

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

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

DRAFT

Petitioner's language with edits and revisions for Advisory Committee (AC) discussion.

Construction Safety Orders  
Article 29. Erection and Construction

Amend Section 1711 to read as follows:

Section 1711. ~~Oiling Forms~~ Reinforcing Steel and Concrete Construction.

~~The oiling of floor panels that are in place shall not be done until the carpentry work on the form has been completed.~~ *[moved to Section 1713(d)]*

(a) Scope and Application.

(1) This section sets forth the requirements for the protection of employees associated with the use of reinforcing steel assemblies used in the construction of concrete and masonry structures including post-tensioning operations.

(2) The duties of controlling contractors under this section include the duties specified in Section 1711(c), (d), (e)(3) and (5), (f)(2) and (6), (g)(4), (h)(1), (4), and (5), and Section 1717(f). *[AC will review and discuss all of these new subsections]*

Note 1: Additional requirements for reinforcing steel and concrete construction are contained in Article 20 and Article 29 of these Orders.

Note 2: Other relevant provisions in the GISO and CSO may apply to concrete and masonry construction operations.

(b) Definitions.

Controlling contractor. Means 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. *(Similar to Section 1710)*

Dead Load. Means a constant load, without load factors, due to the mass of members, the supported structure and permanent attachments or accessories.

*(Definition from DOSH-see subsection (h)(9))*

Falsework. Means formwork to support concrete and placing operations for supported slabs of concrete structures, including all supporting members, hardware and bracing.

*(Definition from DOSH - AC to discuss how this may relate to the definition of "formwork")*

Formwork. Means the total system of support for freshly placed or partially cured concrete, including the mold or sheeting (form) that is in contact with the concrete as well as all supporting

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members including shores, reshores, hardware, braces, and related hardware. [From federal definition – 1926.700(b), also see ANSI A10.9, Section 3.12]

Flying Deck Forms. Means a prefabricated formwork system for floor slabs incorporating support that is moved in large sections by mechanical equipment (crane, forklift, etc.).

(AC to discuss, also see ANSI A10.9-2013, Section 3.11)

Jacks. Means portable hydraulic devices that pull the tendons associated with post-tensioning concrete to create a permanent tension load. (DOSH Recommended)

Post-tensioning operations. Means a method of prestressing reinforced concrete in which tendons running through the concrete are tensioned after the concrete has hardened. (DOSH recommended)

Reshores. Means the temporary vertical supporting members that are placed or left in place when the original supporting shores or posts for the formwork are removed. The reshores are used to support partially cured concrete and other construction loads.

(See ANSI 3.18, check if term will be used)

Reinforcing steel assemblies. Means vertical and horizontal columns, caissons, walls, drilled piers, top mats, and other similar structures. [From Petition III. (1)]

Reinforced concrete. Means a composite material in which the concrete provides the material's compressive strength, while the steel, in the form of embedded reinforcing bars, provides the tensile strength. (Advisory Committee discussion re: need for this definition)

Tendon. Means a metal element, usually of steel such as wire, stranded components (such as wires), bars or rods used in prestressing or post-tensioning concrete. (See ANSI Section 3.26)

Vertical Slip Form. Means a form that is raised as concrete is placed; slides vertically without being detached to form walls or other vertical concrete structures. [DOSH definition & also feds have a similar definition in 1926.700(b)(8)]

*[Additional definitions necessary? AC discussion.]*

(c) Site Access and Layout. The controlling contractor shall ensure that the following is provided and maintained:

(1) Adequate access roads into and through the site for the safe delivery and movement of derricks, cranes, trucks, other necessary equipment, and the material to be erected and means and methods for pedestrian and vehicular control.

EXCEPTON: this requirement does not apply to roads outside of the construction site.

(2) A firm, properly graded, drained area, readily accessible to the work with adequate space for the safe storage of “reinforcing and post-tensioning” materials and the safe operation of the “reinforcing contractors” equipment.

(3) Adequate exterior platform for landing materials on the floors of multi-tiered buildings.

AC to discuss if the erection plan required by Section 1709(d) adequately addresses a platform for landing materials.

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(4) Adequate benching and/or shoring in accordance with the provisions of Sections 1541 and 1541.1 of these Orders prior to the commencement of reinforcing operations in excavations and/or trenches.

*Without the reference to Section 1541 and 1541.1, a clarity concern is that the only requirement with respect to benching and shoring is that it must be "adequate."*

(d) Written Notifications Prior to Commencement of Reinforcing Steel Activities.

Approval to begin reinforcing steel installation. Before authorizing the commencement of reinforcing steel activities, the controlling contractor shall ensure that the reinforcing steel contractor on the project is provided with the following written notifications:

(1) Formwork and falsework have been inspected by a competent person of the controlling contractor prior to, during, and immediately after the installation of reinforcing steel and placement of the concrete.

(2) The structural stability of vertical formwork, elevated decks, and other working/walking surfaces are adequately braced, guyed, or supported in accordance with Sections 1713 and 1717 to allow safe access of reinforcing employees, materials, and equipment.

*AC to review the references to Sections 1713 and 1717 or any need for additional or clarifying provisions.*

(3) The benching and/or shoring for excavations have been inspected by a competent person of the controlling contractor.

(e) Stability Requirements for Vertical and Horizontal Columns, Walls, and Other Reinforcing Assemblies.

(1) Reinforcing steel for walls, piers, columns, and similar vertical structures that are free-standing shall be guyed and supported to prevent collapse.

*AC note: double underlined regarding "free standing" vertical structures is added from Petitioner's language in subsection (e)(1) and (4) for consideration/discussion.*

(A) Guys, supports, and braces shall be installed and removed as directed by a qualified person.

(2) Wire mesh rolls shall be secured to prevent dangerous recoiling action.

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*[AC note: subsection (e)(1) & (2) moved from Section 1712(f) - AC to compare Petitioner's similar language in its proposal, Section III nos. (1) - (3).]*

(3) The controlling contractor shall bar other construction processes below or near the erection of reinforcement assemblies until they are adequately supported and/or secured to prevent structural collapse.

(4) Prefabricated walls, caissons, drilled piers, and other modular reinforcing steel assemblies that are free-standing shall be guyed, braced, or supported under the direction of a competent person.

*With respect to (e)(4), AC to discuss any duplication with subsection (e)(1) and/or the Petition's Section III, no. (1).*

*AC to discuss subsection (e)(5) and whether a qualified person or professional engineer should design such support systems. Also, (e)(1)(A) already requires a qualified person to supervise the removal of guys, bracing and supports. Should the qualified person/competent person be that of the controlling contractor or the reinforcing steel contractor?*

(5) Systems for guying, bracing, or supports shall be designed by a qualified person of the controlling contractor, and removed only with the approval of a competent person.

(f) Requirements for Impalement Protection and Custody of Protective Covers.

(1) Employees shall be protected from the hazards of working around or over exposed, projecting reinforcing steel or other similar projections in accordance with the provisions of Section 1712.

(2) When protective covers are provided by the reinforcing steel contractor, they shall remain in place after reinforcing steel activities have been completed, to protect workers from other trades, only if the controlling contractor or its authorized representative:

(3) Has directed the reinforcing steel contractor to leave the protective covers in place; and

(4) Has inspected and accepted control and responsibility for the protective covers; or

(5) Has placed control and responsibility for the protective covers on another contractor other than the reinforcing steel contractor.

(6) The controlling contractor shall provide written notice to the contractor that is in control and has responsibility for the protective covers.

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*Subsection (f)(2) – (6) are similar to the Petitioner’s language in Section IV, (3)(a) & (b).*

(g) Requirements for Hoisting and Rigging Reinforcement Assemblies.

(1) A qualified person (rigger) shall inspect the rigging prior to each shift in accordance with the General Industry Safety Orders (GISO), Section 4999.

(2) Suspended loads shall be pre-planned and conducted in accordance with GISO, Group 13, Cranes and Other Hoisting Equipment.

Note: Sections 4999 and 5002 include provisions for the handling and rigging of loads, and the requirements for overhead loads respectively.

*AC to review Petition’s Section No. V. relative to subsection (g)(1) and (2). Section V. has provisions that are similar and/or may duplicate existing hoisting and rigging standards in Title 8, Group 13.*

(3) All lifting devices below the hook such as spreader bars used for hoisting pre-assembled cages, walls, columns, beams and other structures shall be designed and fabricated under the direction of a qualified person in accordance with the ASME B 30.20 - 2013 requirements.

*AC to discuss if existing Title 8 crane standards address below the hook lifting devices? Also, the definition of a “qualified person” is different in the ASME B 30.20-2013 standard than Title 8. Reference to the ASME standard in this manner would require an incorporation by reference. Is a “qualified person” as defined adequate for the design and fabrication of below the hook lifting devices or should this require a registered engineer or other competent person?*

(4) The controlling contractor shall bar all activities under or near hoisting operations including unloading and staging areas for reinforcement assemblies.

*Existing standards are not prescriptive regarding the controlling contractor’s responsibilities. Do existing standards address subsection (g)(4) as a performance standard?*

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(h) Post-Tensioning Operations.

(1) No stressing operations shall commence prior to the controlling contractor providing written documentation to the company performing the stressing operation that the initial concrete compressive strength has been achieved.

(2) No employees (except those essential to the post-tensioning operations) shall be permitted to be behind the jack or the fixed end anchorage during tensioning operations. No employees shall be permitted above or alongside the full length of the tendons during tensioning operations.

(3) Signs and barriers shall be erected to limit access into the stressing area only to personnel engaged in stressing or de-tensioning operations.

(4) The controlling contractor shall bar other construction trades from working in the barricaded area during stressing operations.

(5) Where tensioning operations are above grade, the controlling contractor shall ensure that an adequate safe work platform of a minimum of three feet, such as an extension of the formwork, for stressing tendons, cutting tendon tails, and grouting. The work platform shall include guardrails meeting the requirements of Section 1620, and shall be kept clear of any debris or materials not related to the stressing or de-tensioning operations

(6) During operation, stressing equipment shall be secured to prevent accidental displacement.

(7) Stressing equipment calibrations per contract specifications shall be available on site. Prior to stressing, a competent person shall verify the adequacy of the stressing equipment calibrations.

(8) A competent person shall inspect the stressing equipment for damage or defects before stressing operations begin, and periodically during the stressing operations. The use of stressing equipment shall conform to the manufacturer's instructions and recommendations.

(9) Methods shall be employed to insure that supporting forms, falsework or shoring does not fall due to cambering of the concrete during the stressing operations. Dead loads and construction loads (including those due to stressing) shall be considered in the design of the forms, falsework and shoring.

*Subsection (h)(1) – (9) for post-tensioning operations is similar to the Petitioner's Section IV with some edits.*

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(i) Fall Protection Requirements.

*Subsection (f)(1) requires employees to be protected from the hazards of working around or over exposed, projecting reinforcing steel or other similar projections in accordance with the provisions of Section 1712. Section 1712(e) is nearly verbatim to the Petitioner's proposed Section VII, (1).*

*AC to discuss that with respect to the Petitioner's Section VII, (2), CSO in Section 1620 and 1620 sets for guardrail requirements for unprotected elevated locations (e.g. sides of unprotected edges).*

*AC to discuss that the Petitioner's Section VII, (2) – requires the controlling contractor to install perimeter and interior guardrail systems, or covers.  
Is additional language such as the following necessary?*

*(e.g. Unprotected sides and edges. Before employees are permitted to place reinforcing steel or concrete on elevated decks, the controlling contractor shall ensure that guardrail systems which meet the requirements of Section 1620 are installed and maintained.)*

(j) Formwork and falsework stability shall be provided in accordance with Sections 1713 and 1717 of these Orders.

*AC note: Petitioner's Section VIII (1) [first sentence] repeats the controlling contractor's inspection responsibility in Section II, (1). Also, CSO Section 1717 "Falsework and Vertical Shoring" particularly subsection's (b) and (c) appear to have more extensive standards (e.g. involvement of a Calif. registered civil engineer) with respect to the design and inspection of certain formwork, falsework, and vertical shores. AC to discuss portions of Sections 1713 and 1717 that relate to the Petition, Section VIII language.*

*In order to address the Petition language pertaining to the controlling contractor's responsibility in Section VIII, (2), an amendment is proposed in Section 1717, new subsection (f).*

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(k) Training Requirements

(a) The employer shall ensure that each employee who performs reinforcing steel and post-tensioning activities has been provided training in the following areas:

(1) The nature of the hazards associated with reinforcing steel and post-tensioning activities; and;

(2) The proper procedures and equipment to perform reinforcing steel and post-tensioning activities and;

(3) Employees involved in reinforcing bar and post-tensioning operations shall be certified by a qualified evaluator (third-party).

*“Qualified evaluator” (third party) means an entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the training requirements.*

*Subsection (k) including the italics defining a “Qualified evaluator” is the Petitioner’s language in Section IX for training. AC will discuss the merits these recommendations (e.g. the need for a third party qualified evaluator?) as well as the existing training requirements in CSO 1509 and GISO 3203.*

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Amend Section 1712 to read as follows;

§1712. Reinforcing Steel and Other Similar Projections. Requirements for Impalement Protection.

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(e) Fall Protection.

Employees shall not be permitted to place or tie reinforcing steel in walls, piers, columns, etc., more than 6 feet above an adjacent surface, unless a personal fall protection system is used in accordance with Section 1670 or other method affording equivalent protection from the hazard of falls from elevated surfaces.

Exception: Point-to-point horizontal or vertical travel on reinforcing steel up to 24 feet above the surface below providing there are no impalement hazards.

~~(f) Securing Reinforcing Steel.~~

~~(1) Reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent collapse.~~

~~(A) Guys, supports, and braces shall be installed and removed as directed by a qualified person.~~

~~(2) Wire mesh rolls shall be secured to prevent dangerous recoiling action.~~

(f) Moved to Section 1711(e) with edits.

*AC to discuss moving subsection (f) to Section 1711(e) with edits.*

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

Amend Section 1713 to read as follows:

Section 1713. Framing and Concrete Forms.

(a) Framed panels for structures shall be securely anchored, guyed, or braced to prevent them from falling.

(b) Form panels for concrete structures shall be securely anchored, guyed, or braced to prevent them from falling or collapsing.

(1) Panels exceeding 500 pounds shall have lifting attachments with a safety factor of 4.

(2) Nailed lifting attachments shall not be used.

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(c) Reinforcing steel shall not be used as guy attachments.

(d) The oiling of floor panels that are in place shall not be done until the carpentry work on the form has been completed. [AC note, subsection (d) is relocated from Section 1711].

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

Amend Section 1717 to read as follows:

Section 1717. Falsework and Vertical Shoring.

(a) Design Loads.

(1) Formwork and falsework or shoring for the support of concrete or other materials shall be designed, erected, supported, braced and maintained so as to assure its ability to safely withstand all intended loads during erection, construction, usage and removal.

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(e) Removal.

(1) Formwork and shores (except those used for slabs on grade and slip forms) shall not be removed until the employer determines that the concrete has gained sufficient strength to support its weight and superimposed loads. Such determination shall be based on compliance with the stipulated conditions for removal of forms and shores indicated in the plans and specifications.

(2) Reshoring shall not be removed until the concrete being supported has attained the strength to support its weight and all loads placed upon it.

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(f) The controlling contractor shall prohibit employee access to the bridge decks during the jacking and grading operations.

NOTE: For regulations relating to permits for falsework, see Section 1503.

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

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Amend Section 1721 to read as follows:

Section 1721. Post-Tensioning Operations.

- (a) ~~No employee (except those essential to the post-tensioning operations) shall be permitted to be behind the jack during tensioning operations.~~
- (b) ~~Signs and barriers shall be erected to limit employee access to the post-tensioning area during tensioning operations.~~

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

Section 1721 relocated to 1711(h) with edits.