistant features/properties (such as diamond plate metal, strategically placed grip tape, expanded metal, or slip-resistant paint).

(d) Personal fall arrest and fall restraint systems.
Personal fall arrest and fall restraint systems shall conform to the requirements of CSO Article 24, Fall Protection.

(e) For non-assembly/disassembly work, the employer shall provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 7-1/2 feet above a lower level as follows:
(1) When moving point-to-point:
(A) On non-lattice booms (whether horizontal or not horizontal).
(B) On lattice booms that are not horizontal.

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EXCEPTION: On horizontal lattice booms where the fall distance is less than 15 feet.

(2) While at a work station on any part of the equipment (including the boom, of any type), except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(f) For assembly/disassembly work, the employer shall provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level, except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(g) Anchorage criteria. Anchorages for personal fall arrest, positioning device systems and fall restraint systems shall comply with the provisions of CSO Section 1670.

(h) Tower cranes.

(1) For work other than erecting, climbing, and dismantling, the employer shall provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 7-1/2 feet above a lower level, except when the employee is at or near draw-works (when the equipment is running), in the cab, or on the deck.

(2) For erecting, climbing, and dismantling work, the employer shall provide and ensure the use of fall protection equipment for employees who are on a walking/working surface with an unprotected side or edge more than 15 feet above a lower level.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5012 as follows:

§5012. Training – Additional Requirements for Cranes.

(a) The employer shall train each operator of the equipment covered by Group 13 in the following practices:

(1) Whenever moving a boom off a support, first raise the boom a short distance (sufficient to take the load of the boom) to determine if the boom hoist brake needs to be adjusted. If the brake does not hold and cannot be adjusted to hold, the condition shall be repaired.

(A) See §5008.1(e) [tag-out] and 5008.1(g) [adjustments or repairs] for additional requirements.

(2) Where available, the manufacturer's emergency procedures for halting unintended equipment movement.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Group 13. Cranes and Other Hoisting Equipment

Add new Article 98.1, Safety Devices and Operational Aids, as follows:

Article 98.1, Safety Devices and Operational Aids (Cranes and Derricks in Construction).

Add new Section 5017 as follows:

§5017. Safety devices. [Reviewed 3/25/15]
~~(a) Safety devices. The following safety devices are required on all cranes and derricks in construction covered by Group 13, unless otherwise specified:~~
~~Note: See Section 4968 for tower cranes.~~
~~(1) Crane level indicator.~~
~~(A) The equipment shall have a crane level indicator that is either built into the equipment or is available on the equipment.~~
~~(B) If a built-in crane level indicator is not working properly, it shall be tagged-out or removed. If a removable crane level indicator is not working properly, it shall be removed.~~
~~(C) This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.~~
~~(2) Boom stops, except for derricks and hydraulic booms.~~
~~(3) Jib stops (if a jib is attached), except for derricks.~~
~~(4) Equipment with foot pedal brakes shall have locks.~~
~~(5) Hydraulic outrigger jacks and hydraulic stabilizer jacks shall have an integral holding device/check valve.~~
~~(6) Equipment on rails shall have rail clamps and rail stops, except for portal cranes.~~
~~(7) Horn~~
~~(A) The equipment shall have a horn that is either built into the equipment or is on the equipment and immediately available to the operator.~~
~~(B) If a built-in horn is not working properly, it shall be tagged-out or removed. If a removable horn is not working properly, it shall be removed.~~

~~(b)~~ Proper operation required.
Operations shall not begin unless all ~~of the~~ safety devices required by Group 13 ~~listed in this section~~ are in proper working order. If a required device stops working properly during operations, ~~the operator shall safely stop operations~~ the operation shall be safely stopped. If any ~~of the~~ safety device ~~listed in this section are~~ is not in proper working order, the equipment shall be taken out of service and operations shall not resume until the device is again working properly. Alternative measures are not permitted to be used except as otherwise permitted by Group 13.

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Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

~~Add new Section 5018 as follows:~~

~~§5018. Operational aids. *[Ed note: this section is mostly the same as 1615.2 with modifications noted below]*~~ [Reviewed 3/25/15]
~~(a) The devices listed in this section ("listed operational aids") are required on all cranes and derricks in construction covered by Group 13, unless otherwise specified.~~
~~(1) The requirements in subsections (e)(1), (e)(2), and (e)(3) do not apply to articulating cranes.~~
~~(2) The requirements in subsections (d)(3), (e)(1), and (e)(4) apply only to those digger derricks manufactured after July 7, 2012. *[Effective date for CSO Art 15]*~~

~~(b) Operations shall not begin unless the listed operational aids are in proper working order, except where an operational aid is being repaired the employer uses the specified temporary alternative measures. The time periods permitted for repairing defective operational aids are specified in subsections (d) and (e). More protective alternative measures specified by the crane/ derrick manufacturer, if any, shall be followed.~~

~~(c) If a listed operational aid stops working properly during operations, the operator shall safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted subject to the provisions of §4884.1.~~
~~*[Ed note: See SXS remarks regarding last sentence.]*~~

~~(d) Category I operational aids and alternative measures. Operational aids listed in this section that are not working properly shall be repaired no later than 7 calendar days after the deficiency occurs. *[Ed note: see comment on SXS re: 5018(d) and (e) Cat I operational aids]*~~
~~Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, the repair shall be completed within 7 calendar days of receipt of the parts. See §5008.1(g) for additional requirements.~~
~~(1) Boom hoist limiting device.~~
~~(A) For equipment manufactured after December 16, 1969, a boom hoist limiting device is required. Temporary alternative measures (use at least one). One or more of the following methods shall be used:~~
~~1. Use a boom angle indicator.~~
~~2. Clearly mark the boom hoist cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.~~

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~~3. Clearly mark the boom hoist cable (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius.~~

~~(B) If the equipment was manufactured on or before December 16, 1969, and is not equipped with a boom hoist limiting device, at least one of the measures in subsections (d)(1)(A)1 through (d)(1)(A)3 shall be used.~~

~~(2) Luffing jib limiting device.~~

~~Equipment with a luffing jib shall have a luffing jib limiting device. Temporary alternative measures are the same as in paragraph (d)(1)(A) of this section, except to limit the movement of the luffing jib rather than the boom hoist.~~

~~(3) Anti-two-blocking device.~~

~~(A) Telescopic boom cranes manufactured after February 28, 1992, shall be equipped with a device which automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) shall prevent such damage at all points where two-blocking could occur.~~

~~(B) Lattice boom cranes.~~

~~1. Lattice boom cranes manufactured after Feb 28, 1992, shall be equipped with a device that either automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component), or warns the operator in time for the operator to prevent two-blocking. The device shall prevent such damage/failure or provide adequate warning for all points where two-blocking could occur.~~

~~2. Lattice boom cranes and derricks manufactured after July 7, 2012 shall be equipped with a device which automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device(s) shall prevent such damage/failure at all points where two-blocking could occur.~~

~~Exception. The requirements in subsections (d)(3)(B)1 and 2 do not apply to such lattice boom equipment when used for dragline, clamshell (grapple), magnet, and drop ball work that do not involve hoisting personnel.~~

~~(C) Articulating cranes manufactured after December 31, 1999, that are equipped with a load hoisting device (winch) shall be equipped with a device that automatically prevents damage from contact between the load block, overhaul ball, or similar component, and the boom tip (or fixed upper block or similar component). The device shall prevent such damage at all points where two-blocking could occur.~~

~~(e) Category II operational aids and alternative measures. Operational aids listed in this paragraph that are not working properly shall be repaired no later than 30 calendar days after the deficiency occurs.~~

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~~Exception: If the employer documents that it has ordered the necessary parts within 7 calendar days of the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 calendar days, the repair shall be completed within 7 calendar days of receipt of the parts. See §5008.1(g) for additional requirements.~~

~~(1) Boom angle or radius indicator.~~

~~Cranes shall be provided with a boom angle or radius indicator which clearly shows the boom angle in degrees to the operator at all times.~~

~~Exception: When a boom angle or radius indicator is inoperative or malfunctioning, a qualified person shall determine the radius or boom angle by measurement until the indicator is restored to operation.~~

~~(A) Boom angle or radius indicators shall be repaired in accordance with the manufacturer's recommendations.~~

~~(2) Jib angle indicator if the equipment has a luffing jib.~~

~~Temporary alternative measures: When a jib angle or radius indicator is inoperative or malfunctioning, a qualified person shall determine the main boom angle and then measuring the radii or jib angle with a measuring device. *[Ed note: see SXS remarks regarding alternatives]*~~

~~(3) Boom length indicator if the equipment has a telescopic boom, except where the rated capacity is independent of the boom length.~~

~~Temporary alternative measures. One or more of the following methods shall be used:~~

~~(A) Mark the boom with measured marks to calculate boom length,~~

~~(B) Calculate boom length from boom angle and radius measurements,~~

~~(C) Measure the boom with a measuring device.~~

~~(4) Load weighing and similar devices. All mobile cranes including truck-mounted tower cranes having either a maximum rated boom length exceeding 200 feet or a maximum rated capacity exceeding 50 tons shall be equipped with a load indicating device or a load moment device, or a device that prevents an overload condition. Only approved devices as defined in the General Industry Safety Orders, Section 3206 shall be used.~~

~~(A) All other mobile cranes manufactured after March 29, 2003 September 27, 2005, with a maximum rated capacity exceeding 3 tons shall be equipped with a load indicating device, load moment device, or a device that prevents an overload condition. *[See SXS remarks for change in effective date. Date changed to be same as fed]*~~

~~Exception: When installed load indicating devices are not functional, a qualified person shall determine load weights until the device is restored to operation. The weight of the load shall be determined from a source recognized by the industry (such as the load's manufacturer) or by a calculation method recognized by the industry (such as calculating a steel beam from measured dimensions and a known per foot weight). This information shall be provided to the operator prior to the lift.~~

~~(B) Load indicating devices shall be repaired in accordance with the manufacturer's recommendations.~~

~~(5) The following devices are required on equipment manufactured after July 7, 2012:~~

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~~(A) Outrigger/stabilizer position (horizontal beam extension) sensor/monitor if the equipment has outriggers or stabilizers. Temporary alternative measures: The operator shall verify that the position of the outriggers or stabilizers is correct (in accordance with manufacturer procedures) before beginning operations requiring outrigger or stabilizer deployment.~~
~~(B) Hoist drum rotation indicator if the equipment has a hoist drum not visible from the operator's station.~~
~~Temporary alternative measures: Mark the drum to indicate the rotation of the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.~~

~~Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

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Article 99. Testing

Amend Section 5020 as follows:

§5020. Operational Testing.

(a) In addition to prototype tests by the manufacturer, and prior to initial use, each new crane or derrick, or any crane or derrick which is structurally altered due to repair, shall be inspected and tested by a ~~the~~ certified agent to insure compliance with the provisions of these orders, including the following functions where applicable:
(1) Hoisting and lowering boom and load
(2) Swing mechanism
(3) Travel mechanisms, trolley, bridge, carrier
(4) Limit switches, locking, and other safety devices
(b) Visual examination shall be made of welds and other attachments of the critically stressed members.
(c) Where the complete production crane is not supplied by one manufacturer, such tests shall be conducted at final assembly.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend section 5021 as follows:

§5021. Equipment over Three Tons Rated Capacity.
(a) All cranes and derricks used in lifting service, exceeding three tons rated capacity, and their accessory gear shall not be used until the employer has ascertained that such equipment has been certificated as evidenced by current and valid documents attesting to compliance with the following:
(1) Tests and examinations shall be conducted annually by a currently licensed certificating agency or designee listed in the certificating agency license, and a certificate shall be issued by the certificating agency;
(2) Certificates (annual and quadrennial) attesting to current compliance with testing and examination standards of requirements shall be maintained for each crane or derrick and shall be in a form acceptable to the Division. (See Section 4885, Plate V.)
NOTE: The term "lifting service" as used in this Section is not intended to include operations of the following equipment:
NOTE: (1) Clamshells, draglines and other similar equipment used for casting-type work;

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NOTE: (2) Pile drivers, other than those using gravity (drop) hammers.

NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Amend section 5022 as follows:

§5022. Proof Load Test and Examination of Cranes and Their Accessory Gear.
(a) Proof load tests of cranes shall be carried out at the following intervals:
(1) Cranes exceeding 1 ton rated capacity:
(A)~~(1)~~ In the case of new cranes, before being taken into initial use ~~and every 4 years thereafter~~.
(B)~~(2)~~ In the case of uncertificated cranes which have been in use, at the time of initial certification ~~and every 4 years thereafter~~.
(C)~~(3)~~ In the case of major modifications or repairs ~~to important structural components~~ which affect the safe operation of the equipment (such as but not limited to modifications or additions involving a safety device or operational aid, critical part of a control system, power plant, braking system, load sustaining structural components, load hook, or in-use operating mechanism), or capacity shall be inspected by a qualified person after such modifications/ additions have been completed, before they are returned to service.
1. The examination shall assure that the modifications or additions have been done in accordance with the approval obtained pursuant to §4884.1 (Equipment modifications).
(D)~~(4)~~ When certificated equipment is out of service for 6 months or more beyond the due date of a certification inspection, an examination equivalent to an initial certification, including proof load test, shall be performed before the equipment re-enters service.
(2) Additional requirements for cranes over 3 tons rated capacity. After initial certification, cranes exceeding 3 tons rated capacity shall be recertified at intervals not exceeding every 4 years thereafter.
NOTES for 5022(a):
1. For General Industry: Disassembly and reassembly of equipment does not require recertification of the equipment provided that the equipment is reassembled and used in a manner consistent with its certification.
2. Post-assembly for Cranes and Derricks in Construction: See additional requirements in section 5031.2.
3. Fixed and mobile tower cranes: See additional requirements in section 344.81.

(b) Proof load tests of cranes shall be carried out with the boom in the least stable direction relative to the mounting.

(c) Proof load tests shall be based on the manufacturer's load ratings for the conditions of use and shall consist of the application of a proof load as close as possible, but not exceeding 110 percent

of the load ratings for the boom on the crane. Proof loads shall be applied at the designed maximum and minimum boom angles or radii or as close to these as practicable and at such intermediate radii as the certifying agency may deem necessary. Trolley equipped monorail cranes and overhead cranes shall be tested to a proof load as close as possible, but not exceeding 125 percent of the manufacturer's load rating. Monorail cranes and overhead cranes shall be tested by traversing the proof load weight the full length of the track, bridge/runway(s) and cross-overs, in all directions capable of operation, where practicable. In cases of foreign manufacture, the manufacturer's specifications shall be subject to approval by the certified agent as being equivalent to U.S. practice. The weight of all auxiliary handling devices such as, but not limited to, magnets, hooks, slings, and clamshell buckets shall be considered part of the load, except lifting devices which are designed as an integral part of the crane. Other methods of proof load testing may be substituted for the above where acceptable to the Division.

NOTE: The manufacturer's load ratings are usually based upon percentage of tipping loads under some conditions and upon limitations of structural competence under others, as well as on other criteria such as type of crane mounting, whether or not outriggers are used, etc. Some cranes utilizing a trolley may have only one load rating assigned and applicable at any outreach. It is important that the manufacturer's ratings be used.

(d) An examination shall be carried out in conjunction with each proof load test. The certificating agency shall determine if repairs/adjustments meet manufacturer equipment criteria (where applicable and available). Where manufacturer equipment criteria are unavailable or inapplicable, ~~T~~the certificating agency shall make a determination as to requirements for the correction of deficiencies found. The examination shall cover the following points as applicable:

(1) All functional operating mechanisms for improper function, maladjustment, cracks, distortion, or ~~and~~ excessive component wear, with particular attention to sheaves, pins, and drums, bearings, shafts, gears, rollers, and locking devices. This shall include operation with partial load, in which all functions and movements, including, where applicable, maximum possible rotation in both directions, are performed.

(2) All safety devices and operational aids for ~~malfunction~~ proper operation (including significant inaccuracies).

(3) Deterioration, abnormal wear or performance or leakage in lines, tanks, valves, drains, pumps, joints, fittings and other parts of ~~air or~~ pneumatic, hydraulic or other pressurized systems.

(4) Loose gear components (i.e. hooks, etc.), including wire rope and wire rope terminals and connections, with particular attention to sections of wire rope exposed to abnormal wear and sections not normally exposed for examination. Cracked or deformed hooks shall be discarded.

(5) Rope reeving for compliance with certified agent's recommendations.

(6) Deformed, cracked, or excessively corroded members in crane structure and boom.

(7) Loose bolts, rivets, or other connections.

(8) Worn, cracked, or distorted parts affecting safe operation.
(9) Excessive wear on and free operation of brake and clutch system parts, linings, pawls, and ratchets.
(10) Load, boom angle, or other indicators shall be checked for any inaccuracy.
(11) It shall be ascertained that there is a durable rating chart visible to the operator, covering the complete range of the certified agent's capacity ratings at all operating radii, for all permissible boom lengths and jib length, with alternate ratings for optional equipment affecting such ratings. Necessary precautions or warnings shall be included and operating controls marked or an explanation of controls shall be posted at the operator's position to indicate function.
(12) Careful examination of the junction areas of removable boom sections, particularly for proper seating, cracks, deformities, or other defects in securing bolts and in the vicinity of such bolts.
(13) It shall be ascertained that no counterweights in excess of the certified agent's specifications are fitted.
(14) Welds for cracks.
(15) Electrical components and wiring for cracked or split insulation and loose or corroded terminations.
(16) Operator seat: Installed and serviceable.
(17) Originally equipped steps, ladders, handrails, guards: Missing.
(18) Steps, ladders, handrails, guards: In usable and safe condition.
(19)~~(14)~~ Such other examinations deemed necessary under the circumstances.

Authority and reference cited: Section 142.3, Labor Code.

Amend section 5023 as follows:

§5023. Proof Load Test and Examination of Derricks and Their Accessory Gear.

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(b) Proof load tests and safe working load ratings…

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Proof loads shall be applied at the designed maximum and minimum boom angles or radii or, if this is impracticable, as close to these as practicable. The angles or radii of test shall be in the certificate of test. Proof loads shall be swung as far as possible in both directions. The weight of all auxiliary handling devices such as blocks, hooks, etc., shall be considered a part of the load.

(1) Hoist and brakes shall be tested as follows:

(A) The test load shall be hoisted a vertical distance to assure that the load is supported by the hoist and held by the hoist brake(s).

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(B) The test load shall be lowered, stopped and held with the brake(s).
(C) The hoist shall not be used unless a competent person determines that the test has been passed.

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NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Article 100. Inspection and Maintenance

Amend Section 5031 as follows:

§5031. Inspection.
(a) Each shift. ~~A~~ The operator or other qualified person shall visually inspect the crane's or derrick's controls, rigging and operating mechanism prior to the first operation on any work shift. The inspection shall consist of observation for apparent deficiencies. Taking apart equipment components and booming down is not required as part of this inspection unless the results of the visual inspection or trial operation indicate that further investigation necessitating taking apart equipment components or booming down is needed. Any unsafe conditions disclosed by the inspection requirements of this Article shall be corrected promptly. Defective components of equipment which create an imminent safety hazard shall be replaced, repaired or adjusted prior to use.
~~(b) Frequency of Inspections. Daily visual inspections by the operator or other qualified person shall be made of/for:~~
At a minimum the inspection shall include all of the following (as applicable):
(1) All functional mechanisms for maladjustment interfering with proper operation;
(2) ~~The operation of all limit switches without a load on the hook;~~ *[Existing relocated to (15)]* Control and drive mechanisms for apparent excessive wear of components and contamination by lubricants, water or other foreign matter.
(3) Lines, tanks, valves, pumps, and other parts of air, ~~or~~ hydraulic, or other pressurized systems for deterioration or leakage, particularly lines which flex in normal operation. ~~;~~
(4) ~~Hooks for deformation and cracks;~~ *[Existing (4) relocated below]* Hydraulic system for proper fluid level.
(5)~~(4)~~ Hooks and latches for deformation, ~~and~~ cracks, excessive wear, or damage such as from chemicals or heat.
(6)~~(5)~~ Hoist or load attachment chains including end connections for excessive wear, twist, distorted or stretched links interfering with proper function;
(7)~~(6)~~ Excessive wear, broken wires, stretch, kinking, or twisting of ropes and rope slings, including end connections.
(A) See §5036(d) for additional requirements for cranes in construction.
(8) Wire rope reeving for compliance with the manufacturer's specifications.
(9) Electrical apparatus for malfunctioning, signs of apparent excessive deterioration, dirt or moisture accumulation.
(10) Tires (when in use) for proper inflation and condition.

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(11) Ground conditions around the equipment for proper support, including ground settling under and around outriggers/stabilizers and supporting foundations, ground water accumulation, or similar conditions. This section does not apply to the inspection of ground conditions for railroad tracks and their underlying support when the railroad tracks are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR Part 213.
(12) The equipment for level position within the tolerances specified by the equipment manufacturer's recommendations, both before each shift and after each move and setup.
(13) Operator cab windows for significant cracks, breaks, or other deficiencies that would hamper the operator's view.
(14) Rails, rail stops, rail clamps and supporting surfaces when the equipment has rail traveling. This section does not apply to the inspection of rails, rail stops, rail clamps and supporting surfaces when the railroad tracks are part of the general railroad system of transportation that is regulated pursuant to the Federal Railroad Administration under 49 CFR part 213.
(15) Safety devices and operational aids for proper operation.
(16) ~~(2)~~ The operation of all limit switches without a load on the hook;

(b) ~~(c)~~ Periodic inspections.
(1) Frequency:
(A) Periodic inspections shall be conducted at least four times a year.
(B) ~~(c)(3)~~ Cranes handling molten metal shall be inspected at least weekly when in use and necessary repairs made.
(2) The annual certification, as required by Section 5021(a), can serve as one of the required periodic inspections. The periodic inspections shall be evenly spaced or as close to evenly spaced as scheduling permits through the year. Cranes shall not be operated more than 750 hours, between periodic inspections.
(3) The inspection shall include the following in addition to the items in subsection (a) ~~(b)~~ above:
(A) ~~(1)~~ Excessive wear of all functional operating mechanisms.
(B) ~~(2)~~ Ropes, brakes, friction clutches, chain drives, and other parts subject to wear which may be readily inspected.
~~(3) Cranes handling molten metal shall be inspected at least weekly when in use and necessary repairs made.~~
(C) ~~(4)~~ An inspection record shall be maintained which includes the items checked and the results of the inspection, the date of the inspection, the signature of the person who performed the inspection, and the serial number or other identifier of the crane inspected. ~~The most recent~~ Inspection records shall be maintained on file for a minimum of three months.

(c)~~(d)~~ Annual/comprehensive. In any year in which no quadrennial (every four years) proof load test is required on cranes or derricks, such equipment shall be examined by a qualified person as

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described in Section 5021. Such examination shall be made not later than the anniversary date of the quadrennial certification and shall conform with the requirements of Section 5022(d), and the following:

(1) Crane hooks with cracks or with deformation of throat opening more than 15 percent in excess of normal opening or more than 10 degree twist from plane of unbent hook shall be removed from service.

(2) Ropes shall be inspected for proper lubrication, excessive wear, broken strands, and proper reeving.

NOTE 1: Many variable factors are involved in determining the exact time for replacement of rope and timely replacement for safety. Conditions such as the following shall be sufficient reason for replacement:

1. In running ropes, 6 randomly distributed broken wires in one rope lay, or 3 broken wires in one strand in one lay.
2. Wear of 1/3 the original diameter of outside individual wires.
3. Kinking, crushing, bird caging, or other damage resulting in distortion of the rope structure. Evidence of any heat damage.
4. Reductions from nominal diameter of more than:
   1/64 inch for diameters up to 5/16 inch
   1/32 inch for diameters 3/8 inch to 1/2 inch
   3/64 inch for diameters 9/16 inch to 3/4 inch
   1/16 inch for diameters 7/8 inch to 11/8 inch
   3/32 inch for diameters 1 1/4 inch to 1 1/2 inch
5. In standing ropes, more than 2 broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.
6. Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

Note 2. See Section 5036 for additional requirements for cranes in construction.

(3) In order to establish data for judging the proper time for replacement of hoisting rope, a continuing inspection record shall be maintained. The record shall cover factors of deterioration as listed in subsections (a), (b) and (c)~~, and (d)~~.

(4) Whenever it is considered necessary by the certificating agency or authorized representative and whenever it is practical and advisable to avoid disassembly of equipment, removal of pins, etc., examination of structure or parts by electronic, ultrasonic, or other nondestructive methods shall be carried out.

(5) If any deficiency is identified, an immediate determination shall be made by the certificating agency as to whether the deficiency constitutes a safety hazard or, though not yet a safety hazard, needs to be monitored in the monthly inspections.

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(6) If the certificating agency determines that a deficiency is a safety hazard, the equipment shall be taken out of service until it has been corrected. except when temporary alternative measures are implemented as specified in ~~§5018(d) or~~ §4968.2. [Ed: 5018 deleted]

(7) If the certificating agency determines that, though not presently a safety hazard, the deficiency needs to be monitored, the employer shall ensure that the deficiency is checked in the periodic inspections.

(8) Documentation of annual/ comprehensive inspection. An inspection record shall be maintained which includes the items checked and the results of the inspection, the date of the inspection, the name and signature of the person who performed the inspection, and the serial number or other identifier of the crane inspected. Inspection records shall be maintained on file for a minimum of 12 months by the employer that conducts the inspection. The most recent inspection record shall be maintained on file. All documents produced under this section must be available, during the applicable document retention period, to all persons who conduct inspections under this section. (See section 5025)

(d) Any part of a manufacturer's procedures regarding inspections that relate to safe operation (such as to a safety device or operational aid, critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) that is more comprehensive or has a more frequent schedule of inspection than the requirements of this section shall be followed. *[Ed Note: existing 5031(d) relocated to 5031(c)]*

(e) All rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed shall be given a thorough inspection before it is placed in service. This inspection shall be for all types of deterioration and shall be performed by a qualified person whose approval shall be required for further use of the rope. A certification record shall be made available for inspection which includes the date of inspection, the signature of the person who performed the inspection, and an identifier of the rope which was inspected.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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Add new Section 5031.1 as follows:

5031.1 Additional Inspection Requirements for Cranes in Construction Service. At least every 12 months the following equipment shall be inspected by a qualified person as described in Section 5021. Such examination shall include the points listed in Section 5022(d), and the following:
(a) Gasoline, diesel, electric, or other power plants for safety-related problems (such as leaking exhaust and emergency shut-down feature) and conditions, and proper operation.
(b) Chains and chain drive sprockets for excessive wear of sprockets and excessive chain stretch.
(c) Travel steering, brakes, and locking devices, for proper operation.
(d) Tires for damage or excessive wear.
(e) Outrigger or stabilizer pads/floats for excessive wear or cracks.
(f) Slider pads for excessive wear or cracks.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 5031.2 as follows:

§5031.2. Inspection – Post-Assembly (mandatory for Cranes and Derricks in Construction).
(a) Upon completion of assembly, the equipment shall be inspected by a qualified person or certificating agency to assure that it is configured in accordance with manufacturer equipment criteria.
NOTE: Disassembly and reassembly of equipment does not require recertification of the equipment provided that the equipment is reassembled and used in a manner consistent with its certification.

(b) Where manufacturer equipment criteria are unavailable, the qualified person or certificating agency shall:
(1) Determine if a registered professional engineer (RPE) familiar with the type of equipment involved is needed to develop criteria for the equipment configuration. If an RPE is not needed, the employer shall ensure that the criteria are developed by the qualified person. If an RPE is needed, the employer shall ensure that they are developed by an RPE.
(2) Determine if the equipment meets the criteria developed in accordance with subsection (b)(1).

(c) Equipment shall not be used until an inspection under this section demonstrates and documents that the equipment is configured in accordance with the applicable criteria.
NOTE: Applicable criteria are prescribed in Articles 99 (Testing) and 100 (Inspection and Maintenance) of these Orders. See Article 96 for Tower Cranes.

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NOTE: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5031.3 as follows:

§5031.3. Inspection – Severe Service.
Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (such as loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), the employer shall stop using the equipment and a certified agent shall:

(1) Inspect the equipment for structural damage to determine if the equipment can continue to be used safely.
(2) In light of the use/conditions determine whether any items/conditions listed in section 5031(c) (Inspection – Annual/Comprehensive) need to be inspected; if so, the certified agent shall inspect those items/conditions.
(3) If a deficiency is found, the employer shall follow the requirements in sections 5031(c)(5) through (c)(7).

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new Section 5031.4 as follows:

§5031.4. Inspection – Equipment Idle for 3 Months or More.
Equipment that has been idle for 3 months or more shall be inspected by a qualified person in accordance with the requirements of section 5031(b) and shall have a valid certificate as required by section 5021 before initial use.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add news Section 5033.1 as follows:

§5033.1. Qualifications of Maintenance & Repair Employees.
(a) Maintenance, inspection and repair personnel are permitted to operate the equipment only where all of the following requirements are met:

(1) The operation is limited to those functions necessary to perform maintenance, inspect the equipment, or verify its performance.
(2) The personnel either:

(A) Operate the equipment under the direct supervision of an operator who meets the requirements of §5006.1 or 5006.2 (Operator qualification and certification) as applicable; or
(B) Are familiar with the operation, limitations, characteristics and hazards associated with the type of equipment.

(b) Maintenance and repair personnel shall meet the definition of a qualified person with respect to the equipment and maintenance/ repair tasks performed.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 5036 as follows:

§5036. Inspection – Wire Rope (Additional requirements for cranes in construction).

(a) Apparent deficiencies.

(1) Category I. Apparent deficiencies in this category include the following:

(A) Significant distortion of the wire rope structure such as kinking, crushing, un-stranding, bird-caging, signs of core failure or steel core protrusion between the outer strands.
(B) Significant corrosion.
(C) Electric arc damage (from a source other than power lines) or heat damage.
(D) Improperly applied end connections.
(F) Significantly corroded, cracked, bent, or worn end connections (such as from severe service).

(2) Category II. Apparent deficiencies in this category are:

(A) Visible broken wires, as follows:

1. In running wire ropes: Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope.
2. In rotation resistant ropes: Two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters.
3. In pendants or standing wire ropes: More than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection.

(B) A diameter reduction of more than 5% from nominal diameter.

(3) Category III. Apparent deficiencies in this category include the following:

(A) In rotation resistant wire rope, core protrusion or other distortion indicating core failure.
(B) Prior electrical contact with a power line.
(C) A broken strand.

(b) Critical review items. The qualified person shall give particular attention to all of the following:

(1) Rotation resistant wire rope in use.

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(2) Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends.
(3) Wire rope at flange points, crossover points and repetitive pickup points on drums.
(4) Wire rope at or near terminal ends.
(5) Wire rope in contact with saddles, equalizer sheaves or other sheaves where rope travel is limited.

(c) Removal from service.

(1) If a deficiency in Category I [see section (a)(1)] is identified, an immediate determination shall be made by a competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question shall be prohibited until:

(A) The wire rope is replaced, or

(B) If the deficiency is localized, the problem may be corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this subsection, the employer shall ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(2) If a deficiency in Category II [see section (a)(2)] is identified, operations involving use of the wire rope in question shall be prohibited until:

(A) The employer complies with the wire rope manufacturer's established criterion for removal from service or a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope,

(B) The wire rope is replaced, or

(C) If the deficiency is localized, the problem may be corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this subsection, the employer shall ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(3) If a deficiency in Category III is identified, operations involving use of the wire rope in question shall be prohibited until:

(A) The wire rope is replaced, or

(B) If the deficiency (other than power line contact) is localized, the problem may be corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited. If a rope is shortened under this paragraph, the employer shall ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(4) Where a wire rope is required to be removed from service under this section, either the equipment (as a whole) or the hoist with that wire rope shall be tagged-out, in accordance with §5008.1(e)(1), until the wire rope is repaired or replaced.

(d) Shift inspection. Shift inspection shall be in accordance with provisions of section 5031(a) for wire rope, hooks, latches, attachment chains, slings, connections and reeving.

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(e) Monthly inspection.

(1) Each month an inspection shall be conducted in accordance with section 5031(a).

(2) The inspection shall include any deficiencies that the certificating agency that conducts the annual inspection determines under subsection (f)(3)(B) shall be monitored.

(3) Wire ropes on equipment shall not be used until an inspection under this subsection demonstrates that no corrective action under section 5036(c) is required.

(4) The inspection shall be documented according to §5031(b)(3)(C) (monthly inspection documentation).

(f) Annual/comprehensive.

(1) At least every 12 months, wire ropes in use on equipment shall be inspected by a certificating agency in accordance with section 5036(d).

(2) In addition, at least every 12 months, the wire ropes in use on equipment shall be inspected by a certificating agency, as follows:

(A) The inspection shall be for deficiencies of the types listed in section 5036(a).

(B) The inspection shall be complete and thorough, covering the surface of the entire length of the wire ropes, with particular attention given to all of the following:

1. Critical review items listed in section 5036(b).
2. Those sections that are normally hidden during shift and monthly inspections.
3. Wire rope subject to reverse bends.
4. Wire rope passing over sheaves.

Exception: In the event an inspection under subsection (f)(2) is not feasible due to existing set-up and configuration of the equipment (such as where an assist crane is needed) or due to site conditions (such as a dense urban setting), such inspections shall be conducted as soon as it becomes feasible, but no longer than an additional 6 months for running ropes and, for standing ropes, at the time of disassembly.

(3) If a deficiency is identified, an immediate determination shall be made by the certificating agency as to whether the deficiency constitutes a safety hazard.

(A) If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question shall be prohibited until:

1. The wire rope is replaced, or
2. If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened under this section, the employer shall ensure that the drum will still have two wraps of wire when the load and/or boom is in its lowest position.

(B) If the certificating agency determines that, though not presently a safety hazard, the deficiency needs to be monitored, the employer shall ensure that the deficiency is checked in the monthly inspections.

(4) The inspection shall be documented according to §5031(c)(8) (annual/comprehensive inspection documentation).

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(g) Rope lubricants that are of the type that hinder inspection shall not be used.

(h) All documents produced under this section shall be available, during the applicable document retention period, to all persons who conduct inspections under this section.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

Add new section 5037 as follows:

§5037. Wire rope – selection and installation criteria.
(a) Original equipment wire rope and replacement wire rope shall be selected and installed in accordance with the requirements of this section. Selection of replacement wire rope shall be in accordance with the recommendations of the wire rope manufacturer, the equipment manufacturer, or a qualified person.

(b) Wire rope design criteria: Wire rope (other than rotation resistant rope) shall comply with either Option (1) or Option (2), as follows:
(1) Option (1). Wire rope shall comply with section 5–1.7.1 of ASME B30.5–2004 except that section 5-1.7.1(c) shall not apply.
(2) Option (2). Wire rope shall be designed to have, in relation to the equipment's rated capacity, a sufficient minimum breaking force and design factor so that compliance with the applicable inspection provisions in §5031 and 5036 will be an effective means of preventing sudden rope failure.

(c) Wire rope shall be compatible with the safe functioning of the equipment.

(d) Boom hoist reeving.
(1) Fiber core ropes shall not be used for boom hoist reeving, except for derricks.
(2) Rotation resistant ropes shall be used for boom hoist reeving only where the requirements of subsection (e)(4)(B) are met.

(e) Rotation resistant ropes.
(1) Definitions.
(A) Type I rotation resistant wire rope ("Type I"). Type I rotation resistant rope is 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 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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(B) Type II rotation resistant wire rope ("Type II"). Type II rotation resistant rope is 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.

(C) Type III rotation resistant wire rope ("Type III"). Type III rotation resistant rope is 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.

(2) Requirements.

(A) Types II and III with an operating design factor of less than 5 shall not be used for duty cycle or repetitive lifts.

(B) Rotation resistant ropes (including Types I, II and III) shall have an operating design factor of no less than 3.5.

(C) Type I shall have an operating design factor of no less than 5, except where the wire rope manufacturer and the equipment manufacturer approves the design factor, in writing.

(D) Types II and III shall have an operating design factor of no less than 5, except where the requirements of subsection (e)(3) are met.

(3) When Types II and III with an operating design factor of less than 5 are used (for non-duty cycle, non-repetitive lifts), the following requirements shall be met for each lifting operation:

(A) A qualified person shall inspect the rope in accordance with subsections 5036(a) through (d) and 5031(a). The rope shall be used only if the qualified person determines that there are no deficiencies constituting a hazard. In making this determination, more than one broken wire in any one rope lay shall be considered a hazard.

(B) Operations shall be conducted in such a manner and at such speeds as to minimize dynamic effects.

(C) Each lift made under subsection (e)(3) shall be recorded in the monthly and annual inspection documents. Such prior uses shall be considered by the qualified person in determining whether to use the rope again.

(4) Additional requirements for rotation resistant ropes for boom hoist reeving.

(A) Rotation resistant ropes shall not be used for boom hoist reeving, except where the requirements of subsection (e)(4)(B) are met.

(B) Rotation resistant ropes may be used as boom hoist reeving when load hoists are used as boom hoists for attachments such as luffing attachments or boom and mast attachment systems. Under these conditions, all of the following requirements shall be met:

1. The drum shall provide a first layer rope pitch diameter of not less than 18 times the nominal diameter of the rope used.

2. The requirements in §4928.1(a) (irrespective of the date of manufacture of the equipment), and §4928.1(b).

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3. The requirements in ASME B30.5–2004 sections 5-1.3.2(a), (a)(2) through (a)(4), (b) and (d) except that the minimum pitch diameter for sheaves used in multiple rope reeving is 18 times the nominal diameter of the rope used (instead of the value of 16 specified in section 5-1.3.2(d)).
4. All sheaves used in the boom hoist reeving system shall have a rope pitch diameter of not less than 18 times the nominal diameter of the rope used.
5. The operating design factor for the boom hoist reeving system shall be not less than five.
6. The operating design factor for these ropes shall be the total minimum breaking force of all parts of rope in the system divided by the load imposed on the rope system when supporting the static weights of the structure and the load within the equipment's rated capacity.
7. When provided, a power controlled lowering system shall be capable of handling rated capacities and speeds as specified by the manufacturer.

(f) Wire rope clips used in conjunction with wedge sockets shall be attached to the unloaded dead end of the rope only, except that the use of devices specifically designed for dead-ending rope in a wedge socket is permitted.

(g) Socketing shall be done in the manner specified by the manufacturer of the wire rope or fitting.

(h) Prior to cutting a wire rope, seizings shall be placed on each side of the point to be cut. The length and number of seizings shall be in accordance with the wire rope manufacturer's instructions.

Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.

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~~Subchapter 7. General Industry Safety Orders~~
~~Group 13. Cranes and Other Hoisting Equipment~~
~~Article 101. Slings~~

~~Retitle Article 101 to read as follows:~~

~~Article 101. Slings and Hooks.~~

~~Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

~~Add new section 5050 as follows:~~

~~5050. Hooks, Hook and ball assemblies, load blocks~~
~~(a) Hooks, Hook and ball assemblies and load blocks shall be marked with their rated capacity and weight (mobile cranes).~~
~~(b) Latching hooks. Hook and ball assemblies and load blocks shall be equipped with latches.~~

~~Note: Authority cited: Section 142.3, Labor Code. Reference: Section 142.3, Labor Code.~~

[Moved to 4881(d)]

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Subchapter 7. General Industry Safety Orders
Group 26. Diving Operations
Article 153. Commercial Diving Operations

Amend GISO Section 6060 to read:

§6060. Procedures During Dive.

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(b)(4) Working with a diver. The employer shall meet the following additional requirements when working with a diver in the water:
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(C) In addition to the requirements in ~~Construction Safety Orders 1617.1-1617.3~~ Sections 5001 through 5001.2 (Signals), either:
1. A clear line of sight shall be maintained between the operator and tender; or
2. The signals between the operator and tender shall be transmitted electronically.
3. The means used to secure the crane/derrick to the vessel/flotation device [see ~~Construction Safety Orders, Section 1619.3(n)(5)~~ section 4988.10(e)] shall not allow any amount of shifting in any direction.