

**OCCUPATIONAL SAFETY
AND HEALTH STANDARDS BOARD**

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**NOTICE OF PROPOSED MODIFICATIONS TO**

**TITLE 8: Chapter 4, Subchapter 4, Article 2, Section 1504, and Article 21,
Sections 1637 and 1640 of the Construction Safety Orders (CSO)**

Scaffold Design and Use

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 March 20, 2003, the Standards Board held a Public Hearing to consider revisions to Title 8, California Code of Regulations, Sections 1504, 1637 and 1640 of the Construction Safety Orders. The Standards Board received oral 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 regulation as originally proposed, and a copy of the modified text clearly indicating the further modifications, is attached for your information. In addition, a summary of all oral comments regarding the original proposal and staff responses is included.

Any written comments on these modifications must be received by 5:00 p.m. on May 2, 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.

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 Acting Executive Officer, Marley Hart at (916) 274-5721.

**OCCUPATIONAL SAFETY AND HEALTH
STANDARDS BOARD**

Date: April 14, 2003

Marley Hart, Acting 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 1504 to read as follows:

§ 1504. Definitions.

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Scaffolds and Staging.

(A) Scaffold. Any temporary, elevated structure used for the support of a platform.

NOTE: The term “scaffold” is used with inclusion of the platform and all supporting members when reference is made to loading factors.

(B) Scaffold, Heavy Trades. A heavily constructed scaffold built to withstand the weight of workmen and the storage of materials, such as bricks, mortar, concrete blocks, etc. It is intended for use on work where heavy material will accumulate on the scaffold. The load, including workmen to be placed thereon, is limited by the Orders to a maximum of 75 pounds per square foot of scaffold platform.

(C) Scaffold, Light Trades. A wooden scaffold used by plasterers, carpenters, sheetmetal workers, or other trades not using heavy tools or storing heavy material on the scaffold. The load, including workmen to be placed thereon, is limited by the Orders to a maximum of 25 pounds per square foot of scaffold platform.

(B) Scaffold, Engineered. Scaffold designed by a Civil Engineer currently registered in the State of California and experienced in scaffold design.

~~(D)~~ Scaffold, Light-Duty. A ~~metal~~ scaffold designed and constructed to carry a working load ~~not to exceed~~ of 25 pounds per square foot of scaffold platform, including weight of materials and workers on the platform.

NOTE: Load requirements for light-duty interior scaffolds are contained in Section 1640(c)(1).

~~(E)~~ Scaffold, Medium-Duty. A ~~metal~~ scaffold designed and constructed to carry a working load ~~not to exceed~~ of 50 pounds per square foot of scaffold platform, including weight of materials and workers on the platform.

~~(F)~~ Scaffold, Heavy-Duty. A ~~metal~~ scaffold designed and constructed to carry a working load ~~not to exceed~~ of 75 pounds per square foot of scaffold platform, including weight of materials and workers on the platform.

~~(G)~~ Scaffold, Special-Duty. A ~~metal~~ scaffold designed and constructed to carry a working load that exceeds 75 pounds per square foot of scaffold platform, including weight of materials and workers on the platform.

(H) Ledger. The horizontal member of a scaffold that runs at right angles to the wall and directly supports the planking of the platform.

(H) Ribbon. The horizontal member in a scaffold which runs from upright to upright parallel to the building and is normally placed directly under the ledger.

STANDARDS PRESENTATION
TO
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,
TITLE 8, CHAPTER 4

Amend Section 1504 (continued):

- (~~J~~) Uprights. The vertical members of a pole scaffold, such as posts, poles, or columns.
- (~~K~~) Scaffold, Outrigger. A scaffold not suspended by ropes, that is supported by outrigger beams cantilevered out from the structure to which they are anchored.
- (~~L~~) Scaffold, Suspended. A scaffold suspended from above by ropes or cables and rigged with pulley blocks, winches, or equivalent, so that the scaffold elevation is easily adjustable.
- (~~M~~) Scaffold, Suspended, Power-Driven. Any suspended scaffold equipped with 1 or more power units for raising or lowering that are a part of and travel with the scaffold.
- (~~N~~) Thrust-Out. The beam extending out from a structure to support a suspended scaffold.
- (~~O~~) Stud Jack. A scaffold device of metal with saw-like teeth that grip the stud when the load is applied, and having a cantilevered ledger for the support of a working platform.
- (~~P~~) Catenary or Stretch Cables. Cables for the support of staging, that are secured at each end and extend in a nearly horizontal plane. The staging is placed on and supported by these cables.
- (~~Q~~) Boatswain's Chair. ~~Means a~~ seat which may be raised or lowered by means of attached rigging which suspends it and the seated worker ~~maner~~ from above.
- (~~R~~) Working Load. Load imposed by workers, materials and equipment.
- (~~S~~) Brace. A tie that holds one scaffold member in a fixed position with respect to another.
- (~~T~~) Coupler. A device for locking together the component parts of a tubular metal scaffold. (The material used for the couplers shall be of a structural type, such as drop-forged steel, malleable iron, or structural grade aluminum.)
- (~~U~~) Maximum Rated Load. The total of all loads including the working load, the weight of the scaffold, and such other loads that may be reasonably anticipated.
- (~~V~~) Scaffold, Bricklayer's Square. A scaffold composed of framed wood squares which support a platform.
- (~~W~~) Scaffold, Carpenter's Bracket. A scaffold consisting of wood or metal brackets that support a platform.
- (~~X~~) Scaffold, Float. A scaffold hung from overhead supports by means of ropes and usually consisting of a 3/4-inch plywood platform supported by 2 securely fastened bearers.
- (~~Y~~) Scaffold, Horse. A scaffold composed of horses supporting a work platform.
- (~~Z~~) Scaffold, Interior Hung. A scaffold suspended from the ceiling or roof structure.
- (~~A~~) Scaffold, Ladder Jack. A light trade scaffold supported by brackets attached to ladders.
- (~~B~~) Scaffold, Manually Propelled Mobile. (See Rolling Scaffold.)
- (~~C~~) Scaffold, Needle Beam. (See Outrigger Scaffold.)
- (~~D~~) Scaffold, Pole. A scaffold built of one or two rows of vertical members, horizontal ledgers, platform planks, ribbons and braces.
- (~~E~~) Scaffold, Rolling. A portable rolling scaffold supported by casters wheels.

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

PROPOSED STATE STANDARD,
TITLE 8, CHAPTER 4

Amend Section 1504 (continued):

(~~EEEE~~) Scaffold, Tube and Coupler. An assembly consisting of tubing which serves as posts, ledgers, ribbons, ties and braces, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.

(~~GGFF~~) Scaffold, Tubular Welded Frame. A sectional panel or frame metal scaffold substantially built-up of prefabricated, welded sections which consist of posts and horizontal ledgers with intermediate members.

(~~HHGG~~) Scaffold, Window Jack. A scaffold, the platform of which is supported by a bracket or jack which projects through a window opening.

(~~HHH~~) Scaffold, Wooden Pole. A scaffold built of one or two rows of vertical members (uprights), horizontal ledgers, platform planks, ribbons and braces. A single pole scaffold consists of one row of uprights and a double pole scaffold consists of two rows of uprights.

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

STANDARDS PRESENTATION
TO
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,
TITLE 8, CHAPTER 4

Amend Section 1637(b) to read as follows:

§ 1637. General Requirements.

* * * * *

(b) Scaffold Design and Construction.

(1) Scaffolds shall be constructed of wood or other suitable materials such as steel or aluminum members of known strength characteristics. Where materials other than wood are used, or where scaffold designs differ from those specified in these Orders, the scaffold and its parts must provide a degree of strength, rigidity and safety equivalent to that provided by the described scaffold it replaces.

(2) Each scaffold shall be designed and constructed to support at least 4 times its own weight and 4 times the maximum intended working load applied or transmitted to it.

Maximum intended working loads shall be as follows:

(A) Light-duty scaffolds: 25 pounds per square foot of work platform.

EXCEPTION: Light-duty interior scaffolds shall adhere to the loading requirements contained in Section 1640(c)(1).

(B) Medium-duty scaffolds: 50 pounds per square foot of work platform.

(C) Heavy-duty scaffolds: 75 pounds per square foot of work platform.

(D) Special-duty scaffolds: exceeding 75 pounds per square foot of work platform as determined by a qualified person or a Civil Engineer currently registered in the State of California and experienced in scaffold design.

(E) Engineered scaffolds: as determined by a Civil Engineer currently registered in the State of California and experienced in scaffold design.

(3) A scaffold shall not be subjected to loads greater than its maximum intended working load (see 1637(b)(2)).

(4) Manufactured scaffolds shall be used in accordance with the manufacturer's recommendations.

(5) A qualified person shall determine the maximum intended working loads for scaffolds that are neither manufactured nor engineered.

(6) The maximum intended working load for each scaffold shall be posted at a conspicuous location at each jobsite or be provided to each supervisory employee who shall have it readily available at the jobsite.

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

STANDARDS PRESENTATION
TO
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,
TITLE 8, CHAPTER 4

Amend Section 1640 to read as follows:

§ 1640. ~~Light-Trade~~ Duty Wooden Pole Scaffolds.

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(b) ~~Light-Trade~~ Duty Exterior Scaffolds.

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(~~C~~) ~~Light-Trade~~ Duty Interior Scaffolds.

(1) Loading. For scaffolds of the following design, the imposed load on the platform area shall not apply more than 1,500 pounds to any 1 ledger or a single upright, and the total load on the whole platform area shall not average more than 15 pounds per square foot.

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

PROPOSED MODIFICATIONS

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

(Only modified pages are included.)

STANDARDS PRESENTATION
TO
CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD

PROPOSED STATE STANDARD,
TITLE 8, CHAPTER 4

Amend Section 1637(b) to read as follows:

§ 1637. General Requirements.

* * * * *

(b) Scaffold Design and Construction.

(1) Scaffolds shall be constructed of wood or other suitable materials such as steel or aluminum members of known strength characteristics. Where materials other than wood are used, or where scaffold designs differ from those specified in these Orders, the scaffold and its parts must provide a degree of strength, rigidity and safety equivalent to that provided by the described scaffold it replaces.

(2) Each scaffold shall be designed and constructed **using a dead load safety factor that will ensure the scaffold to supports, without failure, 4 times** its own weight and 4 times the maximum intended working (**live**) load applied or transmitted to it. Maximum intended working loads shall be as follows:

(A) Light-duty scaffolds: 25 pounds per square foot of work platform.

EXCEPTION: Light-duty interior scaffolds shall adhere to the loading requirements contained in Section 1640(c)(1).

(B) Medium-duty scaffolds: 50 pounds per square foot of work platform.

(C) Heavy-duty scaffolds: 75 pounds per square foot of work platform.

(D) Special-duty scaffolds: exceeding 75 pounds per square foot of work platform as determined by a qualified person or a Civil Engineer currently registered in the State of California and experienced in scaffold design.

(E) Engineered scaffolds: as determined by a Civil Engineer currently registered in the State of California and experienced in scaffold design.

(3) A scaffold shall not be subjected to loads greater than its maximum intended working load (see 1637(b)(2)).

(4) Manufactured scaffolds shall be used in accordance with the manufacturer's recommendations.

(5) A qualified person shall determine the maximum intended working loads for scaffolds that are neither manufactured nor engineered.

(6) The maximum intended working load for each scaffold shall be posted at a conspicuous location at each jobsite or be provided to each supervisory employee who shall have it readily available at the jobsite.

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

SUMMARY AND RESPONSE TO COMMENTS

SUMMARY AND RESPONSE TO ORAL AND WRITTEN COMMENTS

I. Written Comments

No written comments were received.

II. Oral Comments

Oral comments received at the March 20, 2003 Public Hearing in Oakland, California.

Dialog between Mr. Donald Charles, P.E., President, D.H. Charles Engineering, Inc.; Mr. Larry McCune, Principal Engineer, Research and Standards, Division of Occupational Safety and Health (Division); Mr. John MacLeod, Executive Officer, Occupational Safety and Health Standards Board (OSHSB); Mr. Michael J. Manieri, Principal Safety Engineer, OSHSB; and Mr. Len Welsh, Special Counsel, DOSH Regulatory Development, DOSH.

Comment:

Mr. Charles stated that his company specializes in scaffold design and has been doing so for the past eight years. His attention was drawn to the rulemaking package as a result of the conservative safety factors proposed. He indicated that his own research on scaffold safety factors indicates that a 4 to 1 safety factor for live loading is consistent with industry practice, but that Board Staff's proposed 4 to 1 safety factor for dead loading is too conservative. Again, Mr. Charles reiterated that his research confirms that what is standard in the industry is a design safety factor for live loading of 4 to 1 and 2 to 1 for dead loading. Mr. Charles also stated that a 4 to 1 live load safety factor for scaffolds is understandable and supportable because live loads tend to have unknown factors making it difficult to calculate ahead of time what the live load will be. Consequently, applying a 4 to 1 safety factor is justifiable. However, the same case cannot be made for dead loads where the loading factors can be calculated ahead of time. Mr. Charles stated that a dead load safety factor of 4 to 1 has both safety and cost implications. Mr. MacLeod asked Mr. Charles if there are any national consensus standards that address dead loads and if steel scaffolds had a 1-1/2 factor for dead loads to which Mr. Charles responded that he was not aware of any national consensus standards for dead loads and that the steel codes require a 1-1/2 safety factor but that a 2 to 1 dead load safety factor is sufficient.

The Division interjected that the ANSI scaffold standard requires scaffolds to be able to safely support the dead load and four times the live load. Mr. McCune stated that the Division and Mr. Charles and others (unnamed) in the industry are in agreement that a 2 to 1 dead load safety factor and a 4 to 1 live load safety factor are reasonable. Mr. McCune indicated that an overall 4 to 1 safety factor would be detrimental to scaffold use in high-rise/multi-level applications. Mr. MacLeod asked Mr. McCune if he was involved in the advisory committee process and what the outcome was on this issue. Mr. McCune stated that he did participate in the committee deliberations but that the Division was not able to convince Board staff to use a dead load safety factor of two. Mr. MacLeod wanted to know if there was a committee consensus to use an overall dead and live load safety factor of 4 as proposed to which Mr. Manieri explained that the committee did not reach consensus on this issue preferring to allow staff to resolve the matter

through additional research. It was Board Staff's understanding based on this research that scaffold manufacturers were supportive of an overall dead and live load safety factor of 4. Mr. Charles disputed the need for imposing an overall 4 to 1 scaffold safety factor to which Mr. Welsh responded that he was unaware of the differing opinions on this issue between staff and the Division and stated that the Division would work with staff to resolve the safety factor issue.

Response:

Board Staff consulted with Mr. David Glabe, Western Falsework Engineering, Inc., also representing the Scaffold Industries Association (SIA) and an ANSI A10.8 committee member; Mr. Don Charles, P.E., President D.H. Charles Engineering, Inc. (commenter), and Mr. Larry McCune, Principal Engineer, Research and Standards, Division of Occupational Safety and Health (Division), regarding the dead load safety factor specified in the proposal. The Division, Mr. Charles and Mr. Glabe have indicated that the proposed 4 to 1 dead load safety factor is problematic in high rise construction as it would require the "double legging" (additional structural reinforcement) of the scaffold system in order to meet the proposed 4 to 1 safety factor. This will invariably lead to higher erection costs to building owners and contractors. Mr. Glabe and Mr. Charles pointed out that dead loads are static factors calculable by the qualified person or engineer responsible for the design and erection of the scaffold system. Scaffold design engineers normally design the scaffold system according to its application, taking into account how high the scaffold will rise, the type of scaffold system and materials (e.g. wood, metal, etc.) to be used, etc. By not specifying a dead load factor, scaffold design engineers will have the flexibility to calculate and design in a dead load safety factor (which can range from a factor of 1 to 2.5) specific to the type of scaffold system to be used. Mr. Glabe and Mr. Charles indicated to staff that this is preferable to specifying a dead load safety factor for all scaffolds.

Mr. Glabe and Mr. Charles agree that national consensus standards, contained in American National Standard (ANSI) A10.8, and Federal OSHA regulations, contained in 29 CFR 1926.451(a)(1), are the most reasonable approach to the issue of scaffold dead load safety factors. These standards specify that each scaffold be designed and constructed to support, without failure, its own weight and at least 4 times the maximum intended working load that is applied or transmitted to it.

Board staff and the Division agree that CSO Section 1637(b)(2) should be modified to be consistent with Federal OSHA regulations and national consensus standards, but also emphasizes the importance of clarifying within the text of Section 1637(b)(2) that persons who design and build scaffolds always use a dead load safety factor that will ensure the scaffold will not fail (collapse) under its own weight. For this reason, Board staff proposes to modify the proposal to state that all scaffolds are to be designed and constructed using a dead load safety factor that will ensure the scaffold supports, without failure, its own weight and 4 times the maximum intended working (live) load applied or transmitted to it.

The Board thanks Mr. Charles for his comment and participation in Board's rulemaking process.