

## OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

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### NOTICE OF PROPOSED MODIFICATIONS TO

TITLE 8: Chapter 4, Subchapter 4, Article 29, Section 1712 of the Construction Safety Orders

#### Hazards Associated with Reinforcing Steel and Other Similar Projections

Pursuant to Government Code Section 11346.8(c), the Occupational Safety and Health Standards Board (Standards Board) gives notice of the opportunity to submit written comments on the above-named regulations in which further modifications are being considered as a result of public comments and/or Board staff evaluation.

On February 20, 2003, the Standards Board held a Public Hearing to consider revisions to Title 8, Section 1712 of the Construction Safety Orders, California Code of Regulations. The Standards Board received oral and written comments on the proposed revisions. The regulations have been further modified as a result of the comments and Board consideration.

A copy of the full text of the regulations as originally proposed and a copy of the modified text clearly indicating the further modifications are attached for your information. In addition, a summary of all oral and written comments regarding the original proposal and staff responses are included.

Any written comments on these modifications must be received by 5:00 p.m. on October 10, 2003 at the Occupational Safety and Health Standards Board, 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833. These regulations will be scheduled for adoption at a future business meeting of the Standards Board.

Pursuant to Government Code Section 11346.8(d), notice is also given of the opportunity to submit comments concerning the addition to the rulemaking file of the following document relied upon:

? Drop Test Report, dated March 3, 1995.

A copy of this document is available for review during normal business hours at the Standards Board office located at the address listed above.

The Standards Board's rulemaking files on the proposed action are open to public inspection Monday through Friday, from 8:00 a.m. to 4:30 p.m., at the Standards Board's office at 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833.

Inquiries concerning the proposed changes may be directed to the Executive Officer, Keith Umemoto at (916) 274-5721.

OCCUPATIONAL SAFETY AND HEALTH  
STANDARDS BOARD

Date: September 22, 2003

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Keith Umemoto, Executive Officer

**REGULATIONS AS ORIGINALLY PROPOSED**

STANDARDS PRESENTATION  
TO  
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,  
TITLE 8, CHAPTER 4

Amend Section 1712 to read as follows:

§1712. ~~Hazards Associated with the Use of Reinforcing Steel and Other Similar Projections.~~

(a) Scope. This section applies to all work sites and locations where employees work around or over exposed, projecting, reinforcing steel or other similar projections.

(b) Definitions.

~~Caps. Manufactured devices that completely cover exposed ends of reinforcing steel and have flat or mushroomed surface at least twice the diameter of the reinforcing steel they are designed to cover.~~

Job-Built. As used in this section, protective covers and troughs usually constructed at the job-site of wood or other similar materials and designed specifically for covering exposed ends of reinforcing steel or other similar projections at a specific job-site.

Protective Covers. Manufactured or job-built apparatus designed to cover exposed ends of reinforcing steel or other similar projections so as to prevent impalement.

Troughs. Manufactured or job-built protective covers designed to cover exposed ends of reinforcing steel or other similar projections so as to prevent impalement. Troughs are long narrow open receptacles, usually boxlike in shape. See Appendix Plate C-25 for an example of a job-built trough.

(c) Protection from Reinforcing Steel and Other Similar Projections.

(1) Employees working at grade or at the same surface as exposed protruding reinforcing steel or other similar projections, shall be protected against the hazard of impalement by guarding the exposed ends with protective covers, or troughs, ~~or caps.~~

(2) Employees working above grade or any surface and exposed to protruding reinforcing steel or other similar projections shall be protected against the hazard of impalement. Protection shall be provided by:

(A) The use of guardrails, or

(B) Approved fall protection systems meeting the design requirements of Article 24, or

(C) Protective covers as specified in subsection (d).

~~(3) The use of caps as impalement protection is prohibited for employees working above grade or any surface.~~

~~(4)~~(3) Troughs depicted in Appendix Plate C-25 shall not be used as a substitute for engineered or manufactured protective covers when employees are working at heights greater than 6 feet above grade or other working surface.

(d) Protective Covers, and Troughs ~~and Caps.~~

(1) Protective covers shall be made of wood, plastic, or other similar material. If protective covers are job-built, they shall be designed as specified by an engineer currently registered in the State of California. A copy of the engineering drawing(s) depicting the job-built protective covers shall be kept at the worksite and made available to the Division upon request. ~~Caps shall not be job-built.~~

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(2) Protective covers, except for troughs as depicted in Appendix Plate C-25, shall, at the minimum, be capable of withstanding the impact of a 250 pound weight dropped from a height of 10 feet without penetration failure of the cover. Protective covers shall have a minimum 4-inch by 4-inch square surface area.

NOTE: This requirement is intended to prevent penetration failure of protective covers impacted at heights up to 7-½ feet. Test specifications should be modified when impacts are anticipated from heights greater than 7-½ feet.

(3) Job-built wood protective covers and troughs shall be constructed of at least “Standard Grade” Douglas Fir, as graded by either the Western Lumber Grading Rules 94 98, handbook, effective September March 1, 1991 1998, published by the Western Wood Products Association, or the Standard No. 17 Grading Rules for West Coast Lumber, handbook, effective September 1, 1991 and revised January 1, 2000, published by the West Coast Lumber Inspection Bureau, which is are hereby incorporated by reference.

~~(4) Caps shall be made of rigid molded plastic or similar material and be the proper size for the reinforcing steel being covered.~~

~~(5)~~(4) Manufactured protective covers and caps made prior to October 1, 2000 shall be approved as provided for in Section 1505 and be legibly marked with the manufacturer’s name or logo. Manufactured protective covers made on or after October 1, 2000 shall meet the requirements of Section 344.90.

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

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

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

## **PROPOSED MODIFICATIONS**

**(Modifications are indicated by bold, double-underlined for new language and bold, strikeout for deleted language.)**

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Amend Section 1712 to read as follows:

§1712. ~~Hazards Associated with the Use of Reinforcing Steel and Other Similar Projections.~~

(a) Scope. This section applies to all work sites and locations where employees work around or over exposed, projecting, reinforcing steel or other similar projections.

(b) Definitions.

~~Caps. Manufactured devices that completely cover exposed ends of reinforcing steel and have flat or mushroomed surface at least twice the diameter of the reinforcing steel they are designed to cover.~~

**Hooking. Vertical reinforcing steel bent over to an angle of 90 degrees or more, sufficient to prevent impalement.**

Job-Built. As used in this section, protective covers and troughs usually constructed at the job-site of wood or other ~~similar~~ materials **of equal or greater strength** and designed specifically for covering exposed ends of reinforcing steel or other similar projections at a specific job-site.

Protective Covers. Manufactured or job-built apparatus designed to cover exposed ends of reinforcing steel or other similar projections so as to prevent impalement.

Troughs. Manufactured or job-built protective covers designed to cover **two or more** exposed ends of reinforcing steel or other similar projections so as to prevent impalement, **and which meet the applicable requirements in subsection (d).** ~~Troughs are long narrow open receptacles, usually boxlike in shape. See Appendix Plate C-25 for an example of a job-built trough.~~

(c) Protection from Reinforcing Steel and Other Similar Projections.

(1) Employees working at grade or at the same surface as exposed protruding reinforcing steel or other similar projections, shall be protected against the hazard of impalement by guarding ~~the~~ **all** exposed ends **that extend up to 6 feet above grade or other work surface,** with protective covers, ~~troughs, or caps,~~ **or by hooking.**

(2) Employees working above grade or any surface and exposed to protruding reinforcing steel or other similar projections shall be protected against the hazard of impalement. Protection shall be provided by:

(A) The use of guardrails, or

(B) Approved fall protection systems meeting the design requirements of Article 24, or

(C) Protective covers as specified in subsection (d).

~~(3) The use of caps as impalement protection is prohibited for employees working above grade or any surface.~~

**(3) Protective covers shall not be used to protect against impalement where the maximum height of fall exposure exceeds 7-1/2 feet, unless the protective covers meet the requirement of subsection (d)(4)(D).**

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~~(4)(3) Troughs depicted in Appendix Plate C-25 shall not be used as a substitute for engineered or manufactured protective covers when employees are working at heights greater than 6 feet above grade or other working surface.~~

(d) Protective Covers, ~~and Troughs~~ and Caps Specifications, Testing and Approval.

(1) Protective covers shall be made of wood, plastic, or other ~~similar materials~~ of equal or greater strength. If protective covers are job-built, they shall be designed as specified by an engineer currently registered in the State of California. A copy of the engineering drawing(s) depicting the job-built protective covers shall be kept at the worksite and made available to the Division upon request. Caps shall not be job-built.

(2) Protective covers, ~~except for troughs as depicted in Appendix Plate C-25, shall, at the minimum, be capable of withstanding the impact of a 250 pound weight dropped from a height of 10 feet without penetration failure of the cover.~~ Protective covers shall have a minimum 4-inch by 4-inch square surface area, or if round, a minimum diameter of 4-1/2 inches.

~~NOTE: This requirement is intended to prevent penetration failure of protective covers impacted at heights up to 7-1/2 feet. Test specifications should be modified when impacts are anticipated from heights greater than 7-1/2 feet.~~

(3) Manufactured protective covers shall meet the following requirements:

(A) Manufactured protective covers shall be approved as provided for in Section 1505 and be legibly marked with the manufacturer's name or logo.

(B) Manufactured protective covers made before October 1, 2000 shall, at the minimum, be capable of withstanding the impact of a 250-pound weight dropped from a height of 10 feet without penetration failure of the cover.

(C) Manufactured protective covers made on or after October 1, 2000 shall meet the testing requirements of Section 344.90.

(4) Job-built protective covers shall meet the following requirements:

(A) Job-built protective covers shall be designed as specified by an engineer currently registered in the State of California. A copy of the engineering drawing(s) depicting the job-built protective covers shall be kept at the worksite and made available to the Division upon request.

EXCEPTION: Job-built troughs as depicted in Appendix Plate C-25 may be used as a substitute for engineered or manufactured protective covers when employees are working at heights not greater than 6 feet above grade or other working surface.

~~(3)(B)~~ Job-built wood protective covers and troughs shall be constructed of at least "Standard Grade" Douglas Fir, as graded by either the Western Lumber Grading Rules 94 98, handbook, effective ~~September~~ March 1, 1994 1998, published by the Western Wood Products Association, or the Standard No. 17 Grading Rules for West Coast Lumber, handbook, effective September 1, 1991 and revised January 1, 2000, published by the West Coast Lumber Inspection Bureau, which ~~is~~ are hereby incorporated by reference.

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~~(4) Caps shall be made of rigid molded plastic or similar material and be the proper size for the reinforcing steel being covered.~~

~~(5)(4) Manufactured protective covers and caps made prior to October 1, 2000 shall be approved as provided for in Section 1505 and be legibly marked with the manufacturer's name or logo. Manufactured protective covers made on or after October 1, 2000 shall meet the requirements of Section 344.90.~~

(C) Job-built protective covers, except for troughs as depicted in Appendix Plate C-25, shall, at the minimum, be capable of withstanding the impact of a 250-pound weight dropped from a height of 10 feet without penetration failure of the cover.

NOTE: The drop test requirement in subsection (d)(4)(C) is intended to prevent penetration failure of job-built protective covers impacted at heights up to 7-1/2 feet.

(D) Drop test specifications for job-built protective covers listed in subsection (d)(4)(C) shall be modified where fall heights greater than 7-1/2 feet are anticipated, to ensure that the protective cover can withstand increased impact loading.

(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, provided 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.

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

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

## **SUMMARY AND RESPONSE TO COMMENTS**

## SUMMARY AND RESPONSE TO WRITTEN AND ORAL COMMENTS

### I. Written Comments:

Nancy Moorhouse, Corporate Safety Director, A. Teichert & Son, Inc., by letter dated February 18, 2003.

#### Comment:

Ms. Moorhouse commented on the proposal to delete all references to caps from Section 1712 and questioned whether preventing the use of caps is necessary with regard to work performed “at grade”. Ms. Moorhouse questioned whether caps used at grade need to have the ability to withstand a drop test with an impact of a 250-pound weight dropped from a height of 10 feet. Ms. Moorhouse feels that this test criteria is not reasonable since no person working at grade would be falling 10 feet on reinforcing steel protected by caps. Ms. Moorhouse questioned whether there has been a history of injuries related to employees being impaled on rebar as a result of a failure of caps while working at grade, and if not, whether the cost to business and public agencies is justified.

#### Response:

Caps as defined in Section 1712(b) are manufactured devices that completely cover the exposed ends of reinforcing steel and have a flat or mushroomed surface at least twice the diameter of the reinforcing steel they are designed to cover. This definition for caps includes “mushroom” or “safety” caps which fail to meet the drop test requirements of Sections 344.90 and 1712 and have failed even less rigorous testing (See Drop Test Report, dated March 3, 1995, included as an additional document relied upon). Furthermore, manufacturers of mushroom or safety caps direct their customers not to use these types of caps as impalement protection devices because they are not designed to prevent penetration failure, even for “at grade work.”

Although the Board is unaware of injuries involving employee impalement at grade level as a result of cap failure, the Board is inclined to adhere to manufacturer recommendations that caps are not to be used for impalement protection. The proposed deletion of the definition and other references to caps is intended to eliminate inconsistent language in existing subsection 1712(c) that appeared to allow the use of mushroom or safety caps for impalement protection of employees working at grade.

Given these facts, the Board believes that the proposed amendment is necessary to ensure employee protection from impalement hazards, and that further modification is unnecessary.

The Board thanks Ms. Moorhouse for her comments, suggestion, and participation in the rulemaking process.

### II. Oral Comments:

Oral comments received at February 20, 2003, Public Hearing.



Marti Stroup, representing the Associated General Contractors of California (AGC).

Comment:

Ms. Stroup expressed the AGC's support for the proposal to amend Section 1712 and stated that they concur with the proposed changes to improve the clarity of the proposal through reorganization. AGC also supports the following changes to the proposed regulation:

- ? To allow the practice of "Hooking" only for exposures at grade or same surface by addition of a definition and language in subsection (c)(l);
- ? To add a requirement in subsection (c)(1) to protect employees working at grade from impalement by guarding exposed ends of rebar that extend up to six feet above grade or other work surface;
- ? Reorganize the requirements for job-made protective covers into a proposed subsection (d) and remove specific testing requirements from the note and set them forth as a separate rule;
- ? Reorganize the requirements for manufactured protective covers and troughs into proposed subsection (e);
- ? Add a clause permitting manufacturers to produce special-purpose troughs or covers provided that they meet the engineering and testing requirements of subsection (d) for job-made protective troughs and covers; and,
- ? Add specific language to subsection (g) specifying that guys, supports, and braces be installed and removed as directed by a qualified person.

Response:

The Board agrees with Ms. Stroup and has modified the proposal to incorporate the AGC's recommended changes into the original proposal.

Steve Rank, Director of Safety & Health, representing the District Council of Ironworkers Safety Institute.

Comment:

Mr. Rank stated that the District Council of Ironworkers supports the recommendations regarding the hooking of rebar, the protective covers below 6 feet, the use of testing for covers, and also the installation and removal of guys, supports, and braces by a qualified person.

Response:

The Board agrees with Mr. Rank, as his recommendations reflect concurrence with those of the AGC's, and agrees to modify the proposal accordingly. (See also the Board's response to Ms. Stroup's comments above.)

Bill Jackson, Director of Safety & Environmental Affairs, Granite Construction Co.Comment:

Bill Jackson commented on the proposed deletion of the definition of caps and asked what support there is in the rulemaking record for it. He stated that, in the past, the Board seriously considered allowing the use of caps to protect employees from the hazards of impalement or risk of impalement at grade. Mr. Jackson stated that, unfortunately, the proposal makes reference to impalement hazards associated with working 10 feet above grade. He stated that the test standard it refers to from the Division's regulations, test the impalement protection capability of a product by dropping a weight of 250 pounds from a height of 12 feet. He stated that this could not happen when an employee is working at grade adjacent to rebar and asked where the demonstration of need or necessity is. Mr. Jackson opined that the proposal is taking something out that seems to be working fine.

Response:

The Board agrees with Mr. Jackson that the Board originally considered the safety issues when approving the use of mushroom or safety caps for at grade work during the original promulgation of Section 1712. However, the Board recognizes that since then testing has shown that the mushroom or safety caps were unable to prevent penetration failure during drop tests at less than 10 feet above grade. According to a Drop Test Report, dated March 3, 1995, mushroom or safety caps failed drop tests using bags weighing 140 pounds dropped from a height of 60 inches. The mushroom or safety caps were unable to prevent penetration failure in all of these tests. Additionally, manufacturers direct their customers not to use mushroom/safety caps as impalement protection devices because these types of caps are not designed to prevent penetration failure, even at grade. The Board therefore disagrees with Mr. Jackson's assertion that the proposal involves the removal of an effective safety order because the mushroom or safety caps do not provide adequate impalement protection as shown by the test results. Consequently, the Board believes the term "Caps" should be deleted.