

**2016 CALIFORNIA BUILDING CODE
OFFICE OF STATEWIDE HEALTH PLANNING & DEVELOPMENT
STRUCTURAL EXPRESS TERMS INDEX**

1. Preambles for Express Terms
2. Chapter 1– Scope and Administration
3. Chapter 2 – Definitions
4. Chapter 14 – Exterior Walls
5. Chapter 15 – Roof Assemblies and Rooftop Structures
6. Chapter 16 – Structural Design
7. Chapter 16A – Structural Design
8. Chapter 17 – Structural Tests and Special Inspections
9. Chapter 17A – Structural Tests and Special Inspections
10. Chapter 18 – Soils and Foundations
11. Chapter 18A– Soils and Foundations
12. Chapter 19 – Concrete
13. Chapter 19A – Concrete
14. Chapter 20 – Aluminum
15. Chapter 21 – Masonry
16. Chapter 21A – Masonry
17. Chapter 22 – Steel
18. Chapter 22A – Steel
19. Chapter 23 – Wood
20. Chapter 24 – Glass & Glazing
21. Chapter 25 – Gypsum Board & Plaster
22. Chapter 34A – Existing Structures
23. Chapter 35 – Referenced Standards
24. Appendix J – Grading
25. Appendix L – Earthquake Recording Instrumentation

**45-DAY EXPRESS TERMS
FOR
PROPOSED BUILDING STANDARDS
OF THE
OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT (OSHPD)
REGARDING PROPOSED CHANGES TO

THE CALIFORNIA BUILDING CODE
CALIFORNIA CODE OF REGULATIONS, TITLE 24, PART 2, VOLUMES 1 & 2**

The Office of Statewide Health Planning and Development (OSHPD) proposes to adopt the 2015 edition of the International Building Code (IBC 2015) of International Code Council for codification and effectiveness in the 2016 edition of the California Building Code as presented on the following pages, including any necessary amendments. OSHPD further proposes to:

- Adopt new building standards that are not addressed by the 2015 model code proposed for adoption.
- Adopt new necessary amendments to the 2015 model code proposed for adoption.
- Relocate existing adopted and necessary amendments of the current model code into the format of the 2015 model code proposed for adoption. **These amendments with editorial changes only are outside the rulemaking and are not subject to public comments. All amendments shown highlighted are existing and are not part of the rulemaking.**

LEGEND FOR EXPRESS TERMS

1. Model code text: All International Building Code (IBC) text is shown in regular/*italics* type face.
2. Existing California amendments: All such language appears in *italics*.
3. Code language being modified: All such language appears in *italics and underlined*.
4. Repealed text: Repeal of 2015 IBC language appears in ~~strikeout~~.
5. Existing deletion: IBC model code language that was deleted in the previous Code Adoption Cycles is shown for clarity only. This language appears in ~~strikeout and highlight~~.
6. Existing amendments in 2013 CBC, Chapter 19A: Existing amendments in Sections 1903A through 1905A of the 2013 CBC which are *underlined and italicized* appear in **underline, italics and highlight**. Deletion of existing amendments in Sections 1903A through 1905A appears in ~~italics, strikeout, and underline~~.
7. Instructions: Texts which are instructions only that are not amendments and will not be printed appears in **blue highlight**.

Note:

Following each chapter of the proposed regulations is a notation that cites specific statute(s) that authorizes the adoption of these regulations and statute that allows for regulations to clarify the subject matter being implemented, interpreted or made specific by the authority statute(s).

2016 CALIFORNIA BUILDING CODE

CHAPTER 1 SCOPE AND ADMINISTRATION DIVISION I CALIFORNIA ADMINISTRATION

SECTION 1.1 GENERAL

1.1 Title. *These regulations shall be known as the California Building Code, may be cited as such and will be referred to herein as "this code." The California Building Code is Part 2 of twelve parts of the official compilation and publication of the adoption, amendment and repeal of building regulations to the California Code of Regulations, Title 24, also referred to as the California Building Standards Code. This part incorporates by adoption the ~~2012~~ 2015 International Building Code of the International Code Council with necessary California amendments.*

...

SECTION 1.10 OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT

1.10.1 OSHPD 1. *Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.*

...

1.10.1.2 Applicable building standards. *California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 9 and 11. The provisions of Title 24, Part 2, as adopted and amended by OSHPD, shall apply to the applications listed in Section 1.10.1. OSHPD 1 adopts the following building standards in Title 24, Part 2: Chapters 2 through 10, 12, 14, 15, 16A, 17A, 18A, 19A, 20, 21A, 22A, 23, 24, 25, 26, 30, 31, 32, 33, 34A, 35, ~~Appendix J~~ and Appendix L.*

...

1.10.2 OSHPD 2. *Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.*

...

1.10.2.2 Applicable building standards. *California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 9, 10 and 11. The provisions of Title 24, Part 2, as adopted and amended by OSHPD, shall apply to the applications listed in Section 1.10.2. OSHPD 2 adopts the following building standards in Title 24, Part 2: Chapters 2 through 10, 12, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 30, 31, 32, ~~33, 34, and 35~~, Appendices J and L.*

...

1.10.3 OSHPD 3. *Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.*

...

1.10.3.2 Applicable building standards. *California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 9, 10 and 11.*

The provisions of Title 24, Part 2, as adopted and amended by OSHPD, shall apply to the applications listed in Section 1.10.3.

OSHPD 3 adopts the following building standards in Title 24, Part 2:
Chapter 12.

...

1.10.4 OSHPD 4. Specific scope of application of the agency responsible for enforcement, enforcement agency and the specific authority to adopt and enforce such provisions of this code, unless otherwise stated.

...

1.10.4.2 Applicable building standards. California Building Standards Code, Title 24, Parts 2, 3, 4, 5, 6, 9, 10 and 11.

The provisions of Title 24, Part 2, as adopted and amended by OSHPD, shall apply to the applications listed in Section 1.10.4.

OSHPD 4 adopts the following building standards in Title 24, Part 2:

Chapters 2 through 10, 12, 14, 15, 16A, 17A, 18A, 19A, 20, 21A, 22A, 23, 24, 25, 26, 30, 31, 32, 33, ~~34A, 35 and Appendices J and Appendix L.~~

...

DIVISION II SECTION 101 GENERAL

[A] 101.1 Title. These regulations shall be known as the *California Building Code of the State of California*, hereinafter referred to as "this code."

...

[A] 101.4.7 Existing buildings. The provisions of the ~~International~~ *California Existing Building Code* shall apply to all matters governing the repairs, alterations, change of occupancy, additions and relocation of existing buildings.

[OSHPD 1] The provisions of the Chapter 34A of this code shall apply to all matters governing the repairs, alterations, change of occupancy, additions, and relocation of existing structures and portions thereof under OSHPD jurisdiction. All references to the International/California Existing Building Code shall be replaced by equivalent provisions in Chapter 34A.

[OSHPD 2 & 4] The provisions of the California Existing Building Code, Chapter 4 the "Prescriptive Compliance Method" shall apply to all matters governing the repairs, alterations, change of occupancy, additions, and relocation of existing structures and portions thereof under OSHPD jurisdiction.

Exception: Performance objectives for incidental and minor additions and alterations of nonconforming buildings shall be permitted to be in accordance with the California Existing Building Code Table 301.1.4.2.

SECTION 102 APPLICABILITY

[A] 102.1 General. Where there is a conflict between a general requirement and a specific requirement, the specific requirement shall be applicable. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive shall govern.

...

[A] 102.4 Referenced codes and standards. The codes and standards referenced in this code shall be considered part of the requirements of this code to the prescribed extent of each such reference and as further regulated in Sections 102.4.1 and 102.4.2 through 102.4.4.

...

102.4.3 Code References. [OSHPD 1, 2, 3 & 4] All reference to International Codes or other similar codes in referenced standards shall be replaced by equivalent provisions in the California Building Standard Codes.

102.4.4 Reference in Standards. [OSHPD 1, 2, 3 & 4] All references listed in reference standards shall be replaced by referenced standards listed in Chapter 35 of this code, where applicable, and shall include all amendments to the reference standards in this code.

...

SECTION 104 DUTIES AND POWERS OF BUILDING OFFICIAL

[A] 104.1 General. The *building official* is hereby authorized and directed to enforce the provisions of this code. The *building official* shall have the authority to render interpretations of this code and to adopt policies and procedures in order to clarify the application of its provisions. Such interpretations, policies and procedures shall be in compliance with the intent and purpose of this code. Such policies and procedures shall not have the effect of waiving requirements specifically provided for in this code.

...

[A] 104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative materials, design or methods of construction is not *approved*, the *building official* shall provide in writing, stating the reasons why the alternative was not *approved*. [OSHPD 1, 2 & 4] *Alternative system shall satisfy ASCE 7 Section 1.3, unless more restrictive requirements are established by this code for an equivalent system.* [OSHPD 1, 2 & 4] *Alternative systems shall also satisfy the California Administrative Code, Section 7-104.*

...

104.11.3 Peer review. [OSHPD 1 & 4] When peer review is required, it shall be performed pursuant to Section 3414A.

104.11.4 Earthquake monitoring instruments. [OSHPD 1 & 4] The enforcement agency may require earthquake monitoring instruments for any building that receives approval of an alternative system for the Lateral Force Resisting System (LFRS). There shall be a sufficient number of instruments to characterize the response of the building during an earthquake and shall include at least one tri-axial free field instrument or equivalent. A proposal for instrumentation and equipment specifications shall be forwarded to the enforcement agency for review and approval.

The instruments shall be interconnected for common start and common timing. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" shall be posted in a conspicuous location.

The Owner of the building shall be responsible for the implementation of the instrumentation program. Maintenance of the instrumentation and removal/processing of the records shall be the responsibility of the enforcement agency or its designated agent.

SECTION 105

PERMITS

[A] 105.1 Required. Any owner or owner's authorized agent who intends to construct, enlarge, alter, repair, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, repair, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

...

[A] 105.3.2 Time limitation of application. An application for a permit for any proposed work shall be deemed to have been abandoned 180 days after the date of filing, unless such application has been pursued in good faith or a permit has been issued; except that the building official is authorized to grant one or more extensions of time for additional periods not exceeding 90 days each. The extension shall be requested in writing and justifiable cause demonstrated. *[OSHPD 1, 2, & 4] Time limitation shall be in accordance with the California Administrative Code, Chapter 7, Section 7-129.*

...

SECTION 106 FLOOR AND ROOF DESIGN LOADS

[A] 106.1 Live loads posted. In commercial, *institutional* or industrial buildings, for each floor or portion thereof designed for live loads exceeding 50 psf (2.40 kN/m²), such design live loads shall be conspicuously posted by the owner or owner's authorized agent in that part of each *story* in which they apply, using durable signs. It shall be unlawful to remove or deface such notices.

106.1.1 Snow Load Posting. *[OSHPD 1, 2, & 4] Snow loads used in design shall be posted as for live loads.*

~~**106.1.2 Load Posting Responsibility.** *[OSHPD 1, 2, & 4] The owner or governing board shall be responsible for keeping the actual load below the allowable limits.*~~

[A] 106.2 Issuance of certificate of occupancy. A certificate of occupancy required by Section 111 shall not be issued until the floor load signs, required by Section 106.1, have been installed.

[A] 106.3 Restrictions on loading. It shall be unlawful to place, or cause or *permit* to be placed, on any floor or roof of a building, structure or portion thereof, a load greater than is permitted by this code.

SECTION 107 SUBMITTAL DOCUMENTS

[A] 107.1 General. Submittal documents consisting of *construction documents*, statement of *special inspections*, geotechnical report and other data shall be submitted in two or more sets with each *permit* application. The *construction documents* shall be prepared by a *registered design professional* where required by the statutes of the jurisdiction in which the project is to be constructed. Where special conditions exist, the *building official* is authorized to require additional *construction documents* to be prepared by a *registered design professional*.

Exception: The *building official* is authorized to waive the submission of *construction documents* and other data not required to be prepared by a *registered design professional* if it is found that the nature of the work applied for is such that review of *construction documents* is not necessary to obtain compliance with this code.

[A] 107.2 Construction documents. *Construction documents* shall be in accordance with Sections 107.2.1 through 107.2.6.

...

[A] 107.3.4.2 Deferred submittals.

Deferral of any submittal items shall have the prior approval of the *building official*. The *registered design professional in responsible charge* shall list the deferred submittals on the *construction documents* for review by the *building official*.

Documents for deferred submittal items shall be submitted to the *registered design professional in responsible charge* who shall review them and forward them to the *building official* with a notation indicating that the deferred submittal documents have been reviewed and been found to be in general conformance to the design of the building. The deferred submittal items shall not be installed until the deferred submittal documents have been *approved* by the *building official*. [OSHPD 1, 2, & 4] *Deferred submittals shall be in accordance with the California Administrative Code, Chapter 7, Section 7-126.*

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

**CHAPTER 2
DEFINITIONS**

...

**SECTION 201
GENERAL**

201.1 Scope. Unless otherwise expressly stated, the following words and terms shall, for the purposes of this code, have the meanings shown in this chapter.

...

**SECTION 202
DEFINITIONS**

...

ACTIVE EQUIPMENT/COMPONENT. [OSHPD 1, 2, 3 & 4] *Equipment/Component containing moving or rotating parts, electrical parts such as switches or relays, or other internal components that are sensitive to earthquake forces and critical to the function of the equipment.*

ALTERNATIVE SYSTEM. [OSHPD 1 & 4] *Alternative materials, design and methods of construction in accordance with Section 104.11, Section 11.1.4 of ASCE 7 or structural design criteria as approved by the enforcement agency.*

...

DIAPHRAGM. ...

...

~~**Diaphragm, rigid.** [OSHPD 1 & 4] A diaphragm is rigid for the purpose of distribution of story shear and torsional moment where so indicated in Section 12.3.1 of ASCE 7.~~

...

ENFORCEMENT AGENT. [OSHPD 1, 2, 3 & 4] *That individual within the agency or organization charged with responsibility for agency or organization compliance with the requirements of this Code. Used interchangeably with Building Official and Code Official.*

...

Freestanding Acute Psychiatric Building (APB). [OSHPD 1] A freestanding building, as defined in the California Administrative Code Section 7-111, that provides 24-hour inpatient Acute Psychiatric Services as defined in the Health and Safety Code (H&SC) Section 1250(b) or as special services in accordance with H&SC Section 1255(a)(5) of a general acute care hospital defined in H&SC Section 1250(a) and all structures required for their continuous operation or access/egress.

Freestanding Skilled Nursing Building (SNB). [OSHPD 1] A freestanding building, as defined in the California Administrative Code Section 7-111, that provides skilled nursing and/or intermediate care as defined in the Health and Safety Code Section 1250(c) or (d), and all structures required for their continuous operation or access/egress.

...

General Acute Care Building (GAC Building). [OSHPD 1] Hospital buildings as defined in the California Administrative Code Section 7-111 and all structures required for their continuous operation or access/egress, except Freestanding Skilled Nursing Building (SNB) and Acute Psychiatric Building (APB).

...

INCIDENTAL STRUCTURAL ALTERATIONS, ADDITIONS, OR REPAIRS. [OSHPD 1, 2 & 4] Alterations, additions or repairs which would not reduce the story lateral shear force-resisting capacity by more than 5 percent or increase the story shear by more than 5 percent in any existing story or a combination thereof with equivalent effect (not exceeding 5 percent total). The calculation of lateral shear force-resisting capacity and story shear shall account for the cumulative effects of additions and alterations since original construction.

...

MAJOR STRUCTURAL ALTERATIONS, ADDITIONS, OR REPAIRS. [OSHPD 1, 2 & 4] Alterations, additions, or repairs of greater extent than minor structural alterations, additions or repairs.

...

MINOR STRUCTURAL ALTERATIONS, ADDITIONS, OR REPAIRS. [OSHPD 1, 2 & 4] Alterations, additions or repairs of greater extent than incidental structural additions or alterations which would not reduce the story shear lateral-force-resisting capacity by more than 10 percent or increase the story shear by more than 10 percent in any existing story or a combination thereof with equivalent effect (not exceeding 10 percent total). ~~base shear by more than 10 percent.~~ The calculation of lateral shear force-resisting capacity and story shear shall account for the cumulative effects of additions and alterations since original construction.

NEXT GENERATION ATTENUATION (NGA). [OSHPD 1, 2 & 4] Attenuation relations used for the 2008 United States Geological Survey (USGS) seismic hazards maps (for the Western United States) or their equivalent as determined by the enforcement agency.

...

NON-GENERAL ACUTE CARE BUILDING (NON-GAC BUILDING). [OSHPD 1] A non-freestanding SPC building, which is removed from general acute care services in accordance with the Section 3418A that remains under OSHPD jurisdiction as part of an OSHPD 1 Hospital building.

...

NPC 1, NPC 2, NPC 3/NPC 3R, NPC 4, and NPC 5. [OSHPD 1] ~~are the~~ Building nonstructural performance categories for Hospital Buildings defined in Table 11.1 of California Administrative Code (Part 1, Title 24 CCR), Chapter 6.

...

RETROFIT. [OSHPD 1, 2 & 4] The construction of any new element or system, or the alteration of any existing element or system required to bring an existing building, or portion thereof, conforming to earlier code requirements, into conformance with standards of the currently effective California Building Standards Code.

...

RUGGED EQUIPMENT. [OSHPD 1, 2, 3 & 4] Rugged equipment refers to an amplexness of construction that gives such equipment the ability to survive earthquake strong motions without significant loss of function.

...

SIGNIFICANT LOSS OF FUNCTION. [OSHPD 1, 2 & 4] Significant loss of function for equipment or components means the equipment or component cannot be restored to its original function by competent technicians after a design earthquake because the equipment or component require parts that are not normally stocked by the Owner or not readily available.

...

SPC BUILDING. [OSHPD 1] Means a structure with an independent vertical and lateral force resisting system (LFRS) and a distinct building structural performance category assigned by OSHPD.

...

SPC 1, SPC 2, SPC 3, SPC 4, SPC 4D and SPC 5. [OSHPD 1] ~~are the b~~ Building structural performance categories for Hospital Buildings defined in Table 2.5.3 of California Administrative Code (Part 1, Title 24 CCR), Chapter 6.

...

SUBSTANTIAL STRUCTURAL DAMAGE. [OSHPD 1, ~~2~~ & 4] A condition where one or both of the following apply:

1. The vertical elements of the lateral force-resisting system have suffered damage such that the lateral load-carrying capacity of any story in any horizontal direction has been reduced by more than ~~33~~ 10 percent from its pre-damage condition; or
2. The capacity of any vertical component carrying gravity load, or any group of such components, ~~that supports more than 30 percent of the total area of the structure's floor(s) and roof(s)~~ has been reduced more than ~~20~~ 10 percent from its pre-damage condition and the remaining capacity of such affected elements, with respect to all dead and *live loads*, is less than 75 percent of that required by this code for new buildings of similar structure, purpose and location.

...

SURFACE MOUNTED COMPONENT. [OSHPD 1, 2 & 4] Means component directly attached to only one continuous flat surface of wall, floor or roof, without supports. Surface mounted components are directly attached to a surface by attachments (without any supports) and are not rigidly connected to anything else (e. g. distribution system, other components, etc.).

...

TORQUE-CONTROLLED POST-INSTALLED ANCHOR. [OSHPD 1, 2 & 4] A post-installed anchor that is set by the expansion of one or more sleeves or other elements against the sides of the drilled hole through the application of torque, which pulls the cone(s) into the expansion sleeve(s); after setting, tensile loading can cause additional expansion (follow-up expansion).

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 14 EXTERIOR WALLS

SECTION 1401 GENERAL

1401.1 Scope. The provisions of this chapter shall establish the minimum requirements for exterior walls; *exterior wall* coverings; *exterior wall* openings; exterior windows and doors; architectural *trim*; balconies and similar projections; and bay and oriel windows.

...

SECTION 1405 INSTALLATION OF WALL COVERINGS

1405.1 General. *Exterior wall coverings* shall be designed and constructed in accordance with the applicable provisions of this section.

1405.1.1 Additional requirements. [OSHPD 1,2, and 4] *In addition to the requirements of Sections 1405.6, 1405.7, 1405.8, 1405.9, and 1405.10, the installation of anchored or adhered veneer shall comply with applicable provisions of Section ~~1410~~ 1411.*

...

~~SECTION 1410~~ 1411 [OSHPD 1,2, AND 4] ADDITIONAL REQUIREMENTS FOR ANCHORED AND ADHERED VENEER.

1411.1 ~~1410.1~~ General. *In no case shall veneer be considered as part of the backing in computing strength or deflection nor shall it be considered a part of the required thickness of the backing. Veneer shall be anchored in a manner which will not allow relative movement between the veneer and the wall.*

Anchored or adhered veneer shall not be used on overhead horizontal surfaces.

1411.2 ~~1410.2~~ Adhered Veneer. *Units of tile, masonry, stone or terra cotta which exceed 5/8 inch (16 mm) in thickness shall be applied as for anchored veneer where used over exit ways or more than 20 feet (6096 mm) in height above adjacent ground elevation.*

1411.2.1 ~~1410.2.1~~ Bond Strength and Tests. *Veneer shall develop a bond to the backing in accordance with TMS 402, Section ~~6-3-2.4~~ 12.3.2.4. Not less than two shear tests shall be performed for the adhered veneer between the units and the supporting element. At least one shear test shall be performed at each building for each 5,000 square feet (465 m²) of floor area or fraction thereof.*

(All existing amendments that are not revised above shall continue without any change)

Notation:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 15 ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

SECTION 1501 GENERAL

1501.1 Scope. The provisions of this chapter shall govern the design, materials, construction and quality of roof assemblies, and rooftop structures.

...

SECTION 1507 REQUIREMENTS FOR ROOF COVERINGS

1507.1 Scope. Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions.

...

1507.3.10 Additional requirements. [OSHPD 1, 2, and 4] In addition to the requirements of 1507.3.6 and 1507.3.7, the installation of clay and concrete tile roof coverings shall comply with seismic anchorage provisions of Section 1513.4512.

...

1507.7 Slate shingles. The installation of slate shingles shall comply with the provisions of this section.

...

1507.7.8 Additional requirements. [OSHPD 1, 2, and 4] In addition to the requirements of Section 1507.7.5, the installation of slate shingle roof coverings shall comply with the requirements of Sections 1507.3.6 and 1507.3.7, the installation of slate shingle roof coverings shall comply with seismic anchorage provisions of Section 1513.4512.

...

**SECTION 1513.4512 [OSHPD 1, 2, AND 4]
SEISMIC ANCHORAGE OF SLATE SHINGLE, CLAY
AND CONCRETE TILE ROOF COVERINGS**

1513.1.4512.1 Fasteners. Nails shall be long enough to penetrate into the sheathing 3/4 inch (19 mm). Where sheathing is less than 3/4 inch (19 mm) in thickness, nails shall be driven into supports, unless nails with ring shanks are used.

All fasteners shall be corrosion resistant and fabricated of copper, stainless steel, or brass, or shall have a hot dipped galvanized coating not less than 1.0 ounce of zinc per square foot (305 gm/m²). Nails for slate shingles and clay or concrete tile shall be copper, brass or stainless steel with gage and length per common ferrous nails.

1513.2.4512.2 Wire. Wire for attaching slate shingles and clay or concrete tile shall be copper, brass or stainless steel capable of supporting four times the weight of tile.

Wire supporting a single tile or shingle shall not be smaller than 1/16 inch (1.6 mm) in diameter. Continuous wire ties supporting more than one tile shall not be smaller than 0.084 inch (2 mm) in diameter.

1513.3.4512.3 Metal strips. Metal strips for attaching slate shingles and clay or concrete tile shall be copper, brass or stainless steel capable of supporting four times the weight of tile.

1513.4.4512.4 Clay or Concrete Tiles. Clay or concrete tile shall be installed in accordance with Table 1507.3.7 and as described herein.

1. On wood roofs or roofs of other material to which wood strips are secured, every cover or top tile when fastened with nails shall be nailed directly into 1-1/4 inches (32 mm) sound grain soft wood strips of sufficient height to support the tile.
Pan or bottom tiles shall be nailed directly to the roof sheathing or to wood strips. Wood strips shall be secured to the roof by nails spaced not over 12 inches (305 mm) apart.
2. On concrete roofs, wires shall be secured in place by wire loops embedded into the concrete not less than 2 inches (51 mm). The wire loops shall be spaced not more than 36 inches (914 mm) on center parallel to the eaves, and spaced vertically to allow for the minimum 3 inches (76 mm) lapping of the tile.
3. Where continuous ties of twisted wire, interlocking wires or metal strips extending from the ridge to eave are used to attach tile, the ties shall be attached to the roof construction at the ridge, eave, and at intervals not exceeding 10 feet 0 inch (3048 mm) on center. The ties within 2 feet 0 inch (610 mm) of the rake shall be attached at intervals of 5 feet 0 inch (1524 mm).

Attachment for continuous ties shall be nails, screws, staples or approved clips of the same material as the ties and shall not be subjected to withdrawal forces. Attachments for continuous ties shall have an allowable working stress shear resistance of not less than twice the dead weight of the tile tributary to the attachment, but not less than 300 pounds (136 kg).

4. *Tile with projecting anchor lugs at the bottom of the tiles shall be held in position by means of 1-inch by 2-inch (25mm by 51mm) wood stripping nailed to the roof sheathing over the underlay.*
5. *Clay or concrete tile on roofs with slopes exceeding 24 units vertical in 12 units horizontal (200 percent slope) shall be attached as required for veneer in Chapter 14. The nose of all tiles shall be securely fastened.*
6. *Clay or concrete tile shall have a minimum of two fasteners per tile. Tiles that are 8 inches (203 mm) in width or less are permitted to be fastened at the center of the head with one fastener per tile.*
7. *Interlocking clay or concrete tile shall have a minimum of one nail near center of head or two wire ties per tile.*

1513.5 1512.5 Slate Shingles. *Slate shingles on roofs with slopes exceeding 24 units vertical in 12 units horizontal (200 percent slope) shall be attached as required for veneer in accordance with Chapter 14.*

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 16 STRUCTURAL DESIGN

SECTION 1601 GENERAL

1601.1 Scope. The provisions of this chapter shall govern the structural design of buildings, structures and portions thereof regulated by this code.

1601.2 Enforcement Agency Approval. [OSHPD 2] *In addition to requirements of the California Administrative Code and the California Building Code, any aspect of project design, construction, quality assurance, or quality control programs for which this code requires approval by the design professional, are also subject to approval by the enforcement agency.*

...

SECTION 1603 CONSTRUCTION DOCUMENTS

1603.1 General. Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and other information pertinent to the structural design required by Sections 1603.1.1 through 1603.1.8 shall be indicated on the construction documents.

[OSHPD 2] *Additional requirements are included in Section 7-115 and 7-125 of the California Administration Code (Part 1, Title 24, C.C.R).*

...

**SECTION 1607
LIVE LOADS**

1607.1 General. Live loads are those loads defined in Chapter 2 of this code.

TABLE 1607.1 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_0 , AND MINIMUM CONCENTRATED LIVE LOADS⁹

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
...
<u>36.</u> [OSHPD 2] Storage racks and wall-hung cabinets.	<i>Total Loads²</i>	

...

n. [OSHPD 2] The minimum vertical design live load shall be as follows:

Paper media:

- 12-inch-deep (305 mm) shelf 33 pounds per lineal foot (482 N/m)
- 15-inch-deep (381 mm) shelf 41 pounds per lineal foot (598 N/m), or
- 33 pounds per cubic foot (5183 N/m³) per total volume of the rack or cabinet, whichever is less.

Film media:

- 18-inch-deep (457 mm) shelf 100 pounds per lineal foot (1459 N/m), or
- 50 pounds per cubic foot (7853 N/m³) per total volume of the rack or cabinet, whichever is less.

Other media:

- 20 pounds per cubic foot (311 N/m³) or 20 pounds per square foot (958 Pa), whichever is less, but not less than actual loads.

...

**SECTION 1612
FLOOD LOADS**

1612.3 Establishment of flood hazard areas. To establish flood hazard areas, the governing body shall adopt a flood hazard map and supporting data. The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled "The Flood Insurance Study for [INSERT NAME OF JURISDICTION]," dated [INSERT DATE OF ISSUANCE], as amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto. The adopted flood hazard map and supporting data are hereby adopted by reference and declared to be part of this section.

Exception: [OSHPD 2] The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency's Flood Insurance Study (FIS) adopted by the local authority having jurisdiction where the project is located.

...

**SECTION 1613
EARTHQUAKE LOADS**

1613.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and constructed to resist the effects of earthquake motions in accordance with ASCE 7, excluding Chapter 14 and Appendix 11A. The seismic design category for a structure is permitted to be determined in accordance with Section 1613 or ASCE 7.

Exceptions:

1. Detached one- and two-family dwellings, assigned to Seismic Design Category A, B or C, or located where the mapped short-period spectral response acceleration, S_s , is less than 0.4 g.
2. The seismic-force-resisting system of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section. *[OSHPD 2] Not permitted by OSHPD, see Section 2308.*
3. Agricultural storage structures intended only for incidental human occupancy.
4. Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.
5. *[OSHPD 2] Seismic Design Category shall be in accordance with exception to Section 1613.3.5.*

...

1613.3.1 Mapped acceleration parameters. The parameters S_s and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.3.1(1) through 1613.3.1(8). Where S_1 is less than or equal to 0.04 and S_s is less than or equal to 0.15, the structure is permitted to be assigned to *Seismic Design Category A*.

Exception: *[OSHPD 2] Seismic Design Category shall be in accordance with exception to Section 1613.3.5.*

...

1613.3.5 Determination of seismic design category. Structures classified as *Risk Category I, II or III* that are located where the mapped spectral response acceleration parameter at 1-second period, S_1 , is greater than or equal to 0.75 shall be assigned to *Seismic Design Category E*. Structures classified as *Risk Category IV* that are located where the mapped spectral response acceleration parameter at 1-second period, S_1 , is greater than or equal to 0.75 shall be assigned to *Seismic Design Category F*. All other structures shall be assigned to a *seismic design category* based on their *risk category* and the design spectral response acceleration parameters, S_{DS} and S_{D1} , determined in accordance with Section 1613.3.4 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe *seismic design category* in accordance with Table 1613.3.5(1) or 1613.5.5(2), irrespective of the fundamental period of vibration of the structure, T .

Exception: *[OSHPD 2] Structures not assigned to seismic design category E or F above shall be assigned to seismic design category D.*

1613.3.5.1 Alternative seismic design category determination.

...

Exception: *[OSHPD 2] Seismic design category shall be determined in accordance with exception to Section 1613.3.5.*

1613.3.5.2 Simplified design procedure. Where the alternate simplified design procedure of ASCE 7 is used, the seismic design category shall be determined in accordance with ASCE 7.

Exception: *[OSHPD 2] Seismic design category shall be determined in accordance with exception to Section 1613.3.5.*

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850

**CHAPTER 16A
STRUCTURAL DESIGN**

**SECTION 1601A
GENERAL**

1601A.1 Scope. The provisions of this chapter shall govern the structural design of buildings, structures and portions thereof regulated by this code.

1601A.1.1 Application. *The scope of application of Chapter 16A is as follows:*

1. **(Reserved for DSA).**
2. *Applications listed in Section 1.10.1, and 1.10.4, regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers.*

Exception: [OSHPD 2] *Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 16 and any applicable amendments therein.*

1601A.1.2 Amendments in this chapter. *OSHPD adopt this chapter and all amendments.*

Exception: *Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:*

1. **(Reserved for DSA).**
2. *Office of Statewide Health Planning and Development:
[OSHPD 1] - For applications listed in Section 1.10.1.
[OSHPD 4] - For applications listed in Section 1.10.4.*

1601A.2 Enforcement Agency Approval. *In addition to requirements of the California Administrative Code and the California Building Code, any aspect of project design, construction, quality assurance, or quality control programs for which this code requires approval by the Registered & Design Professional (RDP), are also subject to approval by the enforcement agency.*

**SECTION 1602A
DEFINITIONS AND NOTATIONS**

1602A.1 Definitions. *The following terms are defined in Chapter 2 except those defined below which shall, for the purposes of this section, have the meanings shown herein.*

...

~~**HOSPITAL BUILDING.** *Any building defined in Section 129725, Health and Safety Code.*~~

**SECTION 1603A
CONSTRUCTION DOCUMENTS**

1603A.1 General. Construction documents shall show the size, section and relative locations of structural members with floor levels, column centers and offsets dimensioned. The design loads and

other information pertinent to the structural design required by Sections 1603A.1.1 through **1603A.1.8** 1603A.1.9 shall be indicated on the *construction documents*.

...

[OSHPD 1] *Additional requirements are included in Section 7-115 and 7-125 of the California Administrative Code. (Part 1, Title 24, C.C.R).*

...

1603A.1.5 Earthquake design data. The following information related to seismic loads shall be shown, regardless of whether seismic loads govern the design of the lateral-force-resisting system of the building:

1. Risk Category
2. Seismic importance factor, I_e .
3. Mapped spectral response accelerations, S_S and S_1 .
4. Site class.
5. Design spectral response acceleration parameters, S_{DS} and S_{D1} .
6. Seismic design category.
7. Basic seismic-force-resisting system(s).
8. Design base shear.
9. Seismic response coefficient(s), C_S .
10. Response modification factor(s), R .
11. Analysis procedure used.
12. *Applicable horizontal structural irregularities.*
13. *Applicable vertical structural irregularities.*
14. *Location of base as defined in Section 1613A.2.*

1603A.1.5.1 Connections. *Connections that resist design seismic forces shall be designed and detailed on the design drawings.*

...

1603A.1.9 1603A.1.10 Construction Procedures. *Where unusual erection or construction procedures are considered essential by the Registered Design Professional (RDP) in order to accomplish the intent of the design or influence the construction design, such procedure shall be indicated on the construction documents.*

1603A.2 Site Data Reports. *Geotechnical and Geohazard reports for review by the enforcement agency shall be accompanied by a description of the project prepared by the Registered Design Professional (RDP) in responsible charge, which shall include the following:*

1. *Type of service such as General Acute Care Facility, Skilled Nursing Facility, Intermediate Care Facility, Acute Psychiatric Facility, Central Utility Plants, etc.*
2. *Construction materials used for the project such as Steel, Concrete, Masonry, Wood, etc.*
3. *Type of construction project such as new, addition, alteration, repair, etc.*
4. *For existing buildings, extent of construction such as incidental, minor, major, and/or voluntary seismic improvements as defined in Sections 202 and 3402A-2 [OSHPD 1 & 4].*
5. *Seismic Force Resisting System used for each structure in the project.*
6. *Foundation system that will be used for each structure in the project such as spread footing, drilled piers, etc.*
7. *Analysis procedure used and basis of design such as ASCE 7 Equivalent Lateral Force Procedure, ASCE 41 Nonlinear Dynamic Procedure, etc.*
8. *Building characteristics such as number of stories above and below grade, foot print area at grade, grade slope on site, etc.*
9. *Special features such as requirement for shoring, underpinning, retaining walls, etc.*

1603A.3 Structural Design Basis and Calculations. *The application for the approval of construction documents that involves structural elements or components shall be accompanied by complete and*

accurate structural design computations, which shall comply with requirements prescribed by the enforcement agency:

1. The computations shall be preceded by a detailed index.
2. The computations including each major subsection shall be prefaced by a statement clearly and concisely outlining the basis for the structural design and indicating the manner in which the structure will resist the vertical loads and lateral forces.
3. The computations shall be sufficiently complete to the extent that calculations for the individual structural members and connections can be readily interpreted.

SECTION 1604A GENERAL DESIGN REQUIREMENTS

1604A.3 Serviceability. Structural systems and members thereof shall be designed to have adequate stiffness to limit deflections and lateral drift. See Section 12.12.1 of ASCE 7 for drift limits applicable to earthquake loading.

1604A.3.1 Deflections. The deflections of structural members shall not exceed the more restrictive of the limitations of Sections 1604A.3.2 through 1604A.3.6 or that permitted by Table 1604A.3.

TABLE 1604A.3 - DEFLECTION LIMITS^{a, b, c, h, i}

CONSTRUCTION	L or L_r	S or W^f	$D + (L$ or $L_r)^{d,g}$
...
...	—	... $l/600$... —
<i>Veneered walls, anchored veneers and adhered veneers over 1 inch (25 mm) thick, including the mortar backing</i>			
Farm buildings	—	—	$l/180$
Greenhouses	—	—	$l/120$

...

1604A.3.7 Horizontal diaphragms. The maximum span-width depth ratio for any roof or floor diaphragm consisting of steel and composite steel slab decking shall not exceed those given in Table 4.2.4 of AF & PA SDPWS for wood or maximum span-depth ratio given in Table 1604A.4 for steel and composite steel slab decking, unless test data and design calculations acceptable to the enforcement agency are submitted and approved for the use of other span-width or span-depth ratios. Concrete diaphragms shall not exceed the span-depth ratios for the equivalent composite steel-slab diaphragm in Table 1604A.4.

TABLE 1604A.4 – MAXIMUM HORIZONTAL DIAPHRAGM SPAN AND SPAN-DEPTH RATIOS^{1,3,4}

FLEXIBILITY FACTOR(F) ²	MAXIMUM DIAPHRAGM SPAN FOR MASONRY OR CONCRETE WALLS (feet)	DIAPHRAGM SPAN-DEPTH LIMITATION			
		Rotation (torsion) Not Considered in Diaphragm		Rotation (torsion) Considered in Diaphragm	
		Masonry or Concrete Walls	Flexible Walls	Masonry or Concrete Walls	Flexible Walls
More than 150	Not to be used	Not to be used	2:1	Not to be used	1-1/2:1
70-150	200	2:1 or as required for deflection	3:1	Not to be used	2:1
10-70	400	2-1/2:1 or as required for deflection	4:1	As required for deflection	2-1/2:1
1-10	No limitation	3:1 or as required for deflection	5:1	As required for deflection	3:1
Less than 1	No limitation	As required for deflection	No limitation	As required for deflection	3-1/2:1

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 plf = 14.6 N/m, 1 psi = 6894 Pa

¹ Diaphragms shall satisfy span-depth limitations based on flexibility.

² Flexibility Factor (F) is the average deflection in micro inches (10⁻⁶) or μm of the diaphragm web per foot (m) of span stressed with a shear of 1 pound per foot (N/m).

³ The total deflection Δ of the diaphragm may be computed from the equation: Δ = Δ_f + Δ_w.

Where:

Δ_f = Flexural deflection of the diaphragm determined in the same manner as the deflection of beams. The flexural stiffness of the web of diaphragms consisting of bare steel decking shall be neglected.

Δ_w = Web deflection of the diaphragm may be determined solving the following equation:

$$F = \frac{\Delta_w \times 10^6}{q_{ave} L}$$

Where:

L = Distance in feet (m) between the vertical resisting element (such as a shear wall) and the point to which the deflection is to be determined.

q_{ave} = Average shear in the diaphragm in pounds per foot (N/m) over length L.

⁴ When applying these limitations to cantilevered diaphragms, the allowable span-depth ratio will be half of that shown.

1604A.3.8 Deflections. Deflection criteria for materials not specified shall be developed by the project architect or structural engineer in a manner consistent with the provisions of this section and approved by the enforcement agency.

...

1604A.4 Analysis. Load effects on structural members and their connections shall be determined by methods of structural analysis that take into account equilibrium, general stability, geometric compatibility and both short- and long-term material properties.

Members that tend to accumulate residual deformations under repeated service loads shall have included in their analysis the added eccentricities expected to occur during their service life.

Any system or method of construction to be used shall be based on a rational analysis in accordance with well-established principles of mechanics. Such analysis shall result in a system that provides a complete load path capable of transferring loads from their point of origin to the load-resisting elements.

The total lateral force shall be distributed to the various vertical elements of the lateral force-resisting system in proportion to their rigidities, considering the rigidity of the horizontal bracing system or diaphragm. Rigid elements assumed not to be a part of the lateral force-resisting system are permitted to be incorporated into buildings provided their effect on the action of the system is considered and provided for in the design. Structural analysis shall explicitly include consideration of stiffness of diaphragms in accordance with ASCE 7 Section 12.3.1. ~~A diaphragm is rigid for the purpose of distribution of story shear and torsional moment when the lateral deformation of the diaphragm is less than or equal to two times the average story drift.~~ Where required by ASCE 7, provisions shall be made for the increased forces induced on resisting elements of the structural system resulting from torsion due to eccentricity between the center of application of the lateral forces and the center of rigidity of the lateral force resisting system.

Every structure shall be designed to resist the overturning effects caused by the lateral forces specified in this chapter. See Section 1609A for wind loads, Section 1610A for lateral soil loads and Section 1613A for earthquake loads.

...

1604A.5 Risk category. Each building and structure shall be assigned a *risk category* in accordance with Table 1604A.5. Where a referenced standard specifies an occupancy category, the risk category shall not be taken as lower than the occupancy category specified therein. Where a referenced standard specifies that the assignment of a risk category be in accordance with ASCE 7, Table 1.5-1, Table 1604.5 shall be used in lieu of ASCE 7, Table 1.5-1.

...

TABLE 1604A.5 - RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES

RISK CATEGORY	NATURE OF OCCUPANCY
...	<i>(Existing amendments in this table shall continue, but they are not shown here for clarity)</i>
IV	Buildings and other structures designated as essential facilities, including but not limited to: <ul style="list-style-type: none"> • Group I-2 occupancies having surgery or emergency treatment facilities. • [OSHPD 1 & 4] Hospital Buildings as defined in the California Administrative Code, Section 7-111 and all structures required for their continuous operation or access/egress. ...

...

1604A.8.2 Structural walls. Walls that provide vertical load-bearing resistance or lateral shear resistance for a portion of the structure shall be anchored to the roof and to all floors and members that provide lateral support for the wall or that are supported by the wall. The connections shall be capable of resisting the horizontal forces specified in Section 1.4.4 of ASCE 7 for walls of structures assigned to Seismic Design Category A and to Section 12.11 of ASCE 7 for walls of structures assigned to all other seismic design categories. *For anchorage of concrete or masonry walls to roof and floor diaphragms, the out-of-plane strength design force shall not be less than 280 lb/linear ft (4.09 kN/m) of wall.* Required anchors in masonry walls of hollow units or cavity walls shall be embedded in a reinforced grouted structural element of the wall. See Sections 1609A for wind design requirements and 1613A for earthquake design requirements.

...

**SECTION 1605A
LOAD COMBINATIONS**

1605A.1 General. Buildings and other structures and portions thereof shall be designed to resist:

...

1605A.1.1 Stability. Regardless of which load combinations are used to design for strength, where overall structure stability (such as stability against overturning, sliding, or buoyancy) is being verified, use of the load combinations specified in Section 1605A.2 or 1605A.3 shall be permitted. Where the load combinations specified in Section 1605A.2 are used, strength reduction factors applicable to soil resistance shall be provided by a *registered design professional*. The stability of retaining walls shall be verified in accordance with Section 1807A.2.3. *When using allowable stress design, factor of safety for soil bearing values shall not be less than the overstrength factor of the structures supported.*

...

**SECTION 1606A
DEAD LOADS**

...

1606A.3 Roof Dead Loads. The design dead load shall provide for the weight of at least one additional roof covering in addition to other applicable loadings if the new roof covering is permitted to be applied over the original roofing without its removal, in accordance with Section 1511. 4510.

...

**SECTION 1607A
LIVE LOADS**

...

1607A.1 General. Live loads are those loads defined in Chapter 2 of this code.

1607A.2 Loads not specified. For occupancies or uses not designated in Table 1607A.1, the live load shall be determined in accordance with a method approved by the building official.

1607A.3 Uniform live loads. The live loads used in the design of buildings and other structures shall be the maximum loads expected by the intended use or occupancy but shall in no case be less than the minimum uniformly distributed unit loads required by Table 1607A.1.

...

TABLE 1607A.1 - MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS AND MINIMUM CONCENTRATED LIVE LOADS⁹

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
...
17. Hospitals [OSHPD 1 & 4]		
Corridors above first floor	80-100	1,000
Operating rooms, laboratories	60	1,000
Patient rooms	40	—
<i>Mechanical and electrical equipment areas including open areas around equipment</i>	50	—
<i>Storage:</i>		
<i>Light</i>	125	
<i>Heavy</i>	250	1000
<i>Dining Area (Not used for assembly)</i>	100	1000

Kitchen and serving areas	50	
...
36. Storage racks and wall-hung cabinets.	Total Loads ⁿ	

...

n. The minimum vertical design live load shall be as follows:

Paper media:

- 12-inch-deep (305 mm) shelf 33 pounds per lineal foot (482 N/m)
- 15-inch-deep (381 mm) shelf 41 pounds per lineal foot (598 N/m), or

33 pounds per cubic foot (5183 N/m³) per total volume of the rack or cabinet, whichever is less.

Film media:

- 18-inch-deep (457 mm) shelf 100 pounds per lineal foot (1459 N/m), or

50 pounds per cubic foot (7853 N/m³) per total volume of the rack or cabinet, whichever is less.

Other media:

- 20 pounds per cubic foot (311 N/m³) or 20 pounds per square foot (958 Pa), whichever is less, but not less than actual loads.

...

1607A.12.6 1607A.12.5 Uncovered open-frame roof structures. Uncovered open-frame roof structures shall be designed for a vertical live load of not less than 10 pounds per square foot (0.48 kN/m²) of the total area encompassed by the framework.

...

1607A.14 Interior walls and partitions. Interior walls and partitions that exceed 6 feet (1829 mm) in height, including their finish materials, shall have adequate strength and stiffness to resist the loads to which they are subjected but not less than a horizontal load of 5 psf (0.240 kN/m²). The 5 psf (0.24 kN/m²) service working load need not be applied simultaneously with wind or seismic loads. The deflection of such walls under a load of 5 psf (0.24 kN/m²) shall not exceed the limits in Table 1604A.3.

...

SECTION 1608A SNOW LOADS

1608A.2 Ground snow loads. The ground snow loads to be used in determining the design snow loads for roofs shall be determined in accordance with ASCE 7 or Figure 1608A.2 for the contiguous United States and Table 1608.2 for Alaska. Site-specific case studies shall be made in areas designated "CS" in Figure 1608A.2. Ground snow loads for sites at elevations above the limits indicated in Figure 1608A.2 and for all sites within the CS areas shall be approved. Ground snow load determination for such sites shall be based on an extreme value statistical analysis of data available in the vicinity of the site using a value with a 2-percent annual probability of being exceeded (50-year mean recurrence interval). Snow loads are zero for Hawaii, except in mountainous regions as approved by the building official.

TABLE 1608.2 - GROUND SNOW LOADS, pg , FOR ALASKAN LOCATIONS

LOCATION	POUNDS PER	LOCATION	POUNDS PER	LOCATION	POUNDS PER
----------	------------	----------	------------	----------	------------

	SQUARE FOOT		SQUARE FOOT		SQUARE FOOT
Adak	30	Galena	60	Petersburg	150
Anchorage	50	Gulkana	70	St. Paul Islands	40
Angeon	70	Homer	40	Seward	50
Barrow	25	Juneau	60	Shemya	25
Barter Island	35	Kenai	70	Sitka	50
Bethel	40	Kodiak	30	Talkeetna	120
Big Delta	50	Kotzebue	60	Unalakleet	50
Cold Bay	25	McGrath	70	Valdez	160
Cordeva	100	Nenana	80	Whittier	300
Fairbanks	60	Nome	70	Wrangell	60
Fort Yukon	60	Palmer	50	Yakutat	150

For SI: 1 pound per square foot = 0.0479 kN/m².

(FIGURE 1608A.2 - Not shown for Clarity)

SECTION 1609A WIND LOADS

...

1609A.1.3 Story Drift for Wind Loads. The calculated story drift due to wind pressures with ultimate design wind speed, V_{ult} , shall not exceed 0.008 times the story height for buildings less than 65 feet (19,812 mm) in height or 0.007 times the story height for buildings 65 feet (19,812 mm) or greater in height.

Exception: [OSHPD 1 & 4] This story drift limit need not be applied for single-story open structures.

...

SECTION 1612A FLOOD LOADS

...

1612A.3 Establishment of flood hazard areas. To establish flood hazard areas, the applicable governing authority shall adopt a flood hazard map and supporting data. The flood hazard map shall include, at a minimum, areas of special flood hazard as identified by the Federal Emergency Management Agency in an engineering report entitled "The Flood Insurance Study for [INSERT NAME OF JURISDICTION]," dated [INSERT DATE OF ISSUANCE], Agency's Flood Insurance Study (FIS) adopted by the local authority having jurisdiction where the project is located, as amended or revised with the accompanying Flood Insurance Rate Map (FIRM) and Flood Boundary and Floodway Map (FBFM) and related supporting data along with any revisions thereto. The adopted flood hazard map and supporting data are hereby adopted by reference and declared to be part of this section.

...

SECTION 1613A EARTHQUAKE LOADS

1613A.1 Scope. Every structure, and portion thereof, including nonstructural components that are permanently attached to structures and their supports and attachments, shall be designed and

constructed to resist the effects of earthquake motions in accordance with ASCE 7 *with all the modifications incorporated herein*, excluding Chapter 14 and Appendix 11A. The seismic design category for a structure ~~is permitted to~~ shall be determined in accordance with Section 1613A ~~or ASCE 7~~.

Exceptions:

1. ~~Detached one- and two-family dwellings, assigned to Seismic Design Category A, B or C, or located where the mapped short-period spectral response acceleration, S_S , is less than 0.4 g.~~
2. ~~The seismic force-resisting system of wood-frame buildings that conform to the provisions of Section 2308 are not required to be analyzed as specified in this section.~~
3. ~~Agricultural storage structures intended only for incidental human occupancy.~~

Structures that require special consideration of their response characteristics and environment that are not addressed by this code or ASCE 7 and for which other regulations provide seismic criteria, such as vehicular bridges, electrical transmission towers, hydraulic structures, buried utility lines and their appurtenances and nuclear reactors.

1613A.2 Definitions. The following terms are defined in Chapter 2 *except those defined below which shall, for the purposes of this section, have the meanings shown herein. Definition provided in ASCE 7 Section 11.2 and [OSHPD 1 & 4] Section 3402A.1 and ASCE 7 Section 11.2 shall apply when appropriate in addition to terms defined in this section.*

ACTIVE EARTHQUAKE FAULT. *A fault that has been the source of earthquakes or is recognized as a potential source of earthquakes, including those that have exhibited surface displacement within Holocene time (about 11,000 years) as determined by California Geological Survey (CGS) under the Alquist-Priolo Earthquake Fault Zoning Act, those included as type A or type B faults for the U.S. Geological Survey (USGS) National Seismic Hazard Maps, and faults considered to have been active in Holocene time by any authoritative source, Federal, State or Local Governmental Agency.*

BASE. *The level at which the horizontal seismic ground motions are considered to be imparted to the structure or the level at which the structure as a dynamic vibrator is supported. This level does not necessarily coincide with the ground level. See ASCE 7.*

...

DISTANCE FROM AN ACTIVE EARTHQUAKE FAULT. *Distance measured from the nearest point of the building to the closest edge of an Alquist-Priolo Earthquake fault zone for an active fault, if such a map exists, or to the closest mapped splay of the fault.*

~~**HOSPITAL BUILDINGS.** *Hospital buildings and all other medical facilities as defined in Section 1250, Health and Safety Code.*~~

GENERAL ACUTE CARE HOSPITAL. *See Section 1224.3.*

IRREGULAR STRUCTURE. *A structure designed as having one or more plan or vertical irregularities per ASCE 7 Section 12.3.*

...

~~**STRUCTURAL ELEMENTS.** *Floor or roof diaphragms, decking, joists, slabs, beams, or girders, columns, bearing walls, retaining walls, masonry or concrete nonbearing walls exceeding one story in height, foundations, shear walls or other lateral force-resisting members, and any other elements necessary to the vertical and lateral strength or stability of either the building as a whole or any of its parts, including connection between such elements.*~~

...

1613A.3 Seismic ground motion values. Seismic ground motion values shall be determined in accordance with this section.

1613A.3.1 Mapped acceleration parameters. The parameters S_s and S_1 shall be determined from the 0.2 and 1-second spectral response accelerations shown on Figures 1613.3.1(1) through 1613.3.1(8). Where S_1 is less than or equal to 0.04 and S_s is less than or equal to 0.15, the structure is permitted to be assigned to Seismic Design Category A.

(Figures 1613.3.1(1) through 1613.3.1(8) were stricken in the CBC 2013 and will not be shown in Chapter 16A. These figures are shown in Chapter 16)

...

1613A.3.5 Determination of seismic design category. Structures classified as Risk Category I, II or III that are located where the mapped spectral response acceleration parameter at 1-second period, S_1 , is greater than or equal to 0.75 shall be assigned to Seismic Design Category E. Structures classified as Risk Category IV that are located where the mapped spectral response acceleration parameter at 1-second period, S_1 , is greater than or equal to 0.75 shall be assigned to Seismic Design Category F. All other structures shall be assigned to Seismic Design Category D. a seismic design category based on their occupancy category and the design spectral response acceleration coefficients, S_{DS} and S_{D1} , determined in accordance with Section 1613.5.4 or the site-specific procedures of ASCE 7. Each building and structure shall be assigned to the more severe seismic design category in accordance with Table 1613.5.6(1) or 1613.5.6(2), irrespective of the fundamental period of vibration of the structure, T .

TABLE 1613.3.5(1) - SEISMIC DESIGN CATEGORY BASED ON SHORT-PERIOD (0.2 second) RESPONSE ACCELERATIONS

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \leq S_{DS} < 0.33g$	B	B	C
$0.33g \leq S_{DS} < 0.50g$	C	C	D
$0.50g \leq S_{DS}$	D	D	D

TABLE 1613.3.5(2) - SEISMIC DESIGN CATEGORY BASED ON 1-SECOND PERIOD RESPONSE ACCELERATION

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \leq S_{D1} < 0.133g$	B	B	C
$0.133g \leq S_{D1} < 0.20g$	C	C	D
$0.20g \leq S_{D1}$	D	D	D

1613A.3.5.1 Alternative seismic design category determination. Not permitted by OSHPD. Where S_1 is less than 0.75, the seismic design category is permitted to be determined from Table 1613.3.5(1) alone when all of the following apply:

1. In each of the two orthogonal directions, the approximate fundamental period of the structure, T_a , in each of the two orthogonal directions determined in accordance with Section 12.8.2.1 of ASCE 7, is less than $0.8 T_s$ determined in accordance with Section 11.4.5 of ASCE 7.
2. In each of the two orthogonal directions, the fundamental period of the structure used to calculate the story drift is less than T_g .
3. Equation 12.8-2 of ASCE 7 is used to determine the seismic response coefficient, C_g .

4. The diaphragms are rigid or are permitted to be idealized as rigid in accordance with Section 12.3.1 in ASCE 7 or for diaphragms permitted to be idealized as flexible in accordance with Section 12.3.1 of ASCE 7, the distance between vertical elements of the seismic force-resisting system does not exceed 40 feet (12 192 mm).

1613A.3.5.2 Simplified design procedure. *Not permitted by OSHPD. Where the alternate simplified design procedure of ASCE 7 is used, the seismic design category shall be determined in accordance with ASCE 7.*

...

1613A.4.1 Additional seismic-force-resisting systems for seismically isolated structures.

Add the following exception to the end of Section 17.5.4.2 of ASCE 7:

Exception: For isolated structures designed in accordance with this standard, the structural system limitations including the structural height limitations in Table 12.2-1 for ordinary steel concentrically braced frames (OCBFs) as defined in Chapter 11 and ordinary intermediate moment frames (OMFs) (IMFs) as defined in Chapter 11 are permitted to be taken as 160 feet (48 768 mm) for structures assigned to Seismic Design Category D, E or F, provided that the following conditions are satisfied:

1. The value of R_f as defined in Chapter 17 is taken as 1.
2. For OMFs and OCBFs, design is in accordance with AISC 341.
3. For IMFs, design is in accordance with AISC 341. In addition, requirements of Section E3.6e of AISC 341 shall be satisfied.

...

1613A.6 Ballasted photovoltaic panel systems. Ballasted, roof-mounted photovoltaic panel systems need not be rigidly attached to the roof or supporting structure. Ballasted non-penetrating systems shall be designed and installed only on roofs with slopes not more than one unit vertical in 12 units horizontal. Ballasted nonpenetrating systems shall be design to resist sliding and uplift resulting from lateral and vertical forces as required by Section 1605A, using a coefficient of friction determined by acceptable engineering principles. In structures assigned to Seismic Design Category C, D, E or F, ballasted nonpenetrating systems shall be designed to accommodate seismic displacement determined by nonlinear response history analysis or shake-table testing, using input motions consistent with ASCE 7 lateral and vertical seismic forces for nonstructural components on roofs.

[OSHPD 1 & 4] *Ballasted photovoltaic panel systems shall be considered as an alternative system.*

...

SECTION 1615A STRUCTURAL INTEGRITY

1615A.1 General. High-rise buildings that are assigned to Risk Category III or IV shall comply with the requirements of this section. Frame structures shall comply with the requirements of Section 1615A.3. Bearing wall structures shall comply with the requirements of Section 1615A.4.

1615A.2 Definitions. The following words and terms are defined in Chapter 2 *except those defined below shall, for the purposes of this section, have the meanings shown herein.*

...

HIGH-RISE BUILDING. *A building with an occupied floor located more than 75 feet (22 860 mm) above the base.*

...

SECTION 1616A

MODIFICATIONS TO ASCE 7

1616A.1 General. The text of ASCE 7 shall be modified as indicated in Sections 1616A.1.1 through ~~1616A.1.40~~ ~~1616A.1.42~~.

1616A.1.1 ASCE 7, Section 1.3. Modify ASCE 7 Section 1.3 by adding Section 1.3.6 as follows:

1.3.6 Structural Design Criteria. Where design is based on ASCE 7 Chapters 16, 17, or 18; ~~and 31~~, the ground motion, ~~wind tunnel design recommendations~~, analysis and design methods, material assumptions, testing requirements, and acceptance criteria proposed by the engineer shall be submitted to the enforcement agency in the form of structural design criteria for approval.

[OSHPD 1 & 4] Peer review requirements in Section 3414A of this code shall apply to design reviews required by ASCE 7 Chapters 17 and 18.

1616A.1.2 ASCE 7, Section 11.1.3. Replace last paragraph of ASCE 7 Section 11.1.3 by the following:

Buildings shall be designed and detailed in accordance with Chapter 12.

1616A.1.3 ASCE 7, Section 11.4.7. Modify ASCE 7 Section 11.4.7 by adding the following:

For buildings assigned to Seismic Design Category E or F, or when required by the building official, a ground motion hazard analysis shall be performed in accordance with ASCE 7 Chapter 21 as modified by Section 1803A.6 of this code.

1616A.1.4 ASCE 7, Table 12.2 -1. Modify ASCE 7 Table 12.2-1 as follows:

A. BEARING WALL SYSTEMS

5. Intermediate Precast Shear Walls – Not permitted by OSHPD.

17. Light-framed walls with shear panels of all other materials – Not permitted by OSHPD.

B. BUILDING FRAME SYSTEMS

3. Steel ordinary concentrically braced frames – Not permitted by OSHPD.

8. Intermediate Precast Shear Walls – Not permitted by OSHPD.

24. Light-framed walls with shear panels of all other materials – Not permitted by OSHPD.

26. Special steel plate shear wall – Not permitted by OSHPD.

C. MOMENT RESISTING FRAME SYSTEMS

2. Steel special truss moment frames – Not permitted by OSHPD.

3. Steel intermediate moment frames – Not permitted by OSHPD.

4. Steel ordinary moment frames – Not permitted by OSHPD.

12. Cold-formed steel –special bolted moment frame - Not permitted by OSHPD.

Exception:

- 1) Systems listed in this section can be used as an alternative system when pre-approved by the enforcement agency.
- 2) Rooftop or other supported structures not exceeding two stories in height and 10 percent of the total structure weight can use the systems in this section when designed as components per ASCE 7 Chapter 13.
- 3) Systems listed in this section can be used for seismically isolated buildings, when permitted by Section 1613A.4.1.

1616A.1.5 ASCE 7, Section 12.2.3.1. Replace ASCE 7 Section 12.2.3.1 Items # 1 and # 2 by the following:

The value of the response modification coefficient, R , used for design at any story shall not exceed the lowest value of R that is used in the same direction at any story above that story. Likewise, the deflection amplification factor, C_d , and the system over strength factor, Ω_o , used for the design at any story shall not be less than the largest values of these factors that are used in the same direction at any story above that story.

1616A.1.6 ASCE 7, Section 12.2.3.2. Modify ASCE 7 Section 12.2.3.2 by adding the following additional requirement:

- f. Where design of elements of the upper portion is governed by special seismic load combinations, the special loads shall be considered in the design of the lower portion.

1616A.1.7 [Reserved for DSA-SS].

1616A.1.8 [Reserved for DSA-SS].

1616A.1.9 [Reserved for DSA-SS].

1616A.1.10 ASCE 7, Section 12.3.3. Modify first sentence of ASCE 7 Section 12.3.3.1 as follows:

12.3.3.1 Prohibited Horizontal and Vertical Irregularities for Seismic Design Categories D through F. Structures assigned to Seismic Design Category D, E, or F having horizontal structural irregularity Type 1b of Table 12.3-1 or vertical structural irregularities Type 1b, 5a or 5b of Table 12.3-2 shall not be permitted.

1616A.1.11 ASCE 7, Section 12.7.2. Modify ASCE 7 Section 12.7.2 by adding item 6 to read as follows:

6. Where buildings provide lateral support for walls retaining earth, and the exterior grades on opposite sides of the building differ by more than 6 feet (1829 mm), the load combination of the seismic increment of earth pressure due to earthquake acting on the higher side, as determined by a Geotechnical engineer qualified in soils engineering plus the difference in earth pressures shall be added to the lateral forces provided in this section.

1616A.1.12 ASCE 7, Section 12.8.1.3. Replace ASCE 7 Section 12.8.1.3 by the following:

~~**12.8.1.3 Maximum S_s Value in Determination of C_s .** For regular structures five stories or less above the base as defined in Section 11.2 and with a period, T , of 0.5 s or less, C_s is permitted to be calculated using the larger of either $S_s = 1.5$ or 80% of the value of S_s determined per Sections 11.4.1 or 11.4.7.~~

12.8.1.3 Maximum S_{DS} Value in Determination of C_s and E_v

The value of C_s and E_v are permitted to be calculated using a value of S_{DS} equal to 1.0, but not less than 70% of S_{DS} as defined in Section 11.4.4, provided that all of the following criteria are met:

1. The structure does not have irregularities, as defined in Section 12.3.2;
2. The structure does not exceed five stories above the base as defined in Section 11.2;
3. The structure has a fundamental period, T , that does not exceed 0.5 seconds, as determined using Section 12.8.2;
4. The structure meets the requirements necessary for the redundancy factor, ρ , to be permitted to be taken as 1.0, in accordance with Section 12.3.4.2;
5. The site soil properties are not classified as Site Class E or F, as defined in Section 11.4.2; and
6. **[Reserved for DSA-SS]**
7. **[OSHPD 1 & 4]** The structure is a nonconforming building not supporting SPC-3 or higher buildings.

1616A.1.13 ASCE 7, Section 12.9.4. Replace ASCE 7 Section 12.9.4 as follows:

12.9.4 Scaling Design Values of Combined Response. Modal base shears used to determine forces and drifts shall not be less than the base shears calculated using the equivalent lateral force procedure of section 12.8.

1616A.1.14 ASCE 7, Section 12.10.2.1. Replace ASCE 7 Exception 1. of Section 12.10.2.1 by the following:

EXCEPTIONS:

1. The forces calculated above need not exceed those calculated using the load combinations with overstrength factor of Section 12.4.3.2 with seismic forces determined by Equation 12.10- 3 and transfer forces, where applicable.

1616A.1.15 ASCE 7, Section 12.12.3. [OSHPD 1 & 4] Replace ASCE 7 Equation 12.12-1 by the following:

$$\delta_M = C_d \delta_{max} \quad \text{(Equation 12.12-1)}$$

1616A.1.16 ASCE 7, Section 12.13.1. Modify ASCE 7 section 12.13.1 by adding Section 12.13.1.1 as follows:

12.13.1.1 Foundations and superstructure-to-foundation connections. The foundation shall be capable of transmitting the design base shear and the overturning forces from the structure into the supporting soil. Stability against overturning and sliding shall be in accordance with Section 1605A.1.1.

In addition, the foundation and the connection of the superstructure elements to the foundation shall have the strength to resist, in addition to gravity loads, the lesser of the following seismic loads:

1. The strength of the superstructure elements.
2. The maximum forces that ~~would occur~~ can be delivered to the foundation in the a fully yielded structural system.
3. Forces from the Load Combinations with overstrength factor in accordance with ASCE 7 Section 12.4.3.2.

Exceptions:

1. Where reference standards specify the use of higher design loads.
2. When it can be demonstrated that inelastic deformation of the foundation and superstructure-to-foundation connection will not result in a weak story or cause collapse of the structure.
3. Where ~~basic structural system~~ seismic force-resisting system consists of light framed walls with shear panels, unless the reference standard specifies the use of higher design loads.

Where the computation of the seismic overturning moment is by the equivalent lateral-force method or the modal analysis method, reduction in overturning moment permitted by section 12.13.4 of ASCE 7 may be used.

Where moment resistance is assumed at the base of the superstructure elements, the rotation and flexural deformation of the foundation as well as deformation of the superstructure-to-foundation connection shall be considered in the drift and deformation compatibility analyses.

1616A.1.17 ASCE 7, Section 13.1.3. [OSHPD 1 & 4] Modify ASCE 7 Section 13.1.3 by the following:

The design of supports and attachments for all nonstructural components shall have a component importance factor, I_p , equal to 1.5.

Exception: Freestanding skilled nursing or acute psychiatric buildings, not providing services/systems, utilities, or access/egress to general acute care buildings designated as SPC 3 or higher in accordance with Chapter 6 of the California Administrative Code, shall be permitted to use component importance factor, I_p , as shown in Table 1616A.1.17.

**TABLE 1616A.1.17
COMPONENT IMPORTANCE FACTOR (I_p)¹ FOR
FREESTANDING SKILLED NURSING AND ACUTE PSYCHIATRIC BUILDINGS**

Description	Importance Factor (I_p) ¹
Architectural components	1.0
Mechanical and electrical components	1.5
Medical devices	1.5
Piping, including in-line components	1.5
HVAC ducts, including in-line components	1.0
Electrical raceways	1.0

¹Components required for life-safety purposes after an earthquake, including emergency and standby power systems, mechanical smoke removal systems, fire protection sprinkler systems, fire alarm control panels, and egress stairways shall have a component importance factor (I_p) of 1.5.

...

1616A.1.18 ASCE 7, Section 13.1.4. Replace ASCE 7 Section 13.1.4 with the following:

13.1.4 Exemptions. The following nonstructural components are exempt from the requirements of this section:

1. Furniture (except storage cabinets as noted in Table 13.5-1).
2. Temporary or moveable (mobile) equipment.

Exceptions:

- a) Equipment shall be anchored if it is permanently attached to the building utility services such as electricity, gas, or water. For the purposes of this requirement, "permanently attached" shall include all electrical connections except plugs for duplex receptacles.
- b) The enforcement agency shall be permitted to require temporary attachments for movable equipment which is usually stationed in one place and heavier than 400 pounds or has a center of mass located 4 feet (1.22 m) or more above the adjacent floor or roof level that directly support the component, when they are not in use for a period longer than 8 hours at a time.

3. Architectural, mechanical and electrical components in Seismic Design Categories D, E, or F where all of the following apply:

- a. The component is positively attached to the structure;
- b. Flexible connections are provided at seismic separation joints and between the component and associated ductwork, piping, and conduit; and either:
 - i. The component weighs 400 pounds (1780 N) or less and has a center of mass located 4 feet (1.22 m) or less above the adjacent floor or roof level that directly support the component;

Exception: Special Seismic Certification requirements of this code in accordance with Section 1705A.13.3 ~~4705A.12.4~~ shall be applicable.
or

- ii. The component weighs 20 pounds (89 N) or less or, in the case of a distributed system, 5 lb/ft (73 N/m) or less.

Exception: The enforcement agency shall be permitted to require attachments for equipment with hazardous contents to be shown on construction documents irrespective of weight.

1616A.1.19 ASCE 7, Section 13.4. Replace ASCE 7 Section 13.4.2.3 with the following:

13.4.2.3 Prequalified P post-installed anchors and specialty inserts in Concrete and Masonry.

~~Post-installed anchors and specialty inserts in concrete that are used for component anchorage shall be pre-qualified for seismic applications in accordance with ACI 355.2, ACI 355.4, ICC-ES AC193, ICC-ES AC232, or ICC-ES AC308 or ICC-ES AC446 shall be permitted. Post-installed anchors in masonry used for component anchorage shall be pre-qualified for seismic applications in accordance with ICC-ES AC01, AC58, or AC106.~~

~~Use of screw anchors shall be limited to dry interior conditions and shall not be used in building enclosure walls. Re-use of screw anchors or screw anchor holes shall not be permitted.~~

1616A.1.20 ASCE 7, Section 13.4.5 Modify ASCE 7 Section 13.4.5 by adding Section 13.4.5.1 as follows:

(Relocated from Section 1908A.1.1) 13.4.5.1 1908A.1.4 Power Actuated Fasteners: Power actuated fasteners qualified in accordance with ICC-ES AC 70 shall be deemed to satisfy the requirements of Section 13.4.5. ~~this section.~~

~~Power actuated fasteners shall be permitted in seismic shear for components exempt from permit requirements by Section 1616A.1.18 of this code and for interior non-~~

bearing non-shear wall partitions only. Power actuated fastener shall not be used to anchor seismic bracing, exterior cladding or curtain wall systems.

Exception: Power actuated fasteners in steel to steel connections prequalified for seismic application by cyclic tests in accordance with ICC-ES AC 70 shall be permitted for seismic design.

1616A.1.21 ~~1616A.1.20~~ **ASCE 7, Section 13.5.6.** Replace ASCE 7, Section 13.5.6 with the following:

13.5.6 Suspended Ceilings. Suspended ceilings shall be in accordance with this section.

13.5.6.1 Seismic Forces. The weight of the ceiling, W_p , shall include the ceiling grid; ceiling tiles or panels; light fixtures if attached to, clipped to, or laterally supported by the ceiling grid; and other components that are laterally supported by the ceiling. W_p shall be taken as not less than 4 psf (19 N/m²).

The seismic force, F_p , shall be transmitted through the ceiling attachments to the building structural elements or the ceiling-structure boundary.

13.5.6.2 Seismic Design Requirements. Suspended acoustical tile or lay-in panel ceilings shall be designed in accordance with ASTM E 580 Section 5.2.8 and the requirements of Sections 13.5.6.2.1 and 13.5.6.2.2, or be designed in accordance with Section 13.2.1.1, or be seismically qualified in accordance with Sections 13.2.5 or 13.2.6.

13.5.6.2.1. Industry Standard Construction for Acoustical Tile or Lay-In Panel Ceilings. Acoustical tile or lay-in panel ceilings in Seismic Design Categories D, E, and F shall be designed and installed in accordance with ASTM C635, ASTM C636, and ASTM E 580, Section 5 - Seismic Design Categories D, E, and F as modified by Section 13.5.6.2.2.

Exception to Section 13.5.8.1 shall not be used in accordance with ASTM E 580 Section 5.5.

13.5.6.2.2 Modification to ASTM E 580. Modify ASTM E 580 by the following:

- 1. Exitways.** Lay-in ceiling assemblies in exitways of hospitals shall be installed with a main runner or cross runner surrounding all sides of each piece of tile, board or panel and each light fixture or grille. A cross runner that supports another cross runner shall be considered as a main runner for the purpose of structural classification. Splices or intersections of such runners shall be attached with through connectors such as pop rivets, screws, pins, plates with end tabs or other approved connectors. Lateral force diagonal bracing may be omitted in the short or transverse direction of exitways, not exceeding 8 feet wide, when perimeter support in accordance with ASTM E 580 Sections 5.2.2 and 5.2.3 is provided and the perimeter wall laterally supporting the ceiling in the short or transverse direction is designed to carry the ceiling lateral forces. The connections between the ceiling grid, wall angle and the wall shall be designed to resist the ceiling lateral forces.
- 2. Corridors and Lobbies.** Expansion joints shall be provided in the ceiling at intersections of corridors and at junctions of corridors and lobbies or other similar areas.
- 3. Lay-in panels.** Metal panels and panels weighing more than 1/2 pounds per square foot (24 N/m²) other than acoustical tiles shall be positively attached to the ceiling suspension runners.

4. **Lateral force bracing.** Lateral force bracing is required for all ceiling areas except that they shall be permitted to be omitted in rooms with floor areas up to 144 square feet when perimeter support in accordance with ASTM E 580 Sections 5.2.2 and 5.2.3 are provided and perimeter walls are designed to carry the ceiling lateral forces. The connections between the ceiling grid, wall angle and the wall shall be designed to resist the ceiling lateral forces. Horizontal restraint point spacing shall be justified by analysis or test and shall not exceed a spacing of 12 feet by 12 feet. Restraint Bracing wires shall be secured with four tight twists in 1 1/2 inches, or an approved alternate connection.
5. Ceiling support and bracing wires shall be spaced a minimum of 6" from all pipes, ducts, conduits and equipment that are not braced for horizontal forces, unless approved otherwise by the building official.
5. ~~**Ceiling fixtures.** Fixtures installed in acoustical tile or lay-in panel ceilings shall be mounted in a manner that will not compromise ceiling performance. All recessed or drop-in light fixtures and grilles shall be supported directly from the fixture housing to the structure above with a minimum of two 12 gage wires located at diagonally opposite corners. Leveling and positioning of fixtures may be provided by the ceiling grid. Fixture support wires may be slightly loose to allow the fixture to seat in the grid system. Fixtures shall not be supported from main runners or cross runners if the weight of the fixtures causes the total dead load to exceed the deflection capability of the ceiling suspension system.~~
- Fixtures shall not be installed so that the main runners or cross runners will be eccentrically loaded.*
- Surface-mounted fixtures shall be attached to the main runner with at least two positive clamping devices made of material with a minimum of 14 gage. Rotational spring catches do not comply. A 12-gage suspension wire shall be attached to each clamping device and to the structure above.*
6. ~~**Partitions.** Where the suspended ceiling system is required to provide lateral support for the permanent or relocatable partitions, the connection of the partition to the ceiling system, the ceiling system members and their connections, and the lateral force bracing shall be designed to support the reaction force of the partition from prescribed loads applied perpendicular to the face of the partition. Partition connectors, the suspended ceiling system and the lateral force bracing shall all be engineered to suit the individual partition application and shall be shown or defined in the drawings or specifications.~~

1616A.1.22 ~~1616A.1.21~~ ASCE 7, Section 13.5.7. [OSHPD 1 & 4] Modify ASCE 7 Section 13.5.7 by the following:

All access floors shall be special access floors in accordance with Section 13.5.7.2.

1616A.1.23 ~~1616A.1.22~~ ASCE 7 Tables 13.5-1 and 13.6-1. Modify ASCE 7, Tables 13.5-1 & 13.6-1 by the following:

1. For components with R_p greater than 1.5, overstrength factor (Ω_0) for design of anchorage to concrete and vibration isolators along with associated snubbers/connections shall be 2.0.
2. For Exterior Nonstructural Wall Elements and Connections, overstrength factor (Ω_0) shall be 1.0.

1616A.1.24 ~~1616A.1.23~~ ASCE 7, Section 13.6.5. Modify ASCE 7, Section 13.6.5.6 Exceptions 1 and 2 as follows:

Exceptions:

1. Design for the seismic forces of Section 13.3 shall not be required for raceways where either:
 - a. Trapeze assemblies are used to support raceways and the total weight of the raceway supported by trapeze assemblies is less than 10 lb/ft (146 N/m), or
 - b. The raceway is supported by hangers and each hanger in the raceway run is 12 in. (305 mm) or less in length from the raceway support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.
2. Design for the seismic forces of Section 13.3 shall not be required for conduit, regardless of the value of I_p , where the conduit is less than 2.5 in. (64 mm) trade size.

1616A.1.25 ~~1616A.1.24~~ ASCE 7, Section 13.6.7. Replace ASCE 7, Section 13.6.7 Exceptions 1 and 2 with the following:

Exceptions:

The following exceptions pertain to ductwork not designed to carry toxic, highly toxic, or flammable gases or used for smoke control:

1. Design for the seismic forces of Section 13.3 shall not be required for ductwork where either:
 - a. Trapeze assemblies are used to support ductwork and the total weight of the ductwork supported by trapeze assemblies is less than 10 lb/ft (146 N/m); or
 - b. The ductwork is supported by hangers and each hanger in the duct run is 12 in. (305 mm) or less in length from the duct support point to the supporting structure. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.
2. Design for the seismic forces of Section 13.3 shall not be required where provisions are made to avoid impact with larger ducts or mechanical components or to protect the ducts in the event of such impact; and HVAC ducts have a cross-sectional area of 6 ft² (0.557 m²) or less, or weigh 10 lb/ft (146 N/m) or less.

~~1616A.1.25 ASCE 7, Section 13.6.8.2.~~ Modify ASCE 7, Section 13.6.8.2 by adding Exception as follows:

~~Anchor capacities shall be determined in accordance with material chapters of this code in lieu of using those in NFPA 13 and demand shall be based on ASCE 7.~~

1616A.1.26 ASCE 7, Section 13.6.8.3. Replace ASCE 7, Section 13.6.8.3 with the following:

13.6.8.3 Exceptions. Design of piping systems and attachments for the seismic forces of Section 13.3 shall not be required where one of the following conditions apply:

1. Trapeze assemblies are used to support piping whereby no single pipe exceeds the limits set forth in 3a. or b. below and the total weight of the piping supported by the trapeze assemblies is less than 10 lb/ft (146 N/m).
2. The piping is supported by hangers and each hanger in the piping run is 12 in. (305 mm) or less in length from the top of the pipe to the supporting structure. Where pipes are supported on a trapeze, the trapeze shall be supported by hangers having a length of 12 in. (305 mm) or less. Where rod hangers are used with a diameter greater than 3/8 inch, they shall be equipped with swivels to prevent inelastic bending in the rod.

3. Piping having an R_p in Table 13.6-1 of 4.5 or greater is used and provisions are made to avoid impact with other structural or nonstructural components or to protect the piping in the event of such impact and where the following size requirements are satisfied:
 - a. For Seismic Design Categories D, E, or F and values of I_p greater than one, the nominal pipe size shall be 1 inch (25 mm) or less.
 - b. For Seismic Design Categories D, E, or F, where $I_p = 1.0$ the nominal pipe size shall be 3 inches (80 mm) or less.

The exceptions above shall not apply to elevator piping.

1616A.1.27 ASCE 7, Section 13.6.10.1. Modify ASCE 7 Section 13.6.10.1 by adding Section 13.6.10.1.1 as follows:

13.6.10.1.1 Elevators guide rail support. The design of guide rail support-bracket fastenings and the supporting structural framing shall use the weight of the counterweight or maximum weight of the car plus not less than 40 percent of its rated load. The seismic forces shall be assumed to be distributed one third to the top guiding members and two thirds to the bottom guiding members of cars and counterweights, unless other substantiating data are provided. In addition to the requirements of ASCE 7 Section 13.6.10.1, the minimum seismic forces shall be 0.5g acting in any horizontal direction.

1616A.1.28 ASCE 7, Section 13.6.10.4. Replace ASCE 7, Section 13.6.10.4 as follows:

13.6.10.4 Retainer plates. Retainer plates are required at the top and bottom of the car and counterweight, except where safety devices acceptable to the enforcement agency are provided which meet all requirements of the retainer plates, including full engagement of the machined portion of the rail. The design of the car, cab stabilizers, counterweight guide rails and counterweight frames for seismic forces shall be based on the following requirements:

1. The seismic force shall be computed per the requirements of ASCE 7 13.6.10.1. The minimum horizontal acceleration shall be 0.5g for all buildings.
2. W_p shall equal the weight of the counterweight or the maximum weight of the car plus not less than 40 percent of its rated load.
3. With the car or counterweight located in the most adverse position, the stress in the rail shall not exceed the limitations specified in these regulations, nor shall the deflection of the rail relative to its supports exceed the deflection listed below:

RAIL SIZE (weight per foot of length, pounds)	WIDTH OF MACHINED SURFACE (inches)	ALLOWABLE RAIL DEFLECTION (inches)
8	1 ¼	0.20
11	1 ½	0.30
12	1 ¾	0.40
15	1 31/32	0.50
18 ½	1 31/32	0.50
22 ½	2	0.50
30	2 ¼	0.50

For SI: 1 inch = 25 mm, 1 foot = 305 mm.

NOTE: Deflection limitations are given to maintain a consistent factor of safety against disengagement of retainer plates from the guide rails during an earthquake.

4. Where guide rails are continuous over supports and rail joints are within 2 feet (610 mm) of their supporting brackets, a simple span may be assumed.

5. The use of spreader brackets is allowed.

6. Cab stabilizers and counterweight frames shall be designed to withstand computed lateral load with a minimum horizontal acceleration of 0.5g.

1616A.1.29 ASCE 7, Section 16.1.4. Remove ASCE 7 Sections 16.1.4.1 and 16.1.4.2 and modify Section 16.1.4 by the following:

Maximum scaled base shears used to determine forces and drifts shall not be less than the base shears calculated using the equivalent lateral force procedure of Section 12.8.

1616A.1.30 ASCE 7, Section 16.2.2. Modify ASCE 7 Section 16.2.2 by adding the following:

Requirements of this section shall be deemed to be satisfied for new buildings, using acceptance criteria in Section 16.2.4.2, by the nonlinear modeling parameters in ASCE 41.

1616A.1.31 ASCE 7, Section 16.2.3. Modify ASCE 7 Section 16.2.3 by adding the following:

Requirements of this section shall be deemed to be satisfied by using load combinations in Sections 12.4.2.3 and 12.4.3.2 with 25% of the required live loads.

1616A.1.32 ASCE 7, Section 16.2.4. Modify ASCE 7 Section 16.2.4 by the following:

- a) Where site is located within 3.1 miles (5 km) of an active fault at least seven ground motions shall be analyzed and response parameters shall be based on larger of the average of the maximum response with ground motions applied as follows:
1. Each of the ground motions shall have their maximum component at the fundamental period aligned in one direction.
 2. Each of the ground motion's maximum component shall be rotated orthogonal to the previous analysis direction.
- b) Where site is located more than 5 km from an active fault at least 10 ground motions shall be analyzed. The ground motions shall be applied such that one-half shall have their maximum component aligned in one direction and the other half aligned in the orthogonal direction. The average of the maximum response of all the analyses shall be used for design.

1616A.1.33 ASCE 7, Section 16.2.4.1. [OSHPD 1 & 4] Replace ASCE 7 exception to Section 16.2.3 by the following:

Where this standard requires the consideration of the load combinations with overstrength factor of Section 12.4.3.2, average demand from MCE_R analysis obtained from suite of analysis in accordance with Section 16.2.4 shall be used with Immediate Occupancy (IO) acceptance criteria in Section 16.2.4.2.

1616A.1.34 ASCE 7, Section 16.2.4.2. [OSHPD 1 & 4] Modify ASCE 7 Section 16.2.4.2 by the following:

Acceptance criteria for elements subjected to deformation beyond their linear range of response shall be based on ASCE 41 for Immediate Occupancy (IO) at Design Earthquake (DE) and Life Safety (LS) at Risk-Targeted Maximum Considered Earthquake (MCE_R). ~~For LS acceptance criteria at MCE_R , primary components shall be within the acceptance criteria for primary components and secondary components shall be within the acceptance criteria for secondary components.~~

1616A.1.35 ASCE 7, Section 17.2.1. Modify ASCE 7, Section 17.2.1 by adding the following:

~~The importance factor, I_p , for parts and portions of a seismic-isolated building shall be the same as that required for a fixed-base building of the same risk category.~~

1616A.1.35 ~~1616A.1.36~~ **ASCE 7 Section 17.2.4.7.** Modify ASCE 7, Section 17.2.4.7 by adding the following:

~~The effects of uplift and/or rocking shall be explicitly accounted for in the analysis and in the testing of the isolator units.~~

1616A.1.37 ~~ASCE 7, Section 17.2.5.2.~~ Modify ASCE 7, Section 17.2.5.2 by adding the following:

~~The separation requirements for the building above the isolation system and adjacent buildings shall be the sum of the factored displacements for each building. The factors to be used in determining separations shall be:~~

- ~~1. For seismically isolated buildings, the deformation resulting from the analyses using the Risk-Targeted Maximum Considered Earthquake unmodified by R_f .~~
- ~~2. For fixed based buildings, C_d times the elastic deformations resulting from an equivalent static analysis using the seismic base shear computed via ASCE 7, Section 12.8.~~

1616A.1.36 ~~1616A.1.38~~ **ASCE 7, Section 17.4.** Modify ASCE 7, Section 17.4.2 by adding the following:

~~**17.4.2.3 Linear Procedure.** Linear procedures shall not be used in Seismic Design Category E and F structures. be limited to structures located at sites where mapped value of S_s is less than 0.6g.~~

1616A.1.37 ~~1616A.1.39~~ **ASCE 7, Section 17.6** Modify ASCE 7, Section 17.6 by adding the following:

17.6.1.1 Minimum Seismic Force. For the response spectrum and linear response history procedures, V_b and V_s , shall not be taken less than those calculated in accordance with Equations 17.5-7 and 17.5-8.

1616A.1.38 ~~1616A.1.40~~ **ASCE 7, Section 18.3.1.** Modify ASCE 7, Section 18.3.1 by replacing the third paragraph with the following:

If the calculated force in an element of the seismic force resisting system does not exceed 1.5 times its nominal strength for the Risk-Targeted Maximum Considered Earthquake (MCE_R) nor its nominal strength for the Design Earthquake (DE), the element is permitted to be modeled as linear. For this section, the MCE_R and DE response shall be based on largest response due to a single ground motion and not the average response of suite of ground motions.

1616A.1.39 ~~1616A.1.41~~ **Earthquake Motion Measuring Instrumentation and Monitoring. Post-Earthquake Structural Verification. [OSHPD 1 & 4]** Modify ASCE 7 by the following:

Scope: ~~For buildings with a Seismic Isolation System, a Damping System or a Lateral Force Resisting System (LFRS) not listed in ASCE 7 Table 12.2-1, earthquake motion measuring instrumentation and installed by the owner and monitoring shall be required. Monitoring requirements shall also apply to welded steel moment frames buildings constructed under a permit issued prior to October 25, 1994 post earthquake verification shall be in accordance with this section.~~

Instrumentation: ~~There shall be a sufficient number of instruments to characterize the response of the building during an earthquake and shall include at least one tri-axial free field instrument or equivalent. A proposal for instrumentation and equipment specifications shall be forwarded to the enforcement agency for review and approval.~~

~~The instruments shall be interconnected for common start and common timing. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" shall be posted in a conspicuous location.~~

~~The owner of the building shall be responsible for the implementation of the instrumentation program. Maintenance of the instrumentation and removal/processing of the records shall be the responsibility of the enforcement agency.~~

~~**Monitoring:** After every significant seismic event, where the ground shaking acceleration at the site exceeds 0.3g, or the acceleration at any monitored building level exceeds 0.8g, as measured by the seismic monitoring system in the building, the owner shall retain a structural engineer to make an inspection of the structural system. The inspection shall include viewing the performance of the building, reviewing the strong motion records, and a visual examination of the isolators, dampers, and their connections for deterioration, offset or physical damage. A report for each inspection, including conclusions on the continuing adequacy of the structural system, shall be submitted to the enforcement agency.~~

~~**Verification:** After every seismic event that generates ground motions specified in the California Administrative Code, Chapter 6, Section 4.2.0.1 or the damage indicators specified in the California Administrative Code, Chapter 6, Section 4.2.0.2 at a welded steel moment frame building constructed under a permit issued prior to October 25, 1994, the owner shall retain a structural engineer to perform detailed joint evaluations required to meet the following requirements:~~

~~1. A detailed joint evaluation program shall be submitted to the enforcement agency for approval prepared in accordance with the requirements of the California Administrative Code, Chapter 6, Section 4.2.0.3.~~

~~2. Upon approval of the joint evaluation program required by Item 1 above for the joint inspections, a project to perform the joint inspections, detailed in the program, shall be submitted and a building permit shall be obtained by the owner no later than 6 months from the date of occurrence of the seismic event.~~

~~**Exception:** Where the ground motions at the building site are less than 0.4g, the permit shall be obtained no later than 12 months from the date of occurrence of the seismic event.~~

~~3. A detailed joint evaluation report shall be submitted to the enforcement agency no later than 6 months of obtaining the building permit. The report shall document the findings from the inspections of the joints and include conclusions on the adequacy of the structural system. Where unsafe conditions are discovered, the provisions of Section 116 shall apply.~~

~~Where the detailed joint evaluation report is not submitted within the timeframes specified above, the building shall not be issued a building permit for any projects except for those for seismic compliance, maintenance and repair until the detailed joint evaluation work is complete.~~

1616A.1.40 ~~1616A.1.42~~ Operational Nonstructural Performance Level Requirements.

[OSHPD 1 & 4] New general acute care hospitals and new building(s) required for general acute care services shall satisfy Operational Nonstructural Performance Level (NPC-5) requirements.

Exception: A new building which is required for general acute care services that is added to an existing general acute care hospital and which has a building area of 4,000 square feet (371 m²) or less, need not satisfy the NPC-5 requirements until the deadline specified in California Administrative Code (Part 1, Title 24 CCR), Chapter 6.

Hospitals and buildings designed and constructed to the provisions of this code for new construction shall be deemed to satisfy Operational Nonstructural Performance Level (NPC-5) requirements when:

1. The facility has on-site supplies of water and holding tanks for sewage and liquid waste, sufficient to support 72 hours of emergency operations for the hospital or building, which are integrated into the building plumbing systems in accordance with the California Plumbing Code.
2. An on-site emergency system as defined in the California Electrical Code is incorporated into the building electrical system for critical care areas. Additionally, the system shall provide for radiological service and an onsite fuel supply for 72 hours of acute care operation.

Emergency and standby generators shall not be located below the higher of the Design Flood Elevation (DFE) or Base Flood Elevation (BFE) plus two feet (BFE + 2 ft.) or 500 year flood elevation, whichever is higher, and shall be located at an elevation close to grade for easy accessibility from outside for maintenance.

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 17 SPECIAL INSPECTIONS AND TESTS

SECTION 1701 GENERAL

1701.1 Scope. The provisions of this chapter shall govern the quality, workmanship and requirements for materials covered. Materials of construction and tests shall conform to the applicable standards listed in this code.

...

SECTION 1703 APPROVALS

...

1703.4 Performance. Specific information consisting of test reports conducted by an approved agency in accordance with the appropriate referenced standards, or other such information as necessary, shall be provided for the building official to determine that the product, material or assembly meets the applicable code requirements.

[OSHDP 2] Tests performed by an independent approved testing agency/laboratory having accreditation to the International Standards Organization (ISO) accreditation Standard 17025 or under the responsible charge of a competent approved independent Registered Design Professional shall be deemed to comply with requirements of this section. Test reports for structural tests shall be reviewed and accepted by an independent California licensed structural engineer.

...

SECTION 1704 SPECIAL INSPECTIONS AND TESTS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATION

...

1704.2 Special inspections and tests. Where application is made to the building official for construction as specified in section 105, the owner or the owners authorized agent, other than the contractor, shall employ one or more *approved agencies* to provide special inspections and tests during construction on the types of work specified in Section 1705 and identify the approved agencies to the building official. These special inspections and tests are in addition to the inspections by the building official that are identified in Section 110.

[OSHPD 2] An inspection agency having accreditation to the International Standards Organization (ISO) accreditation Standard 17020 shall be deemed to comply with the requirements for an approved inspection agency.

...

Exceptions:

...

3. Special inspections and tests are not required for portions of structures designed and constructed in accordance with the cold-formed steel light-frame construction provisions of Section 2211.7 or the conventional light-frame construction provisions of Section 2308. *[OSHPD 2] Not permitted by OSHPD.*

...

SECTION 1705 REQUIRED SPECIAL INSPECTIONS AND TESTS

...

1705.5.3 [OSHPD 2] Manufactured Trusses and Assemblies. *The fabrication of trusses and other assemblages constructed using wood and metal members, or using light metal plate connectors, shall be continuously inspected by an approved agency. ~~a qualified inspector approved by the enforcement agency~~. The ~~inspector~~ approved agency shall furnish the architect, structural engineer and the enforcement agency with a report that the lumber species, grades and moisture content; type of glue, temperature and gluing procedure; type of metal members and metal plate connectors; and the workmanship conform in every material respect with the duly approved construction documents, plans and specifications. Each inspected truss shall be stamped by the approved agency ~~inspector~~ with an identifying mark.*

...

1705.13.3 Designated Seismic System. For structures assigned to *Seismic design* Category C, D, E or F and with *designated seismic systems* that are subject to the requirements of Section 13.2.2 of ASCE 7 for certification, the *registered design professional* shall specify on the *approved construction documents* the requirements to be met by analysis, testing or experience data as specified therein. *Certificate of compliance* documenting that the requirements are met shall be submitted to the building official as specified in Section 1704A.5.

1705.13.3.1 Special Seismic Certification. [OSHPD 2]

1. Special seismic certification shall be required for life-safety components, such as emergency and standby power systems, mechanical smoke removal systems, and fire sprinkler/fire protection systems.
2. Equipment and components supporting sub-acute bed(s) shall have special seismic certification in accordance with Section 1705A.

Construction documents for OSHPD 2 buildings without sub-acute beds shall explicitly state that skilled nursing facility or intermediate care facility does not admit patients needing sustained electrical life-support equipment.

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 17A SPECIAL INSPECTIONS AND TESTS

SECTION 1701A GENERAL

1701A.1 Scope. The provisions of this chapter shall govern the quality, workmanship and requirements for materials covered. Materials of construction and tests shall conform to the applicable standards listed in this code.

1701A.1.1 Application. The scope of application of Chapter 17A is as follows:

1. (Reserved for DSA).
2. Structures regulated by the Office of Statewide Health Planning and Development (OSHPD), which include those applications listed in Section 1.10.1, and 1.10.4. These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.

Exception: [OSHPD 2] Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 17 and any applicable amendments therein.

1701A.1.2 Amendments in this chapter. OSHPD adopt this chapter and all amendments.

Exception: Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:

1. (Reserved for DSA).
2. Office of Statewide Health Planning and Development:
[OSHPD 1] - For applications listed in Section 1.10.1.
[OSHPD 4] - For applications listed in Section 1.10.4.

...

1701A.3 1701A.4 Special inspectors inspections and tests. [OSHPD 1 and 4] In addition to the inspector(s) of record required by the California Administrative Code, Section 7-144, the owner shall employ one or more approved agencies to provide special inspections and tests ~~special inspectors who shall provide inspections~~ during construction on the types of work listed under Chapters 17A, 18A, 19A, 20, 21A, 22A, 23, 24, 25, 34A, and noted in the Test, Inspection, and Observation (TIO) program required by Sections 7-141, 7-145 and 7-149 of the California Administrative Code. Test, Inspection, and Observation (TIO) program shall satisfy requirements of Section s 1704A. 2-3 and 1704A.5.

...

SECTION 1702A DEFINITIONS

1702A.1 Definitions. The following terms are defined in Chapter 2 *except those defined below which shall, for the purposes of this section chapter, have the meanings shown herein.*

...

Quality Assurance (QA). *Special inspections and testing provided by an approved agency employed by the Owner. Project specific testing required by approved construction documents shall be performed by the approved agency responsible for Quality Assurance (QA), unless approved otherwise by the building official.*

Quality Control (QC). *Inspections and materials/functionality testing provided by the fabricator, erector, manufacturer or other responsible contractor as applicable.*

...

SPECIAL INSPECTION.

Continuous special inspection. *The full-time observation of work requiring special inspection by a special inspector who is present in the area where the work is being performed.*

Periodic special inspection. *The part-time or intermittent observation of work requiring special inspection by a special inspector who is present in the area where the work has been or is being performed and at the completion of the work.*

...

SECTION 1703A APPROVALS

...

1703A.4 Performance. Specific information consisting of test reports conducted by an approved agency in accordance with the appropriate referenced standards, or other such information as necessary, shall be provided for the building official to determine that the product, material or assembly meets the applicable code requirements.

(Relocated from Section 1705A.12.3) [OSHPD 1 & 4] All Tests shall be performed by an independent approved testing agency/laboratory having accreditation to the International Standards Organization (ISO) accreditation Standard 17025 or shall be under the responsible charge of a ~~an~~ competent approved independent Registered Design Professional California licensed engineer shall be deemed to comply with requirements of this section. Test reports for structural tests shall be reviewed and accepted by an independent California licensed structural engineer.

...

SECTION 1704A SPECIAL INSPECTIONS AND TESTS, CONTRACTOR RESPONSIBILITY AND STRUCTURAL OBSERVATION

1704A.1 General. Special inspections and tests, statements of special inspections, responsibilities of contractors, submittal to the building official and structural observation shall meet applicable requirements of this section.

1704A.2 Special inspections and tests. Where application is made to the building official for construction as specified in section 105, the owner ~~or the owners authorized agent, other than contractor,~~ shall employ one or more *approved agencies* to provide special inspections and tests during construction on the types of work specified in Section 1705A and identify the approved agencies to the building official. These special inspections and tests are in addition to the inspections by the building official that are identified in Section 110.

[OSHPD 1 & 4] An inspection agency having accreditation to the International Standards Organization (ISO) accreditation Standard 17020 shall be deemed to comply with the requirements for an approved inspection agency.

The inspectors shall act under the direction of the architect or structural engineer or both, and be responsible to the Owner. Where the California Administrative Code (CAC) Section 7-115 (a) 2 permits construction documents to be prepared under the responsible charge of a mechanical, electrical or civil engineer, inspectors shall be permitted to work under the direction of engineer in appropriate branch as permitted therein.

Exceptions:

1. *Special inspections* and tests are not required for construction of a minor nature or as warranted by conditions in the jurisdiction as *approved* by the *building official*.
2. Unless otherwise required by the building official, special inspections are not required for Group U occupancies that are accessory to a residential occupancy including, but not limited to, those listed in Section 312.1.
3. Special inspections are not required for portions of structures designed and constructed in accordance with the cold-formed steel light frame construction provisions of Section 2211.7 or the conventional light frame construction provisions of Section 2308.
4. The contractor is permitted to employ the approved agencies where the contractor is also the owner.

...

1704A.2.3 Statement of special inspections. The applicant shall submit a statement of *special inspections prepared by the registered design professional in responsible charge* in accordance with Section 107.1 as a condition for *permit issuance construction documents review*. This statement shall be in accordance with Section 1704A.3.

Exception: A statement of *special inspections* is not required for portions of structures designed and constructed in accordance with the cold-formed steel light frame construction provisions of Section 2211.7 or the conventional light frame construction provisions of Section 2308.

...

1704A.2.4 Report requirement. The *inspector(s) of record and A approved agencies* shall keep records of special inspections and tests. The *inspector of record and approved agency* shall submit reports of special inspections and tests to the building official, and to the registered design professional in responsible charge *as required by the California Administrative Code*. Reports shall indicate that work inspected or tested was or was not completed in conformance to approved construction documents *as required by the California Administrative Code and this code, Title 24 Parts 1 and 2*. Discrepancies shall be brought to the immediate attention of the contractor for correction. If they are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and tests, and correction of any discrepancies noted in the inspections or tests, shall be submitted at a point in time agreed upon prior to the start of work by the owner or owner's authorized agent to the building official.

1704A.2.5 Special inspection of fabricated items. Where fabrication of structural, load-bearing or lateral load resisting members or assemblies is being conducted on the premises of a fabricator's shop, *special inspection* of the fabricated items shall be performed during fabrication.

Exceptions: [OSHPD 1 & 4]

- 4) Special inspections during fabrication are not required where the fabricator maintains approved detailed fabrication and quality control procedures that provide a basis for control of the workmanship and the fabricator's ability to conform to *approved construction*

documents and this code. Approval shall be based upon review of fabrication and quality control procedures and periodic inspection of fabrication practices by the special inspector and/or building official, as determined by the building official.

- 2) ~~Special inspections are not required where fabricator is registered and approved in accordance with Section 1704.2.5.1.~~

1704.2.5.1 Fabricator approval. ~~Special inspections during fabrication are not required where the work is done on the premises of a fabricator registered and approved to perform such work without special inspection. Approval shall be based upon review of the fabricator's written procedural and quality control manuals and periodic auditing of fabrication practices by an approved agency. At completion of fabrication, the approved fabricator shall submit a certificate of compliance to the owner or owner's authorized agent for submittal to the building official as specified in Section 1704.5 stating that the work was performed in accordance with the approved construction documents.~~

...

1704A.3.2 Seismic requirements in the statement of special inspections. Where Section 1705A.12 or 1705A.13 specifies *special inspections* or tests for seismic resistance, the statement of special inspections shall identify the equipment/components that require special seismic certification ~~designated seismic systems~~ and seismic force resisting systems that are subject to *special inspections* or tests.

...

1704A.4 Contractor responsibility. Each contractor responsible for the construction of a main wind- or seismic force resisting system, *installation of equipment/components requiring special seismic certification* ~~designated seismic system~~ or a wind- or seismic-resisting component listed in the statement of special inspections shall submit a written statement of responsibility to the *building official* and the owner or the Owner's authorized agent prior to the commencement of work on the system or component. The contractor's statement of responsibility shall contain acknowledgement of awareness of the special requirements contained in the statement of *special inspections*.

1704A.5 Submittal to the Building official. In addition to the submittal of reports of *special inspections* and tests in accordance with Section 1704A.2.4, reports and certificates shall be submitted by the owner or owner's authorized agent to the building official for each of the following:

1. ~~[OSHPD 1 & 4]~~ *Certificate of Compliance* for the fabrication of structural, load-bearing or lateral load-resisting members or assemblies on the premises of an ~~an~~ *registered and approved fabricator* in accordance with Section ~~1704A.2.5~~ 1704.2.5.1.
2. *Certificate of compliance* for the seismic qualification manufacturer's certification of non-structural components, supports and attachments in Section 1705A.13.2.
3. *Certificate of compliance* for the ~~designated seismic system~~ equipment/components requiring special seismic certification in accordance with Section 1705A.13.3.

...

1704A.6 Structural observations. ~~Where required by the provisions of Section 1704.6.1 or 1704.6.2,~~ ~~‡~~ The owner or the owner's authorized agent shall employ a *registered design professional* to perform structural observations. Structural observation does not include or waive the responsibility for inspection in Section 110 or the special inspections in Section 1705A or other sections of this code.

Prior to the commencement of observations, the structural observer shall submit to the *building official* a written statement identifying the frequency and extent of structural observations.

At the conclusion of the work included in the permit, the structural observer shall submit to the *building official* a written statement that the site visits have been made and identify any reported deficiencies that, to the best of the structural observer's knowledge, have not been resolved.

1704.6.1 Structural observations for seismic resistance. Structural observations shall be provided for those structures assigned to *Seismic Design Category D, E or F* where one or more of the following conditions exist:

1. The structure is classified as *Risk Category III or IV*.
2. The height of the structure is greater than 75 feet (22 860 mm) above the base as defined in ASCE 7.
3. The structure is assigned to *Seismic Design Category E*, is classified as *Risk Category I or II*, and is greater than two stories above grade plane.
4. When so designated by the *registered design professional* responsible for the structural design.
5. When such observation is specifically required by the *building official*.

1704.6.2 Structural observations for wind requirements. Structural observations shall be provided for those structures sited where *Vasd* as determined in accordance with Section 1609.3.1 exceeds 110 mph (49 m/sec), where one or more of the following conditions exist:

1. The structure is classified as *Risk Category III or IV*.
2. The *building height* is greater than 75 feet (22 860 mm).
3. When so designated by the *registered design professional* responsible for the structural design.
4. When such observation is specifically required by the *building official*.

SECTION 1705A REQUIRED SPECIAL INSPECTIONS AND TESTS

1705A.1 General. Special inspections and tests of elements and nonstructural components of buildings and structures shall meet the applicable requirements of this section.

...

1705A.2.1 Structural steel. Special inspections and nondestructive testing of structural steel elements in buildings, structures and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 360 of this section, and Chapter 22A and quality control requirements of AISC 360, AISC 341 and AISC 358.

Exception: *Special inspection* of railing systems composed of structural steel elements shall be limited to welding inspection of welds at the base of cantilevered rail post.

AISC 360, Chapter N and AISC 341, Chapter J are adopted, except as noted below:

The following provisions of AISC 360, Chapter N are not adopted:

1. N4., Item 2. (*Quality Assurance Inspector Qualifications*)
2. N5., Item 2. (*Quality Assurance*)
- N5., Item 3. (*Coordinated Inspection*)
- N5., Item 4. (*Inspection of Welding*)
- N7. (Approved Fabricators and Erectors)
- N8. (Nonconforming Material and Workmanship)

In addition to the quality assurance inspection requirements contained in AISC 360, Section N5 Item 6 (Inspection of High Strength Bolting) (Minimum Requirements for Inspection of Structural Steel Buildings), the requirements of Table 1705A.2.1 of the California Building Code shall apply.

In addition to the quality assurance requirements contained in AISC 360, Section N6 (Minimum Requirements for Inspection of Composite Construction), the requirements of Table 1705A.2.1 of the California Building Code shall apply.

In addition to the quality assurance requirements contained in AISC 341, Chapter J, Section J5 (Inspection Tasks), the requirements of Section 1704A.3 and Table 1705A.2.1 of the California Building Code shall apply.

TABLE 1705A.2.1 - REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD^a	CBC REFERENCE
1. Material verification of high-strength bolts, nuts and washers:				
<i>a. Identification markings to conform to ASTM standards specified in the approved construction documents.</i>	-	X	AISC 360, Section A3.3 and applicable ASTM material standards	-
<i>b. Manufacturer's certificate of compliance required.</i>	-	X	-	-
2. Inspection of high-strength bolting:				
<i>a. Snug-tight joints.</i>	-	X	AISC 360, Section M2.5	-
<i>b. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt or direct tension indicator methods of installation.</i>	-	X		
<i>c. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation.</i>	X	-		
3. Material verification of structural steel and cold-formed steel deck:				
<i>a. For structural steel, identification markings to conform to AISC 360.</i>	-	X	AISC 360, Section A3.1	2203A.1
<i>b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.</i>	-	X	Applicable ASTM material standards	
<i>c. Manufacturer's certified test reports.</i>	-	X		
4. Material verification of weld filler materials:				
<i>a. Identification markings to conform to AWS specification in the approved construction documents.</i>	-	X	AISC 360, Section A3.5 and applicable AWS A5 documents	-
<i>b. Manufacturer's certificate of</i>	-	X	-	-

compliance required.				
5. Inspection of welding:				
a. Structural steel and cold-formed steel deck:				
1) Complete and partial joint penetration groove welds.	X	-	AWS D1.1, AWS D1.8	1705A.2.1
2) Multipass fillet welds.	X	-		
3) Single-pass fillet welds $> \frac{5}{16}$ "	X	-		
4) Plug and slot welds.	X	-		
5) Single-pass fillet welds $\leq \frac{5}{16}$ "	-	X		
6) Floor and roof deck welds.	-	X	AWS D1.3	

**TABLE 1705A.2.1- continued
REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION**

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD ^a	CBC REFERENCE
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.	-	X	AWS D1.4, ACI 318: Sections <u>26.6.4.1,</u> <u>18.2.8,</u> <u>25.5.7.4 3.5.2</u>	-
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	-		
3) Shear reinforcement.	X	-		
4) Other reinforcing steel.	-	X		
6. Inspection of steel frame joint details for compliance:				
a. Details such as bracing and stiffening.	-	X	-	1705A.2.1 1705A.2.2
b. Member locations.	-	X		
c. Application of joint details at each connection.	-	X		

For SI: 1 inch = 25.4 mm.

a. Where applicable, see also Section ~~1705A.11~~ 1705A.12, Special inspection for seismic resistance

... **1705A.2.2 Cold-formed steel deck.** Special inspections ~~and qualification of welding special inspectors~~ for cold formed steel floor and roof deck shall be in accordance with the quality assurance inspection requirements of SDI QA/QC.

Deck weld special inspection shall also satisfy requirements in Table 1705A.2.1 and Section 1705A.2.5.

...

1705A.2.3.1 1705A.2.2.3 Steel joist and joist girder inspection. Special inspection is required during the manufacture and welding of steel joists or joist girders. The ~~approved agency special inspector~~ shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual inspection of the finished product. The ~~approved agency special inspector~~ shall place a distinguishing mark, and/or tag with this distinguishing mark, on each inspected joist or joist girder. This mark or tag shall remain on the joist or joist girder throughout the job site receiving and erection process.

...

1705A.2.4.1 1705A.2.2.4 Light-framed steel truss inspection. The manufacture of cold-formed light framed steel trusses shall be continuously inspected by ~~an approved agency a qualified special inspector approved by the enforcement agency~~. The ~~approved agency special inspector~~ shall verify conformance of materials and manufacture with approved plans and specifications. The ~~approved agency special inspector~~ shall place a distinguishing mark, and/or tag with this distinguishing mark, on each inspected truss. This mark or tag shall remain on the truss throughout the job site receiving and erection process.

1705A.2.5 1705A.2.2.5 Inspection of structural welding. Inspection of all shop and field welding operations shall be made by a qualified welding inspector approved by the enforcement agency. The minimum requirements for a qualified welding inspector shall be as those for an AWS Certified Welding Inspector (CWI), as defined in the provisions of the AWS QC1. ~~All welding inspectors shall be as approved by the enforcement agency.~~

Exception: [OSHPD 1 & 4] Inspection and nondestructive testing personnel meeting the requirements of AISC 341 Section J4 (in addition to AISC 360 Section N4) shall be permitted to perform quality control and quality assurance inspections at the premises of an approved fabricator's shop.

The welding inspector shall make a systematic daily record of all welds. In addition to other records, this record shall include:

1. Identification marks of welders.
2. List of defective welds.
3. Manner of correction of defects.

The welding inspector shall check the material, details of construction and procedure, as well as workmanship of the welds. The inspector shall verify that the installation of end-welded stud shear connectors is in accordance with the requirements of AWS D1.1 and the approved plans and specifications. The ~~inspector approved agency~~ shall furnish the architect, structural engineer, and the enforcement agency with a verified report that the welding is ~~proper and~~ has been done in ~~conformity conformance~~ with AWS D1.1, D1.3, D1.8, and the approved construction documents.

1705A.3 Concrete construction. Special inspections and tests of concrete construction shall be performed in accordance with this section and Table 1705A.3.

Exception: Special inspections and tests shall not be required for:

1. ~~Isolated spread concrete footings of buildings three stories or less above grade plane that are fully supported on earth or rock.~~
2. ~~Continuous concrete footings supporting walls of buildings three stories or less above grade plane that are fully supported on earth or rock where:~~
 - 2.1. ~~The footings support walls of light frame construction;~~
 - 2.2. ~~The footings are designed in accordance with Table 1809.7; or~~
 - 2.3. ~~The structural design of the footing is based on a specified compressive strength, f'_c , no greater than 2,500 pounds per square inch (psi) (17.2 MPa), regardless of the compressive strength specified in the approved construction documents or used in the footing construction.~~
3. ~~Nonstructural concrete slabs supported directly on the ground, including prestressed slabs on grade, where the effective prestress in the concrete is less than 150 psi (1.03 MPa).~~

~~4. Concrete foundation walls constructed in accordance with Table 1807.1.6.2.~~

~~5. Concrete patios, driveways and sidewalks, on grade.~~

...

1705A.3.3 ~~1705A.3.2~~ **Batch plant inspection.** Except as provided under this ~~§~~ section 1705A.3.3, the quality and quantity of materials used in transit-mixed concrete and in batched aggregates shall be continuously inspected by an approved agency special inspector ~~special inspector~~ at the location where materials are measured.

1705A.3.3.1 ~~1705A.3.3~~ **Waiver of continuous batch plant inspection.** Continuous batch plant inspection may be waived by the registered design professional, subject to approval by the enforcement agency under either of the following conditions:

1. The concrete plant complies fully with the requirements of ASTM C 94, Sections 9.8 and 10.9, and has a current certificate from the National Ready Mixed Concrete Association or another agency acceptable to the enforcement agency. The certification shall indicate that the plant has automatic batching and recording capabilities.
2. For single -story light-framed construction (without basement or retaining wall higher than 6' in height measured from bottom of footing to top of wall) ~~buildings~~ and isolated foundations supporting equipment only, where deep foundation elements are not used, ~~where the specified compressive strength f_c of the concrete delivered to the jobsite is 3,500 psi (24.13 MPa) and where the f_s used in design is not greater than 3,000 psi (20.68 MPa).~~

When continuous batch plant inspection is waived, the following ~~periodic inspection~~ requirements shall apply and shall be described in the construction documents:

1. ~~Qualified technician of the~~ An approved agency testing laboratory shall check the first batch at the start of the day to verify materials and proportions conform to the approved mix design.
2. ~~A~~ L licensed weighmaster shall ~~to~~ positively identify quantity of materials as to quantity and certify ~~to~~ each load by a batch ticket.
3. Batch tickets, including material quantities and weights shall accompany the load, shall be transmitted to the inspector of record by ~~a~~ the truck driver with load identified thereon. The load shall not be placed without a batch ticket identifying the mix. The inspector of record shall will keep a daily record of placements, identifying each truck, its load, and time of receipt at the job site, and approximate location of deposit in the structure and shall maintain will transmit a copy of the daily record as required by to the enforcement agency.

1705A.3.4 Inspection of prestressed concrete.

1. In addition to the general inspection required for concrete work, all plant fabrication of prestressed concrete members or tensioning of posttensioned members constructed at the site shall be continuously inspected by an inspector specially approved for this purpose by the enforcement agency.
2. The prestressed concrete plant fabrication inspector shall check the materials, equipment, tensioning procedure and construction of the prestressed members and prepare daily written reports. ~~The inspector~~ approved agency shall make a verified report identifying the members by mark and shall include such pertinent data as lot numbers of tendons used, tendon jacking forces, age and strength of concrete at time of tendon release and such other information that may be required.
3. The inspector of prestressed members posttensioned at the site shall check the condition of the prestressing tendons, anchorage assemblies and concrete in the area of the anchorage, the tensioning equipment and the tensioning procedure and prepare daily written reports. The

inspector approved agency shall make a verified report of the prestressing operation identifying the members or tendons by mark and including such pertinent data as the initial cable slack, net elongation of tendons, jacking force developed, and such other information as may be required.

4. *The verified reports of construction shall show that of the inspector's own personal knowledge, the work covered by the report has been performed and materials used and installed in every material respect in compliance with the duly approved plans and specifications for plant fabrication inspection. The verified report shall be accompanied by test reports required for materials used. For site posttensioning inspections the verified report shall be accompanied by copies of calibration charts, certified by an approved testing laboratory, showing the relationship between gage readings and force applied by the jacks used in the prestressing procedure*

1705A.3.5 Concrete pre-placement inspection. *Concrete shall not be placed until the forms and reinforcement have been inspected, all preparations for the placement have been completed, and the preparations have been checked by the inspector of Record.*

1705A.3.6 Placing record. *A record shall be kept on the site of the time and date of placing the concrete in each portion of the structure. Such record shall be kept until the completion of the structure and shall be open to the inspection of the enforcement agency.*

...

TABLE 1705A.3 - REQUIRED SPECIAL INSPECTION AND TESTS OF CONCRETE CONSTRUCTION

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCE STANDARDS	CBC REFERENCE
...	
4. Inspect anchors post installed in hardened concrete members. ^{b,c} a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads. ...	X		ACI318: 17.8.2.4	—
13. Inspection of adhesive anchors in horizontal and upwardly inclined positions. ^c		X	ACI318: D.9.2.2	==

...

c. Installation of all adhesive anchors in horizontal and upwardly inclined positions shall be performed by an ACI/CRSI Certified Adhesive Anchor Installer, except where the factored design tension on the anchors is less than 100 lbs. and those anchors are clearly noted on the approved construction documents or where the anchors are shear dowels across cold joints in slabs on grade where the slab is not part of the lateral force resisting system.

...

1705A.4 Masonry construction. Special inspections and tests of masonry construction shall be performed in accordance with the quality assurance program requirements of TMS 402/ACI 530/ASCE 5, ~~as set forth in Table 3.1.3 Level C requirements,~~ and TMS 602/ACI 530.1/ASCE 6, ~~as set forth in Table 1.19.3 Level C requirements.~~ *Special inspection and testing of post-installed anchors in masonry shall be required in accordance with requirements for concrete in Chapters 17A and 19A.*

Exception: *Special inspections and tests shall not be required for:*

1. Empirically designed masonry, glass unit masonry or masonry veneer in accordance with Section 2109, 2110 or Chapter 14, respectively, where they are part of structures classified as *Risk Category I, II or III.*
2. Masonry foundation walls constructed in accordance with Table 1807.1.6.3(1), 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4).
3. Masonry fireplaces, masonry heaters or masonry chimneys installed or constructed in accordance with Section 2111, 2112 or 2113, respectively.

1705A.4.1 Empirically designed masonry, g Glass unit masonry and masonry veneer in Risk Category Categories II, III or IV. *Special inspections and tests for empirically designed masonry, glass unit masonry or masonry veneer designed by Section 2109, 2110A or Chapter 14, respectively, in structures classified as Risk Category Categories II, III or IV, shall be performed in accordance with TMS 402/ACI 530/ASCE 5 Level B Quality Assurance.*

...

1705A.5 Wood construction. *Special inspections of prefabricated wood structural elements and assemblies shall be in accordance with Section 1704A.2.5 except as modified in this section. Special inspections of site-built assemblies shall be in accordance with this section.*

...

1705A.5.3 Wood structural elements and assemblies. *Special inspection of wood structural elements and assemblies is required, as specified in this section, to ensure conformance with approved drawings and specifications construction documents, and applicable standards. The approved agency special inspector shall furnish a verified report to the design professional in general responsible charge of construction observation, the structural engineer, and the enforcement agency, in accordance with the California Administrative code and this chapter. The verified report shall list all inspected members or trusses, and shall indicate whether or not the inspected members or trusses conform with applicable standards and the approved drawings and specifications. Any non-conforming items shall be indicated on the verified report.*

1705A.5.4 Structural glued laminated timber. *Manufacture of all structural glued laminated timber shall be continuously inspected by an approved agency a qualified special inspector approved by the enforcement agency.*

The approved agency special inspector shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual inspection of the finished product. Each inspected member shall be stamped by the approved agency special inspector with an identification mark.

Exception: *Special Inspection is not required for non-custom members of 5-1/8 inch maximum width and 18 inch maximum depth, and with a maximum clear span of 32 feet, manufactured and marked in accordance with ANSI/APA A190.1 Section 6.1.1 for non-custom members.*

1705A.5.5 Manufactured open web trusses. *The manufacture of open web trusses shall be continuously inspected by an approved agency a qualified special inspector approved by the enforcement agency.*

The approved agency special inspector shall verify that proper quality control procedures and tests have been employed for all materials and the manufacturing process, and shall perform visual

inspection of the finished product. Each inspected truss shall be stamped with an identification mark by the ~~special inspector~~ approved agency.

1705A.5.6 Timber connectors. The installation of all split ring and shear plate timber connectors, and timber rivets shall be continuously inspected by an approved agency ~~a qualified inspector approved by the enforcement agency~~. The approved agency inspector shall furnish the architect, structural engineer and the enforcement agency with a report verifying ~~duly verified by him~~ that the materials, timber connectors and workmanship conform to the approved plans and specifications construction documents.

...

1705A.6.1 Soil fill. All fills used to support the foundations of any building or structure shall be continuously inspected by the geotechnical engineer or his or her qualified representative. It shall be the responsibility of the geotechnical engineer to verify that fills meet the requirements of the approved construction documents and to coordinate all fill inspection and testing during the construction involving such fills.

The duties of the geotechnical engineer or his or her qualified representative shall include, but need not be limited to, the inspection of cleared areas and benches prepared to receive fill; inspection of the removal of all unsuitable soils and other materials; the approval of soils to be used as fill material; the inspection of placement and compaction of fill materials; the testing of the completed fills; the inspection or review of geotechnical drainage devices, buttress fills or other similar protective measures in accordance with the approved construction documents.

A verified report shall be submitted by the geotechnical engineer as required by the California Administrative Code. The report shall indicate that all tests and inspection required by the approved construction documents were completed and that the tested materials and/or inspected work meet the requirements of the approved construction documents.

...

1705A.7.1 Driven deep foundations observation. The installation of driven deep foundations shall be continuously inspected by a qualified representative of the geotechnical engineer responsible for that portion of the project.

The representative of the geotechnical engineer shall make a report of the deep foundation pile-driving operation giving such pertinent data as the physical characteristics of the deep foundation pile-driving equipment, identifying marks for each deep foundation pile, the total depth of embedment for each deep foundation; and when the allowable deep foundation pile loads are determined by a dynamic load formula, the design formula used, and the permanent penetration under the last 10 blows. One copy of the report shall be sent to the enforcement agency.

...

1705A.11.1 Structural wood. Continuous special inspection is required during field gluing operations of elements of the main windforce-resisting system. Periodic special inspection is required for nailing, bolting, anchoring and other fastening of elements of the main windforce resisting system, including wood shear walls, wood diaphragms, drag struts, braces and hold-downs.

Exception: ~~Special inspections are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other components of the main windforce-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.~~

1705A.11.2 Cold-formed steel light-frame construction. Periodic special inspection is required for welding operations of elements of the main windforce-resisting system. Periodic special inspection is required for screw attachment, bolting, anchoring and other fastening of elements of the main

windforce-resisting system, including shear walls, braces, diaphragms, collectors (drag struts) and hold-downs.

Exception: *Special inspections are not required for cold formed steel light frame shear walls and diaphragms, including screwing, bolting, anchoring and other fastening to components of the windforce resisting system, where either of the following apply:*

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center (o.c.).

...

1705A.12 Special inspections for seismic resistance. *Special inspections for seismic resistance shall be required as specified in Sections 1705A.12.1 through 1705A.12.9, unless exempted by the exceptions of Section 1704A.2.*

Exception: *The special inspections specified in Sections 1705.12.1 through 1705.12.9 are not required for structures designed and constructed in accordance with one of the following:*

1. The structure consists of light frame construction; the design spectral response acceleration at short periods, S_{DS} , as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 35 feet (10 668 mm).
2. The seismic force-resisting system of the structure consists of reinforced masonry or reinforced concrete; the design spectral response acceleration at short periods, S_{DS} , as determined in Section 1613.3.4, does not exceed 0.5; and the building height of the structure does not exceed 25 feet (7620 mm).
3. The structure is a detached one- or two-family dwelling not exceeding two stories above grade plane and does not have any of the following horizontal or vertical irregularities in accordance with Section 12.3 of ASCE 7:
 - 3.1. Torsional or extreme torsional irregularity.
 - 3.2. Nonparallel systems irregularity.
 - 3.3. Stiffness-soft story or stiffness-extreme soft story irregularity.
 - 3.4. Discontinuity in lateral strength-weak story irregularity.

1705A.12.1 Structural steel. *Special inspections for structural steel shall be in accordance with Section 1705A.12.1.1 or 1705A.12.1.2, as applicable.*

1705A.12.1.1 Seismic Force-Resisting Systems. *Special inspections of structural steel in the seismic force resisting systems of buildings and structures assigned to Seismic Design Category B, C, D, E or F shall be performed in accordance with quality assurance requirements of AISC 341 as modified by Section 1705A.2.1 of this code.*

Exception: *Special inspections the seismic force-resisting systems of buildings and structures assigned to Seismic Design Category B or C that are not specifically detailed for seismic resistance, with a response modification coefficient, R , of 3 or less, excluding cantilever column systems.*

1705A.12.1.2 Structural Steel Elements. *Special inspections of structural steel elements in the seismic force resisting systems of buildings and structures assigned to Seismic Design Category B, C, D, E or F, other than those covered in Section 1705A.12.1.1, including struts, collectors, chords, and foundation elements, shall be performed in accordance with quality assurance requirements of AISC 341 as modified by Section 1705A.2.1 of this code.*

Exception: *Special inspections of structural steel element are not required in the seismic force-resisting systems of buildings and structures assigned to Seismic Design Category B or C with a response modification coefficient, R , of 3 or less.*

1705A.12.2 Structural wood. For the seismic force-resisting system of structures assigned to *Seismic Design Category* C, D, E or F:

...

Exception: *Special inspections* are not required for wood shear walls, shear panels and diaphragms, including nailing, bolting, anchoring and other fastening to other elements of the seismic force-resisting system, where the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

1705A.12.3 Cold-formed steel light-frame construction. For the seismic force-resisting system of structures assigned to *Seismic Design Category* C, D, E or F, periodic special inspection shall be required:

...

Exception: *Special inspections* are not required for cold formed steel light frame shear walls and diaphragms, including screw installation, bolting, anchoring and other fastening to components of the seismic force-resisting system, where either of the following applies:

1. The sheathing is gypsum board or fiberboard.
2. The sheathing is wood structural panel or steel sheets on only one side of the shear wall, shear panel or diaphragm assembly and the fastener spacing of the sheathing is more than 4 inches (102 mm) on center.

...

1705A.12.4 Special Inspection for Special Seismic Certification. Designated seismic systems. For structures assigned to *Seismic Design Category* C, D, E or F, the special inspector shall examine equipment and components designated seismic systems requiring special seismic certification qualification in accordance with Section 1705A.13.3 or ASCE 7 Section 13.2.2 and verify that the label, anchorage and mounting conforms to the certificate of compliance.

1705A.12.5 Architectural components. Periodic special inspection is required for the erection and fastening of exterior cladding, interior and exterior nonbearing walls, ceilings, and interior and exterior veneer in structures assigned to *Seismic Design Category* D, E or F.

Exceptions: Periodic special inspection is not required for the following:

1. Exterior cladding, interior and exterior nonbearing walls and interior and exterior veneer 30 feet (9144 mm) or less in height above grade or walking surface.
2. Exterior cladding and interior and exterior veneer weighing 5 psf (24.5 N/m²) or less.
3. Interior nonbearing walls weighing 15 psf (73.5 N/m²) or less.

...

1705A.12.6 Plumbing, mechanical and electrical components. Periodic special inspection of plumbing, mechanical and electrical components shall be required for the following:

1. Anchorage of electrical equipment for emergency or standby power systems in structures assigned to *Seismic Design Category* C, D, E or F.
2. Anchorage of other electrical equipment in structures assigned to *Seismic Design Category* D, E or F.
3. Installation and anchorage of piping systems designed to carry hazardous materials and their associated mechanical units in structures assigned to *Seismic Design Category* C, D, E or F.
4. Installation and anchorage of ductwork designed to carry hazardous materials in structures assigned to *Seismic Design Category* C, D, E or F.
5. Installation and anchorage of vibration isolation systems in structures assigned to *Seismic Design Category* C, D, E or F where the approved construction documents require a nominal clearance of 1/4 inch (6.4 mm) or less between the equipment support frame and restraint.

...

1705A.12.8 Seismic isolation and damping systems. Periodic special inspection shall be provided for seismic isolation *and damping* systems in ~~seismically isolated~~ structures assigned to Seismic Design Category ~~B, C~~, D, E or F during the fabrication and installation of isolator units and energy dissipation devices. *Continuous special inspection is required for prototype and production testing of isolator units and damping devices.*

1705A.12.9 Cold-formed steel special bolted moment frames. Periodic special inspection shall be provided for the installation of cold-formed steel special bolted moment frames in the seismic force-resisting systems of structures assigned to Seismic Design Category D, E or F.

1705A.13 Testing for seismic resistance. Testing for seismic resistance shall be required as specified in Sections 1705A.13.1.1 through 1705A.13.4, unless exempted from special inspections by exceptions of Section 1704A.2.

1705A.13.1 Structural Steel. Nondestructive testing for seismic resistance shall be in accordance with Section 1705A.13.1.1 or 1705A.13.1.2, as applicable.

1705A.13.1.1 Seismic Force-Resisting Systems. Nondestructive testing of structural steel in the seismic force resisting systems of buildings and structures assigned to Seismic Design Category ~~B, C~~, D, E or F shall be performed in accordance with the quality assurance requirements of AISC 341.

~~**Exception:** Nondestructive testing is not required in the seismic force-resisting systems of buildings and structures assigned to Seismic Design Category B or C that are not specifically detailed for seismic resistance, with a response modification coefficient, R , of 3 or less, excluding cantilever column systems.~~

1705A.13.1.2 Structural Steel Elements. Nondestructive testing of *structural steel elements* in the seismic force resisting systems of buildings and structures assigned to Seismic design Category ~~B, C~~, D, E or F, other than those covered in Section 1705A.13.1.1, including struts, collectors, chords, and foundation elements, shall be performed in accordance with quality assurance requirements of AISC 341.

~~**Exception:** Nondestructive testing of *structural steel element* is not required in the seismic force-resisting systems of buildings and structures assigned to Seismic Design Category B or C with a response modification coefficient, R , of 3 or less.~~

1705A.13.2 Nonstructural Components. For structures assigned to Seismic design Category ~~B, C~~, D, E or F, where requirements of Section 13.2.1 of ASCE 7 for non-structural components, supports, or attachments are met by *manufacturer's certification* ~~seismic qualification~~ as specified in Item 2 therein, the *registered design professional* shall specify on the *approved construction documents* the requirements for seismic ~~certification~~ ~~qualification~~ by analysis, *or* testing. ~~or experience data.~~ *Certificates of compliance* for the ~~seismic qualification~~ *manufacturer's certification* shall be submitted to the building official as specified in Section 1704A.5.

Seismic sway braces satisfying requirements of FM 1950 shall be deemed to satisfy the requirements of this Section. Component tests shall be supplemented by assembly tests, when required by the building official.

1705A.13.3 Special Seismic Certification. [OSHPD 1 & 4] Designated Seismic System. For structures assigned to Seismic design Category ~~C~~, D, E or F, ~~and with designated seismic systems equipment and components~~ that are subject to the requirements of Section 13.2.2 of ASCE 7 for *special seismic* certification, the *registered design professional* shall specify on the *approved construction documents* the requirements to be met by analysis, *or* testing ~~or experience data~~ as specified therein. *Certificates of compliance* documenting that the requirements are met shall be submitted to the building official as specified in Section 1704A.5.

Active or energized equipment and components shall be certified exclusively on the basis of approved shake table testing in accordance with ICC-ES AC 156. Minimum of two equipment/components shall be tested for a product line with similar structural configuration. Where a range of products are tested, the two equipment/components shall be either the largest and a small unit smallest, or approved alternative representative equipment/components.

Exception: When a single product (and not a product line with more than one product with variations) is certified and manufacturing process is ISO 9001 certified, one test shall be permitted.

(Relocated to Section 1703A.4) ~~All tests shall be performed by an independent laboratory having accreditation to the International Standards Organization (ISO) accreditation standard 17025 or shall be under the responsible charge of an independent California licensed engineer. Test reports shall be reviewed and accepted by an independent California licensed structural engineer.~~

For a multi-component system, where active or energized components are certified by tests, connecting elements, attachments, and supports can be justified by supporting analysis.

1705A.13.3.1 [OSHPD 1 & 4] 1705A.12.4.1 Special seismic certification shall be required for the following systems, equipment, and components:

1. Emergency and standby power systems.
2. Elevator equipment (excluding elevator cabs).
3. Components with hazardous contents.
4. Exhaust and Smoke control fans.
5. Switchgear and Switchboards.
6. Motor control centers.
7. Radiography and/or fluoroscopy systems for trauma and/or diagnostic use in fluoroscopy rooms and radiographic rooms (Rad rooms).
8. CT (Computerized Tomography) systems for trauma and/or diagnostic use.
9. Air conditioning units excluding Variable/Constant Air Volume (VAV/CAV) boxes up to 75 lbs.
10. Air handling units.
11. Chillers, including associated evaporators, and condensers.
12. Cooling Towers.
13. Transformers.
14. Electrical substations.
15. UPS and batteries.
16. ~~Distribution panels~~ Panelboards as defined in the California Electrical Code (CEC) Article 100.
17. Industrial Control panels as defined in the California Electrical Code (CEC) Article 100.
18. Power isolation and correction systems.
19. Motorized surgical lighting systems.
20. Motorized operating table systems
21. Internal communication servers and routers.
22. Medical gas and vacuum systems.
23. Electrical busways as defined in UL 857.
24. Components powered by life safety or critical branches in accordance with the California Electrical Code (CEC) Articles 517.32 and 517.33. Fixed equipment powered by these circuits shall require special seismic certification only when identified in items # 1 through # 23 in this section.

Exceptions:

1. Equipment and components weighing not more than ~~20~~ 50 lbs. supported directly on structures ~~and not~~ or surface mounted on other equipment or

- components) that are not required to have special seismic certification by this section. with supports and attachments in accordance with this code.
2. Movable (mobile) and temporary equipment/components, which are not anchored to structure or permanently attached to the building utility services such as electricity, gas, or water. For the purposes of this requirement, "permanently attached" shall include all electrical connections except plugs for duplex receptacles.
 3. Pipes, ducts, conduits, and cable trays, excluding in-line equipment and components.
 4. Underground tanks.
 5. Electric motors, and pumps, and compressors up to 20 hp. not more than 10 hp. rigidly supported directly on structures (and not mounted on other equipment or components) with supports and attachments in accordance with this code.
 6. Electrical Controllers, Switches, Transformers, Circuit Breakers, and fuses up to 10 lbs. or 10 amperes.
 7. Components where importance factor, I_p , is permitted to be 1.0 by this code.
 8. Emergency generators up to 25 kilowatts.
 9. Equipment and Components used for clinical trials only.

1705A.13.4 Seismic isolation and damping systems. Seismic isolation and damping systems in seismically isolated structures assigned to Seismic Design Category B, C, D, E or F shall be tested in accordance with Section 17.8 and 18.9 of ASCE 7.

Prototype and production testing and associated acceptance criteria for isolator units and damping devices shall be subject to preapproval by the building official. Testing exemption for similar units shall require approval by the building official.

...

1705A.19 ~~1705A.18~~ Shotcrete. All shotcrete work shall be continuously inspected during placing by an approved agency inspector specially approved for that purpose by the enforcement agency. The special shotcrete inspector shall check the materials, placing equipment, details of construction and construction procedure. ~~The inspector~~ an approved agency shall furnish a verified report that of his or her own personal knowledge the work covered by the report has been performed and materials used and installed in every material respect in compliance with the duly approved plans and specifications.

1705A.19.1 ~~1705A.18.1~~ Visual examination for structural soundness of in-place shotcrete. Completed shotcrete work shall be checked visually for reinforcing bar embedment, voids, rock pockets, sand streaks and similar deficiencies by examining a minimum of three 3-inch (76 mm) cores taken from three areas chosen by the design engineer which represent the worst congestion of reinforcing bars occurring in the project. Extra reinforcing bars may be added to noncongested areas and cores may be taken from these areas. The cores shall be examined by the special inspector and a report submitted to the enforcement agency prior to final approval of the shotcrete.

Exception: Shotcrete work fully supported on earth, minor repairs, and when, in the opinion of the enforcement agency, no special hazard exists.

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 18 SOILS AND FOUNDATIONS

**SECTION 1801
GENERAL**

1801.1 Scope. The provisions of this chapter shall apply to building and foundation systems.

...

**SECTION 1803
GEOTECHNICAL INVESTIGATIONS**

1803.1 General. Geotechnical investigations shall be conducted in accordance with Section 1803.2 and reported in accordance with Section 1803.6. Where required by the *building official* or where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a *registered design professional*.

1803.2 Investigations required. Geotechnical investigations shall be conducted in accordance with Sections 1803.3 through 1803.5.

Exception: The *building official* shall be permitted to waive the requirement for a geotechnical investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1803.5.1 through 1803.5.6 and Sections 1803.5.10 and 1803.5.11.

[OSHPD 2] Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371 m²) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS). Allowable foundation and lateral soil pressure values may be determined from Table 1806.2.

...

1803.6 Reporting.

...

11. *[OSHPD 2] The report shall consider the effects of seismic hazard in accordance with Section 1803.7.*

...

1803.7 Geohazard reports. [OSHPD 2]

Geohazard reports shall be required for all proposed construction.

Exceptions:

1. *Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type V construction and 4,000 square feet (371m²) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS); nonstructural, associated structural or voluntary structural alterations and incidental structural additions or alterations, and structural repairs for other than earthquake damage.*

2. *A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.*

The purpose of the geohazard report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer.

The preparation of the geohazard report shall consider the most recent CGS Note 48; Checklist for the Review of Engineering Geology and Seismology Reports for California Public School, Hospitals, and Essential Services Buildings. In addition, the most recent version of CGS Special Publication 42, Fault Rupture Hazard Zones in California, shall be considered for project sites proposed within an Alquist-Priolo Earthquake Fault Zone. The most recent version of CGS Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, shall be considered for project sites proposed within a Seismic Hazard Zone. All conclusions shall be fully supported by satisfactory data and analysis.

In addition to requirements in Sections 1803.5.11 and 1803.5.12, the report shall include, but shall not be limited to, the following:

1. Site Geology.
2. Evaluation of the known active and potentially active faults, both regional and local.
3. Ground-motion parameters, as required by Section 1613 and ASCE 7.

...

1810.3.1.5 Helical piles. Helical piles shall be designed and manufactured in accordance with accepted engineering practice to resist all stresses induced by installation into the ground and service loads.

1810.3.1.5.1 Helical piles seismic requirements. [OSHPD 2] For structures assigned to Seismic Design Category D, E or F, capacities of helical piles shall be determined in accordance with Section 1810.3.3 by at least two project specific pre-production tests for each soil profile, size and depth of helical pile. At least two percent of all production piles shall be proof tested to design ultimate strength determined by using load combinations in Section 1605.2.1.

Helical piles shall satisfy corrosion resistance requirements of ICC-ES AC 358. In addition, all helical pile materials that are subject to corrosion shall include at least 1/16" corrosion allowance.

Helical piles shall not be considered as carrying any horizontal loads.

...

1810.3.10.4 Seismic reinforcement. For structures assigned to Seismic Design Category C, a permanent steel casing shall be provided from the top of the micropile down to the point of zero curvature. For structures assigned to Seismic Design Category D, E or F, the micropile shall be considered as an alternative system in accordance with Section 104.11. The alternative system design, supporting documentation and test data shall be submitted to the building official for review and approval.

1810.3.10.4.1 Seismic requirements. [OSHPD 2] For structures assigned to Seismic Design Category D, E or F, a permanent steel casing having a minimum thickness of 3/8" shall be provided from the top of the micropile down to a minimum of 120 percent of the point of zero curvature. Capacity of micropiles shall be determined in accordance with Section 1810.3.3 by at least two project specific pre-production tests for each soil profile, size and depth of micropile. At least two percent of all production piles shall be proof tested to design ultimate strength determined by using load combinations in Section 1605.2.1.

Steel casing length in soil shall be considered as unbonded and shall not be considered as contributing to friction. Casing shall provide confinement at least equivalent to hoop reinforcing required by ACI 318 Section ~~18.13.4. 24.12.4.~~

Reinforcement shall have Class 1 corrosion protection in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors. Steel casing design shall include at least 1/16" corrosion allowance.

Micropiles shall not be considered as carrying any horizontal loads.

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(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850

CHAPTER 18A SOILS AND FOUNDATIONS

SECTION 1801A GENERAL

1801A.1 Scope. The provisions of this chapter shall apply to building and foundation systems. ~~Refer to Appendix J: Grading, for requirements governing grading, excavation and earthwork construction, including fills and embankments.~~

1801A.1.1 Application. The scope of application of Chapter 18A is as follows:

1. **(Reserved for DSA).**
2. Applications listed in Section 1.10.1, and 1.10.4 regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers.

Exception: [OSHPD 2] Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 18 and any applicable amendments therein.

1801A.1.2 Amendments in this chapter. OSHPD adopt this chapter and all amendments.

Exception: Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:

1. **(Reserved for DSA).**
2. Office of Statewide Health Planning and Development:

[OSHPD 1] - For applications listed in Section 1.10.1.

[OSHPD 4] - For applications listed in Section 1.10.4.

...

SECTION 1803A GEOTECHNICAL INVESTIGATIONS

1803A.1 General. Geotechnical investigations shall be conducted in accordance with Section 1803A.2 and reported in accordance with Section ~~1803.6~~ 1803A.7. ~~Where required by the building official or where geotechnical investigations involve in-situ testing, laboratory testing or engineering calculations, such investigations shall be conducted by a registered design professional.~~ The classification and investigation of the soil shall be made under the responsible charge of a California registered geotechnical engineer. All recommendations contained in geotechnical and geohazard reports shall be subject to the approval of the enforcement agency. All reports shall be prepared and signed by a

registered geotechnical engineer, certified engineering geologist, and a registered geophysicist, where applicable.

1803A.2 Investigations required. Geotechnical investigations shall be conducted in accordance with Sections 1803A.3 through 1803A.5 1803A.6.

Exceptions: The building official shall be permitted to waive the requirement for a geotechnical investigation where satisfactory data from adjacent areas is available that demonstrates an investigation is not necessary for any of the conditions in Sections 1803.5.1 through 1803.5.6 and Sections 1803.5.10 and 1803.5.11.

1. Geotechnical reports are not required for one-story, wood-frame and light-steel-frame buildings of Type II or Type V construction and 4,000 square feet (371 m²) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS) or in seismic hazard zones as defined in the Safety Element of the local General Plan. Allowable foundation and lateral soil pressure values may be determined from Table 1806A.2.
2. A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.

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1803A.3 Basis of investigation. Soil classification shall be based on observation and any necessary tests of the materials disclosed by borings, test pits or other subsurface exploration made in appropriate locations. Additional studies shall be made as necessary to evaluate slope stability, soil strength, position and adequacy of load-bearing soils, the effect of moisture variation on soil-bearing capacity, compressibility, liquefaction and expansiveness.

1803A.3.1 Scope of investigation. The scope of the geotechnical investigation including the number and types of borings or soundings, the equipment used to drill or sample, the in-situ testing equipment and the laboratory testing program shall be determined by a registered design professional.

There shall not be less than one boring or exploration shaft for each 5,000 square feet (465 m²) of building area at the foundation level with a minimum of two provided for any one building. A boring may be considered to reflect subsurface conditions relevant to more than one building, subject to the approval of the enforcement agency.

Borings shall be of sufficient size to permit visual examination of the soil in place or, in lieu thereof, cores shall be taken.

Borings shall be of sufficient depth and size to adequately characterize sub-surface conditions.

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1803A.5.4 Ground-water table. A subsurface soil investigation shall be performed to determine whether the existing ground-water table is above or within 5 feet (1524 mm) below the elevation of the lowest floor level where such floor is located below the finished ground level adjacent to the foundation.

Exception: A subsurface soil investigation to determine the location of the ground-water table shall not be required where waterproofing is provided in accordance with Section 1805.

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1803A.6. Geohazard Reports. Geohazard reports shall be required for all proposed construction.

Exceptions:

1. Reports are not required for one-story, wood-frame and light-steel-frame buildings of Type II or Type V construction and 4,000 square feet (371m²) or less in floor area, not located within Earthquake Fault Zones or Seismic Hazard Zones as shown in the most recently published maps from the California Geological Survey (CGS) or in seismic hazard zones as defined in the Safety Element of the local General Plan; nonstructural, associated structural or voluntary structural alterations, and incidental structural additions or alterations, and structural repairs for other than earthquake damage.
2. A previous report for a specific site may be resubmitted, provided that a reevaluation is made and the report is found to be currently appropriate.

The purpose of the geohazard report shall be to identify geologic and seismic conditions that may require project mitigations. The reports shall contain data which provide an assessment of the nature of the site and potential for earthquake damage based on appropriate investigations of the regional and site geology, project foundation conditions and the potential seismic shaking at the site. The report shall be prepared by a California-certified engineering geologist in consultation with a California-registered geotechnical engineer.

The preparation of the geohazard report shall consider the most recent CGS Note 48: Checklist for the Review of Engineering Geology and Seismology Reports for California Public School, Hospitals, and Essential Services Buildings. In addition, the most recent version of CGS Special Publication 42, Fault Rupture Hazard Zones in California, shall be considered for project sites proposed within an Alquist-Priolo Earthquake Fault Zone. The most recent version of CGS Special Publication 117, Guidelines for Evaluating and Mitigating Seismic Hazards in California, shall be considered for project sites proposed within a Seismic Hazard Zone. All conclusions shall be supported by satisfactory data and analysis.

In addition to requirements in Sections 1803A.5.11 and 1803A.5.12, the report shall include, but shall not be limited to, the following:

1. Site Geology.
2. Evaluation of the known active and potentially active faults, both regional and local.
3. Ground-motion parameters, as required by Sections 1613A, 1616A & ASCE

The three Next Generation Attenuation (NGA) relations used for the 2008 USGS seismic hazards maps for Western United States (WUS) shall be utilized to determine the site-specific ground motion. When supported by data and analysis, other NGA (NGA West 1) relations, that were not used for the 2008 USGS maps, shall be permitted as additions or substitutions. No fewer than three NGA relations shall be utilized.

1803A.7 Geotechnical Reporting. Where geotechnical investigations are required, a written report of the investigations shall be submitted to the *building official* by the permit applicant at the time of permit application. *The geotechnical report shall provide completed evaluations of the foundation conditions of the site and the potential geologic/seismic hazards affecting the site. The geotechnical report shall include, but shall not be limited to, site-specific evaluations of design criteria related to the nature and extent of foundation materials, groundwater conditions, liquefaction potential, settlement potential and slope stability. The report shall contain the results of the analyses of problem areas identified in the geohazard report. The geotechnical report shall incorporate estimates of the characteristics of site ground motion provided in the geohazard report.* This geotechnical report shall include, but need not be limited to, the following information:

1. A plot showing the location of the soil investigations.
2. A complete record of the soil boring and penetration test logs and soil samples.
3. A record of the soil profile.

4. Elevation of the water table, if encountered. *Historic high ground water elevations shall be addressed in the report to adequately evaluate liquefaction and settlement potential.*
5. Recommendations for foundation type and design criteria, including but not limited to: bearing capacity of natural or compacted soil; provisions to mitigate the effects of expansive soils; mitigation of the effects of liquefaction, differential settlement and varying soil strength; and the effects of adjacent loads.
6. Expected total and differential settlement.
7. Deep foundation information in accordance with Section 1803A.5.5.
8. Special design and construction provisions for foundations of structures founded on expansive soils, as necessary.
9. Compacted fill material properties and testing in accordance with Section 1803A.5.8.
10. Controlled low-strength material properties and testing in accordance with Section 1803A.5.9.
11. *The report shall consider the effects of stepped footings addressed in Section 1809A.3.*
12. *The report shall consider the effects of seismic hazards in accordance with Section 1803A.6 and shall incorporate the findings of the associated geohazard report.*

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SECTION 1805A DAMPPROOFING AND WATERPROOFING

1805A.1 General. Walls or portions thereof that retain earth and enclose interior spaces and floors below grade shall be waterproofed and damp proofed in accordance with this section, with the exception of those spaces containing groups other than residential and institutional where such omission is not detrimental to the building or occupancy.

Ventilation for crawl spaces shall comply with Section 1203.4.

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1805A.2 Dampproofing. Where hydrostatic pressure will not occur as determined by Section 1803A.5.4, floors and walls ~~for other than wood foundation systems~~ shall be dampproofed in accordance with this section. ~~Wood foundation systems shall be constructed in accordance with AWC PWF.~~

...

SECTION 1807A FOUNDATION WALLS, RETAINING WALLS AND EMBEDDED POSTS AND POLES

1807A.1 Foundation walls. Foundation walls shall be designed and constructed in accordance with Sections 1807A.1.1 through 1807A.1.6. Foundation walls shall be supported by foundations designed in accordance with Section 1808A.

1807A.1.1 Design lateral soil loads. Foundation walls shall be designed for the lateral soil loads ~~set forth in Section 1610A.~~ *determined by a geotechnical investigation in accordance with Section 1803A.*

1807A.1.2 Unbalanced backfill height. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab on grade is provided and is in contact with the interior surface of the foundation wall, the unbalanced backfill height shall be permitted to be measured from the exterior finish ground level to the top of the interior concrete slab.

1807A.1.3 Rubble stone foundation walls. *Not permitted by OSHPD.* ~~Foundation walls of rough or random rubble stone shall not be less than 16 inches (406 mm) thick. Rubble stone shall not be used for foundation walls of structures assigned to Seismic Design Category C, D, E or F.~~

1807A.1.4 Permanent wood foundation systems. *Not permitted by OSHPD.* Permanent wood foundation systems shall be designed and installed in accordance with AWC PWF. Lumber and plywood shall be treated in accordance with AWPA U1 (Commodity Specification A, Use Category 4B and Section 5.2) and shall be identified in accordance with Section 2303A.1.9.1.

1807A.1.5 Concrete and masonry foundation walls. Concrete and masonry foundation walls shall be designed in accordance with Chapter 19A or 21A, as applicable.

Exception: Concrete and masonry foundation walls shall be permitted to be designed and constructed in accordance with Section 1807.1.6.

1807.1.6 Prescriptive design of concrete and masonry foundation walls. Concrete and masonry foundation walls that are laterally supported at the top and bottom shall be permitted to be designed and constructed in accordance with this section.

1807.1.6.1 Foundation wall thickness. The thickness of prescriptively designed foundation walls shall not be less than the thickness of the wall supported, except that foundation walls of at least 8-inch (203 mm) nominal width shall be permitted to support brick-veneered frame walls and 10-inch-wide (254 mm) cavity walls provided the requirements of Section 1807.1.6.2 or 1807.1.6.3 are met.

1807.1.6.2 Concrete foundation walls. Concrete foundation walls shall comply with the following:

1. The thickness shall comply with the requirements of Table 1807.1.6.2.
2. The size and spacing of vertical reinforcement shown in Table 1807.1.6.2 are based on the use of reinforcement with a minimum yield strength of 60,000 psi (414 Mpa). Vertical reinforcement with a minimum yield strength of 40,000 psi (276 Mpa) or 50,000 psi (345 Mpa) shall be permitted, provided the same size bar is used and the spacing shown in the table is reduced by multiplying the spacing by 0.67 or 0.83, respectively.

**TABLE 1807.1.6.2
CONCRETE FOUNDATION WALLS^{b,c}**

(Deleted Table not shown for clarity)

3. Vertical reinforcement, when required, shall be placed nearest the inside face of the wall a distance, d , from the outside face (soil face) of the wall. The distance, d , is equal to the wall thickness, t , minus 1.25 inches (32 mm) plus one-half the bar diameter, db , [$d = t - (1.25 + db / 2)$]. The reinforcement shall be placed within a tolerance of $\pm 3/8$ inch (9.5 mm) where d is less than or equal to 8 inches (203 mm) or $\pm 1/2$ inch (12.7 mm) where d is greater than 8 inches (203 mm).
4. In lieu of the reinforcement shown in Table 1807.1.6.2, smaller reinforcing bar sizes with closer spacings that provide an equivalent cross-sectional area of reinforcement per unit length shall be permitted.
5. Concrete cover for reinforcement measured from the inside face of the wall shall not be less than $3/4$ inch (19.1 mm). Concrete cover for reinforcement measured from the outside face of the wall shall not be less than 1 1/2 inches (38 mm) for No. 5 bars and smaller, and not less than 2 inches (51 mm) for larger bars.
6. Concrete shall have a specified compressive strength, f_c' , of not less than 2,500 psi (17.2 MPa).
7. The unfactored axial load per linear foot of wall shall not exceed $1.2 t f_c'$ where t is the specified wall thickness in inches.

1807.1.6.2.1 Seismic requirements. Based on the seismic design category assigned to the structure in accordance with Section 1613, concrete foundation walls designed using Table 1905.1.7 shall be subject to the following limitations:

1. *Seismic Design Categories A and B.* No additional seismic requirements, except provide reinforcement around openings in accordance with Section 1909.6.3.
2. *Seismic Design Categories C, D, E and F.* Tables shall not be used except as allowed for plain concrete members in Section 1908.1.8.

1807.1.6.3 Masonry foundation walls. Masonry foundation walls shall comply with the following:

1. The thickness shall comply with the requirements of Table 1807.1.6.3(1) for plain masonry walls or Table 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4) for masonry walls with reinforcement.
2. Vertical reinforcement shall have a minimum yield strength of 60,000 psi (414 Mpa).
3. The specified location of the reinforcement shall equal or exceed the effective depth distance, d , noted in Tables 1807.1.6.3(2), 1807.1.6.3(3) and 1807.1.6.3(4) and shall be measured from the face of the exterior (soil) side of the wall to the center of the vertical reinforcement. The reinforcement shall be placed within the tolerances specified in TMS 602/ACI 530.1/ASCE 6, Article 3.3.B.11 of the specified location.

TABLE 1807.1.6.3(1)
PLAIN MASONRY FOUNDATION WALLS^{a,b,e}

(Deleted Table not shown for clarity)

4. Grout shall comply with Section 2103.12.
5. Concrete masonry units shall comply with ASTM C 90.
6. Clay masonry units shall comply with ASTM C 652 for hollow brick, except compliance with ASTM C 62 or ASTM C 216 shall be permitted where solid masonry units are installed in accordance with Table 1807.1.6.3(1) for plain masonry.
7. Masonry units shall be laid in running bond and installed with Type M or S mortar in accordance with Section 2103.2.1.
8. The unfactored axial load per linear foot of wall shall not exceed $1.2 t f'_m$ where t is the specified wall thickness in inches and f'_m is the specified compressive strength of masonry in pounds per square inch.
9. At least 4 inches (102 mm) of solid masonry shall be provided at girder supports at the top of hollow masonry unit foundation walls.
10. Corbeling of masonry shall be in accordance with Section 2104.2. Where an 8-inch (203 mm) wall is corbelled, the top corbel shall not extend

TABLE 1807.1.6.3(2)
8-INCH MASONRY FOUNDATION WALLS WITH REINFORCEMENT WHERE $d \geq 5$ INCHES^{a,b,e}

(Deleted Table not shown for clarity)

higher than the bottom of the floor framing and shall be a full course of headers at least 6 inches (152 mm) in length or the top course bed joint shall be tied to the vertical wall projection. The tie shall be W2.8 (4.8 mm) and spaced at a maximum horizontal distance of 36 inches (914 mm). The hollow space behind the corbelled masonry shall be filled with mortar or grout.

1807.1.6.3.1 Alternative foundation wall reinforcement. In lieu of the reinforcement provisions for masonry foundation walls in Table 1807.1.6.3(2), 1807.1.6.3(3) or 1807.1.6.3(4), alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per linear foot (mm) of wall shall be permitted to be used, provided the spacing of reinforcement does not exceed 72 inches (1829 mm) and reinforcing bar sizes do not exceed No. 11.

1807.1.6.3.2 Seismic requirements. Based on the *seismic design category* assigned to the structure in accordance with Section 1613, masonry foundation walls designed using Tables 1807.1.6.3(1) through 1807.1.6.3(4) shall be subject to the following limitations:

1. *Seismic Design Categories A and B.* No additional seismic requirements.
2. *Seismic Design Category C.* A design using Tables 1807.1.6.3(1) through 1807.1.6.3(4) is

TABLE 1807.1.6.3(3)

10-INCH MASONRY FOUNDATION WALLS WITH REINFORCEMENT WHERE $d \geq 6.75$ INCHES^a

^{b, c}

(Deleted Table not shown for clarity)

- subject to the seismic requirements of Section 7.4.3 of TMS 402/ACI 530/ASCE 5.
3. *Seismic Design Category D.* A design using Tables 1807.1.6.3(2) through 1807.1.6.3(4) is subject to the seismic requirements of Section 7.4.4 of TMS 402/ACI 530/ASCE 5.
 4. *Seismic Design Categories E and F.* A design using Tables 1807.1.6.3(2) through 1807.1.6.3(4) is subject to the seismic requirements of Section 7.4.5 of TMS 402/ACI 530/ASCE 5.

TABLE 1807.1.6.3(4)

12-INCH MASONRY FOUNDATION WALLS WITH REINFORCEMENT WHERE $d \geq 8.75$ INCHES^{a, b, c}

(Deleted Table not shown for clarity)

1807A.2 Retaining walls. Retaining walls shall be designed in accordance with Sections 1807A.2.1 through 1807A.2.3. *Freestanding cantilever walls shall be design in accordance with Section 1807A.2.4.*

1807A.2.1 General. Retaining walls shall be designed to ensure stability against overturning, sliding, excessive foundation pressure and water uplift. Where a keyway is extended below the wall base with the intent to engage passive pressure and enhance sliding stability, lateral soil pressures on both sides of the keyway shall be considered in the sliding analysis.

1807A.2.2 Design lateral soil loads. Retaining walls shall be designed for the lateral soil loads set forth in Section 1610, determined by a geotechnical investigation in accordance with Section 1803A and shall not be less than eighty percent of the lateral soil loads determined in accordance with Section 1610A. For use with the load combinations, lateral soil loads due to gravity loads surcharge shall be considered gravity loads and seismic earth pressure increases due to earthquake shall be considered as seismic loads.

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1807A.2.4 Freestanding Cantilever Walls. A stability check against the possibility of overturning shall be performed for isolated spread footings which support freestanding cantilever walls. The stability check shall be made by dividing R_p used for the wall by 2.0. The allowable soil pressure may be doubled for this evaluation.

Exception: For overturning about the principal axis of rectangular footings with symmetrical vertical loading and the design lateral force applied, a triangular or trapezoidal soil pressure distribution which covers the full width of the footing will meet the stability requirement.

...

**SECTION 1808A
FOUNDATIONS**

1808A.1 General. Foundations shall be designed and constructed in accordance with Sections 1808A.2 through 1808A.9. Shallow foundations shall also satisfy the requirements of Section 1809A. Deep foundations shall also satisfy the requirements of Section 1810A.

1808A.2 Design for capacity and settlement. Foundations shall be so designed that the allowable bearing capacity of the soil is not exceeded, and that differential settlement is minimized. Foundations in areas with expansive soils shall be designed in accordance with the provisions of Section 1808A.6.

The enforcing agency may require an analysis of foundation elements to determine subgrade deformations in order to evaluate their effect on the superstructure, including story drift.

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1808A.8 Concrete foundations. The design, materials and construction of concrete foundations shall comply with Sections 1808A.8.1 through 1808A.8.6 and the provisions of Chapter 19A.

~~Exception: Where concrete footings supporting walls of light frame construction are designed in accordance with Table 1809.7, a specific design in accordance with Chapter 19 is not required.~~

...

**TABLE 1808A.8.1
MINIMUM SPECIFIED COMPRESSIVE STRENGTH f'_c OF CONCRETE OR GROUT**

FOUNDATION ELEMENT OR CONDITION	SPECIFIED COMPRESSIVE STRENGTH, f'_c
1. Foundations for structures assigned to Seismic Design Category A, B or C	2,500 psi
2a. Foundations for Group R or U occupancies of light-frame construction, two stories or less in height, assigned to Seismic Design Category D, E or F	2,500 psi
2b-1. Foundations for other structures assigned to Seismic Design Category D, E or F	3,000 psi
3 2. Precast nonprestressed driven piles	4,000 psi
4 3. Socketed drilled shafts	4,000 psi
5 4. Micropiles	4,000 psi
6 5. Precast prestressed driven piles	5,000 psi

For SI: 1 pound per square inch = 0.00689MPa.

...

1808A.8.6 Seismic requirements. See Section 1905A for additional requirements for foundations of structures assigned to *Seismic Design Category C*, D, E or F.

For structures assigned to *Seismic Design Category* D, E or F, provisions of Sections 18.13 of ACI 318 shall apply where not in conflict with the provisions of Sections 1808A through 1810A.

Exceptions:

1. Detached one- and two-family dwellings of light frame construction and two stories or less above grade plane are not required to comply with the provisions of Section 18.13 of ACI 318.

2. Section 18.13.4.3(a) of ACI 318 shall not apply.

...

**SECTION 1809A
SHALLOW FOUNDATIONS**

1809A.1 General. Shallow foundations shall be designed and constructed in accordance with Sections 1809A.2 through 1809A.13.

1809A.2 Supporting soils. Shallow foundations shall be built on undisturbed soil, compacted fill material or controlled low-strength material (CLSM). Compacted fill material shall be placed in accordance with Section 1804A.5. CLSM shall be placed in accordance with Section 1804A.6.

1809A.3 Stepped footings. The top surface of footings shall be level. The bottom surface of footings shall be permitted to have a slope not exceeding one unit vertical in 10 units horizontal (10-percent slope). Footings shall be stepped where it is necessary to change the elevation of the top surface of the footing or where the surface of the ground slopes more than one unit vertical in 10 units horizontal (10-percent slope).

Individual steps in continuous footings shall not exceed 18 inches (457 mm) in height and the slope of a series of such steps shall not exceed 1 unit vertical to 2 units horizontal (50% slope) unless otherwise recommended by a geotechnical report. The steps shall be detailed on the drawings. The local effects due to the discontinuity of the steps shall be considered in the design of the foundation.

...

1809A.7 Prescriptive footings for light-frame construction. *Not permitted by OSHPD.* Where a specific design is not provided, concrete or masonry unit footings supporting walls of light-frame construction shall be permitted to be designed in accordance with Table 1809.7.

**TABLE 1809.7
PRESCRIPTIVE FOOTINGS SUPPORTING WALLS OF LIGHT-FRAME CONSTRUCTION^{a,b,c,d,e}**

(Table not shown for clarity)

1809A.8 Plain concrete footings. *Not permitted by OSHPD.* The edge thickness of plain concrete footings supporting walls of other than light-frame construction shall not be less than 8 inches (203 mm) where placed on soil or rock.

Exception: For plain concrete footings supporting Group R-3 occupancies, the edge thickness is permitted to be 6 inches (152 mm), provided that the footing does not extend beyond a distance greater than the thickness of the footing on either side of the supported wall.

1809A.9 Masonry-unit footings. *Not permitted by OSHPD.* The design, materials and construction of masonry-unit footings shall comply with Sections 1809.9.1 and 1809.9.2, and the provisions of Chapter 21.

Exception: Where a specific design is not provided, masonry unit footings supporting walls of light-frame construction shall be permitted to be designed in accordance with Table 1809.7.

1809.9.1 Dimensions. Masonry unit footings shall be laid in Type M or S mortar complying with Section 2103.8 and the depth shall not be less than twice the projection beyond the wall, pier or column. The width shall not be less than 8 inches (203 mm) wider than the wall supported thereon.

1809.9.2 Offsets. The maximum offset of each course in brick foundation walls stepped up from the footings shall be 1 1/2 inches (38 mm) where laid in single courses, and 3 inches (76 mm) where laid in double courses.

1809A.10 Reserved. Pier and curtain wall foundations. Except in *Seismic Design Categories D, E and F*, pier and curtain wall foundations shall be permitted to be used to support light frame construction not more than two stories above grade plane, provided the following requirements are met:

1. All load-bearing walls shall be placed on continuous concrete footings bonded integrally with the exterior wall footings.
2. The minimum actual thickness of a load-bearing masonry wall shall not be less than 4 inches (102 mm) nominal or 35/8 inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced 6 feet (1829 mm) on center (o.c.).
3. Piers shall be constructed in accordance with Chapter 21 and the following:
 - 3.1. The unsupported height of the masonry piers shall not exceed 10 times their least dimension.
 - 3.2. Where structural clay tile or hollow concrete masonry units are used for piers supporting beams and girders, the cellular spaces shall be filled solidly with concrete or Type M or S mortar.

Exception: Unfilled hollow piers shall be permitted where the unsupported height of the pier is not more than four times its least dimension.

- 3.3. Hollow piers shall be capped with 4 inches (102 mm) of solid masonry or concrete or the cavities of the top course shall be filled with concrete or grout.
4. The maximum height of a 4-inch (102 mm) load-bearing masonry foundation wall supporting wood frame walls and floors shall not be more than 4 feet (1219 mm) in height.
5. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for solid masonry, nor 12 inches (305 mm) for hollow masonry.

...

1809A.12 Timber footings. *Not permitted by OSHPD.* Timber footings shall be permitted for buildings of Type V construction and as otherwise approved by the building official. Such footings shall be treated in accordance with AWP A U1 (Commodity Specification A, Use Category 4B). Treated timbers are not required where placed entirely below permanent water level, or where used as capping for wood piles that project above the water level over submerged or marsh lands. The compressive stresses perpendicular to grain in untreated timber footings supported upon treated piles shall not exceed 70 percent of the allowable stresses for the species and grade of timber as specified in the AF&PA NDS.

...

1809A.14 Pipes and Trenches. Unless otherwise recommended by the soils report, open or backfilled trenches parallel with a footing shall not be below a plane having a downward slope of 1 unit vertical to 2 units horizontal (50% slope) from a line 9 inches (229 mm) above the bottom edge of the footing, and not closer than 18 inches (457 mm) from the face of such footing.

Where pipes cross under footings, the footings shall be specially designed. Pipe sleeves shall be provided where pipes cross through footings or footing walls and sleeve clearances shall provide for possible footing settlement, but not less than 1 inch (25 mm) all around pipe.

Exception: Alternate trench locations and pipe clearances shall be permitted when approved by registered design professional in responsible charge and the enforcement agent.

...

SECTION 1810A DEEP FOUNDATIONS

1810A.1 General. Deep foundations shall be analyzed, designed, detailed and installed in accordance with Sections 1810A.1 through 1810A.4.

...

1810A.3.1.5 Helical piles. Helical piles shall be designed and manufactured in accordance with accepted engineering practice to resist all stresses induced by installation into the ground and service loads.

1810A.3.1.5.1 Helical Piles Seismic Requirements. For structures assigned to Seismic Design Category D, E or F, capacities of helical piles shall be determined in accordance with Section 1810A.3.3 by at least two project specific pre-production tests for each soil profile, size and depth of helical pile. At least two percent of all production piles shall be proof tested to the load determined in accordance with Section 1616A.1.16.

Helical piles shall satisfy corrosion resistance requirements of ICC-ES AC 358. In addition, all helical pile materials that are subject to corrosion shall include at least 1/16" corrosion allowance.

Helical piles shall not be considered as carrying any horizontal loads.

...

1810A.3.2 Materials. The materials used in deep foundation elements shall satisfy the requirements of Sections 1810A.3.2.1 through 1810A.3.2.8, as applicable.

...

1810.3.2.1.2 ACI 318 Equation (25.7.3.3). Where this chapter requires detailing of concrete deep foundation elements in accordance with Section 18.7.5.4 of ACI 318, compliance with Equation (25.7.3.3) of ACI 318 shall not be required.

...

1810A.3.2.4 Timber. Not permitted by OSHPD. Timber deep foundation elements shall be designed as piles or poles in accordance with AF&PA NDS. Round timber elements shall conform to ASTM D 25. Sawn timber elements shall conform to DOC PS-20.

1810.3.2.4.1 Preservative treatment. Timber deep foundation elements used to support permanent structures shall be treated in accordance with this section unless it is established that the tops of the untreated timber elements will be below the lowest ground-water level assumed to exist during the life of the structure. Preservative and minimum final retention shall be in accordance with AWPA U1 (Commodity Specification E, Use Category 4C) for round timber elements and AWPA U1 (Commodity Specification A, Use Category 4B) for sawn timber elements. Preservative-treated timber elements shall be subject to a quality control program administered by an approved agency. Element cutoffs shall be treated in accordance with AWPA M4.

...

1810A.3.3.1.2 Load tests. Where design compressive loads are greater than those determined using the allowable stresses specified in Section 1810A.3.2.6, where the design load for any deep foundation element is in doubt, where driven deep foundation elements are installed by means other than a pile hammer, or where cast-in-place deep foundation elements have an enlarged base formed either by compacting concrete or by

driving a precast base, control test elements shall be tested in accordance with ASTM D 1143 *including Procedure G: Cyclic Loading Test* or ASTM D 4945. At least one element shall be load tested in each area of uniform subsoil conditions. Where required by the building official, additional elements shall be load tested where necessary to establish the safe design capacity. The resulting allowable loads shall not be more than one-half of the ultimate axial load capacity of the test element as assessed by one of the published methods listed in Section 1810A.3.3.1.3 with consideration for the test type, duration and subsoil. The ultimate axial load capacity shall be determined by a registered design professional with consideration given to tolerable total and differential settlements at design load in accordance with Section 1810A.2.3. In subsequent installation of the balance of deep foundation elements, all elements shall be deemed to have a supporting capacity equal to that of the control element where such elements are of the same type, size and relative length as the test element; are installed using the same or comparable methods and equipment as the test element; are installed in similar subsoil conditions as the test element; and, for driven elements, where the rate of penetration (e.g., net displacement per blow) of such elements is equal to or less than that of the test element driven with the same hammer through a comparable driving distance, or where the downward pressure and torque on such elements is greater than or equal to that applied to the test element that determined the ultimate axial load capacity at a comparable driving distance.

...

1810A.3.3.1.5 Uplift capacity of a single deep foundation element. Where required by the design, the uplift capacity of a single deep foundation element shall be determined by an approved method of analysis based on a minimum factor of safety of three or by load tests conducted in accordance with ASTM D 3689. The maximum allowable uplift load shall not exceed the ultimate load capacity as determined in Section 1810A.3.3.1.2, using the results of load tests conducted in accordance with ASTM D3689 *including the Cyclic Loading Procedure*, divided by a factor of safety of two.

Exception: Where uplift is due to wind or seismic loading, the minimum factor of safety shall be two where capacity is determined by an analysis and one and a half where capacity is determined by load tests.

...

1810A.3.3.2 Allowable lateral load. Where required by the design, the lateral load capacity of a single deep foundation element or a group thereof shall be determined by an *approved* method of analysis or by lateral load tests *in accordance with ASTM D3966, including the Cyclic Loading Procedure*, to at least twice the proposed design working load. The resulting allowable load shall not be more than one-half of the load that produces a gross lateral movement of 1 inch (25 mm) at the lower of the top of foundation element and the ground surface, unless it can be shown that the predicted lateral movement shall cause neither harmful distortion of, nor instability in, the structure, nor cause any element to be loaded beyond its capacity.

...

1810A.3.5.3.3 Structural Steel Sheet Piling. Individual sections of structural steel sheet piling shall conform to the profile indicated by the manufacturer, and shall conform to general requirements specified by ASTM A6.

Installation of sheet piling shall satisfy inspection, monitoring, and observation requirements in Sections 1812A.6 and 1812A.7.

...

1810A.3.8.3 Precast prestressed piles. Precast prestressed concrete piles shall comply with the requirements of Sections 1810A.3.8.3.1 through 1810A.3.8.3.3.

...

1810A.3.8.3.2 Seismic reinforcement in Seismic Design Category C. *Not permitted by OSHPD.* For structures assigned to *Seismic Design Category C* in accordance with Section 1613, precast prestressed piles shall have transverse reinforcement in accordance with this section. The volumetric ratio of spiral reinforcement shall not be less than the amount required by the following formula for the upper 20 feet (6096 mm) of the pile.

$$\rho_s = 0.12 f'_c / f_{yh} \text{ (Equation 18-5)}$$

where:

f'_c = Specified compressive strength of concrete, psi (MPa);

f_{yh} = Yield strength of spiral reinforcement $\leq 85,000$ psi (586 MPa);

ρ_s = Spiral reinforcement index (vol. spiral/vol. core).

At least one-half the volumetric ratio required by Equation 18-5 shall be provided below the upper 20 feet (6096 mm) of the pile.

1810A.3.8.3.3 Seismic reinforcement in Seismic Design Categories D through F. For structures assigned to *Seismic Design Category D, E or F*, *in accordance with Section 1613A*, precast prestressed piles shall have transverse reinforcement in accordance with the following:

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This required amount of spiral reinforcement is permitted to be obtained by providing an inner and outer spiral.

...

1810A.3.9.4.2.1 Site Classes A through D. For Site Class A, B, C or D sites, transverse confinement reinforcement shall be provided in the element in accordance with Sections 18.7.5.2, 18.7.5.3 and 18.7.5.4 of ACI 318 within three times the least element dimension at ~~of~~ the bottom of the pile cap. A transverse spiral reinforcement ratio of not less than one-half of that required in Section 18.7.5.4 (a) of ACI 318 shall be permitted *for concrete deep foundation elements*.

1810A.3.9.4.2.2 Site Classes E and F. For Site Class E or F sites, transverse confinement reinforcement shall be provided in the element in accordance with Sections 18.7.5.2, 18.7.5.3 and 18.7.5.4 of ACI 318 within seven times the least element dimension at ~~of~~ the *bottom of the pile cap* and within seven times the least element dimension at ~~of~~ the interfaces of strata that are hard or stiff and strata that are liquefiable or are composed of soft- to medium-stiff clay.

...

1810A.3.10 Micropiles. Micropiles shall be designed and detailed in accordance with Sections 1810A.3.10.1 through 1810A.3.10.4.

...

1810A.3.10.4 Seismic reinforcement. For structures assigned to *Seismic Design Category C*, a permanent steel casing shall be provided from the top of the micropile down to the point of zero curvature. For structures assigned to *Seismic Design Category D, E or F*, the micropile shall be considered as an alternative system in accordance with Section 104.11. The alternative system design, supporting documentation and test data shall be submitted to the *building official* for review and approval.

1810A.3.10.4 Seismic requirements. For structures assigned to *Seismic Design Category D, E, or F*, a permanent steel casing having a minimum thickness of 3/8" shall be provided from the top of the micropile down to a minimum of 120 percent of the point of zero curvature.

Capacity of micropiles shall be determined in accordance with Section 1810A.3.3 by at least two project specific pre-production tests for each soil profile, size and depth of micropile. At least two percent of all production piles shall be proof tested to the load determined in accordance with Section ~~1616A.1.16-1615A.1.10~~.

Steel casing length in soil shall be considered as unbonded and shall not be considered as contributing to friction. Casing shall provide confinement at least equivalent to hoop reinforcing required by ACI 318 Section ~~18.13.4~~, ~~21.12.4~~

Reinforcement shall have Class 1 corrosion protection in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors. Steel casing design shall include at least 1/16" corrosion allowance.

Micropiles shall not be considered as carrying any horizontal loads.

...

1810A.4 Installation. Deep foundations shall be installed in accordance with Section 1810A.4. Where a single deep foundation element comprises two or more sections of different materials or different types spliced together, each section shall satisfy the applicable conditions of installation.

1810A.4.1 Structural integrity. Deep foundation elements shall be installed in such a manner and sequence as to prevent distortion or damage that may adversely affect the structural integrity of adjacent structures or of foundation elements being installed or already in place and as to avoid compacting the surrounding soil to the extent that other foundation elements cannot be installed properly.

...

1810A.4.1.5 Defective timber piles. *Not permitted by OSHPD. Any substantial sudden increase in rate of penetration of a timber pile shall be investigated for possible damage. If the sudden increase in rate of penetration cannot be correlated to soil strata, the pile shall be removed for inspection or rejected.*

...

SECTION 1811A PRESTRESSED ROCK AND SOIL FOUNDATION ANCHORS

1811A.1 General. The requirements of this section address the use of vertical rock and soil anchors in resisting seismic or wind overturning forces resulting in tension on shallow foundations.

1811A.2 Adoption. Except for the modifications as set forth in Sections 1811A.3 and 1811A.4, all Prestressed Rock and Soil Foundation Anchors shall comply with ~~be designed in accordance with~~ PTI Recommendations for Prestressed Rock and Soil Anchors.

1811A.3 Geotechnical Requirements. Geotechnical report for the Prestressed Rock & Soil Foundation Anchors shall address the following:

1. Minimum diameter and minimum spacing for the anchors including consideration of group effects.
2. Maximum unbonded length and minimum bonded length of the tendon.
3. Maximum recommended anchor tension capacity based upon the soil or rock strength / grout bond and anchor depth / spacing.
4. Allowable bond stress at the ground / grout interface and applicable factor of safety for ultimate bond stress.
5. Anchor axial tension stiffness recommendations at the anticipated anchor axial tension displacements, when required for structural analysis.
6. Minimum grout pressure for installation and post-grout pressure.
7. Class I Corrosion Protection is required for all permanent anchors. Geotechnical report shall specify the corrosion protection recommendations for temporary anchors.

8. Performance test shall be at a minimum of 1.6 times the design loads. There shall be a minimum of two preproduction test anchors. Preproduction test anchors shall be tested to ultimate load or 0.80 times the specified minimum tensile strength of the tendon. A Creep test is required for all prestressed anchors with greater than 10 kips of lock-off prestressing load.
9. Lock-off prestressing load requirements.
10. Acceptable Drilling methods.
11. Geotechnical observation and monitoring requirements.

1811A.4 Structural Requirements.

1. Tendons shall be thread-bar anchors conforming to ASTM A722.
2. The anchors shall be placed vertical.
3. Design Loads shall be based upon the load combinations in Section 1605A.3.1 and shall not exceed 60 percent of the specified minimum tensile strength of the tendons.
4. Ultimate Load shall be based upon Section ~~1616A.1.16~~ ~~1615A.1.10~~ and shall not exceed 80 percent of the specified minimum tensile strength of the tendons.
5. The anchor shall be designed to fail in grout bond to the soil or rock before pullout of the soil wedge by group effect.
6. Foundation design shall incorporate the effect of lock-off loads.
7. Design shall account for as-built locations of soil anchors considering all the acceptable construction tolerances.
8. Design shall account for both short and long term deformation.
9. Enforcement agency may require consideration of anchor deformation in evaluating deformation compatibility or building drift where it may be significant.

SECTION 1812A **EARTH RETAINING SHORING**

(Relocated from Section J106.2) ~~J106.2 Earth retaining shoring. [OSHPD 1 & 4]~~

1812A.1 ~~J106.2.1~~ General. The requirements of this section shall apply to temporary and permanent earth retaining shoring using soldier piles and lagging with or without tie-back anchors in soil or rock, only when existing or new ~~OSHPD 1 or 4~~ facilities are affected. Shoring used as construction means and methods only, which does not affect existing or new ~~OSHPD 1 or 4~~ facilities, are not regulated by this section ~~OSHPD~~ and shall satisfy the requirements of the authorities having jurisdiction.

Design, construction, testing, and inspection shall satisfy the requirements of this code except as modified in Sections 1812A.2 ~~J106.2.2~~ through ~~J106.2.8~~ 1812A.8.

1812A.2 ~~J106.2.2~~ Duration. Shoring shall be considered temporary when elements of the shoring will be exposed to site conditions for a period of less than one (1) year, and shall be considered permanent otherwise. Permanent shoring shall account for the increase in lateral soil pressure due to earthquake. At the end of the construction period, the existing and new structures shall not rely on the temporary shoring for support in anyway. Wood components shall not be used for permanent shoring lasting more than two (2) years. Wood components of the temporary shoring that may affect the performance of permanent structure shall be removed after the shoring is no longer required.

All components of the shoring shall have corrosion protection or preservative treatment for their expected duration. Wood components of the temporary shoring that will not be removed shall be treated in accordance with AWPA U1 (Commodity Specification A, Use Category 4B and Section 5.2), and shall be identified in accordance with Section 2303.1.9.1 ~~2303.1.8.1~~.

1812A.3 ~~J106.2.3~~ Surcharge. Surcharge pressure due to footings, traffic, or other sources shall be considered in design. If the footing surcharge is located within the semi-circular distribution or

bulb of earth pressure (when shoring is located close to a footings), lagging shall be designed for lateral earth pressure due to footing surcharge. Soil arching effects may be considered in the design of lagging. Underpinning of the footing may be used in lieu of designing the shoring and lagging for surcharge pressure. Alternatively, continuously contacting drilled pier shafts near the footings shall be permitted. The lateral surcharge design pressure shall be derived using Boussinesq equations modified for the distribution of stresses in an elastic medium due to a uniform, concentrated or line surface load as appropriate and soil arching effects.

1812A.4 J406.2.4 Design and testing. Except for the modifications as set forth in Sections 1812A.4.1 J406.2.4.1 and J406.2.4.2 through 1812A.4.3 below, all Prestressed Rock and Soil Tie-back Anchors shall be designed and tested in accordance comply with PTI Recommendations for Prestressed Rock and Soil Anchors (PTI-2004).

1812A.4.1 J406.2.4.1 Geotechnical requirements. The geotechnical report for the earth retaining shoring shall address the following:

1. Minimum diameter and minimum spacing for the anchors including consideration of group effects.
2. Maximum unbonded length and minimum bonded length of the tie-back anchors.
3. Maximum recommended anchor tension capacity based upon the soil or rock strength / grout bond and anchor depth / spacing.
4. Allowable bond stress at the ground / grout interface and applicable factor of safety for ultimate bond stress for the anchor. For permanent anchors, a minimum factor of safety of 2.0 shall be applied to ground soil interface as required by PTI-2004 Section 6.6.
5. Minimum grout pressure for installation and post-grout pressure for the anchor. The presumptive post grout pressure of 300 psi may be used for all soil type.
6. Class I Corrosion Protection is required for all permanent anchors. The geotechnical report shall specify the corrosion protection recommendations for temporary anchors.
7. Performance test for the anchors shall be at a minimum of two (2) times the design loads and shall not exceed 80% of the specified minimum tensile strength of the anchor rod. A creep test is required for all prestressed anchors that are performance tested. All production anchors shall be tested at 150% of design loads and shall not be greater than 70% of the specified minimum tensile strength of the anchor rod.
8. Earth pressure, surcharge pressure, and the seismic increment of earth pressure loading, when applicable.
9. Maximum recommended lateral deformation at the top of the soldier pile, at the tie-back anchor locations, and the drilled pier concrete shafts at the lowest grade level.
10. Allowable vertical soil bearing pressure, friction resistance, and lateral passive soil resistance for the drilled pier concrete shafts and associated factors of safety for these allowable capacities.
11. Soil-pier shaft / pile interaction assumptions and lateral soil stiffness to be used in design for drilled pier concrete shaft or pile lateral loads.
12. Acceptable drilling methods.
13. Geotechnical observation and monitoring recommendations.

1812A.4.2 J406.2.4.2 Structural requirements:

1. Tendons shall be thread-bar anchors conforming to ASTM A 722.
2. Anchor design loads shall be based upon the load combinations in Section 1605A.3.1 and shall not exceed 60 percent of the specified minimum tensile strength of the tendons.
3. The anchor shall be designed to fail in grout bond to the soil or rock before pullout of the soil wedge.

4. Design of shoring system shall account for as-built locations of soil anchors considering all specified construction tolerances in Section 1812A.8 J406.2-8.
5. Design of shoring system shall account for both short and long term deformation.

1812A.4.3 J406.2.4.3 Testing of tie-back anchors:

1. The geotechnical engineer shall keep a record at job site of all test loads, total anchor movement, and report their accuracy.
2. If a tie-back anchor initially fails the testing requirements, the anchor shall be permitted to be re-grouted and retested. If anchor continues to fail, the followings steps shall be taken:
 - a. The contractor shall determine the cause of failure – variations of the soil conditions, installation methods, materials, etc.
 - b. Contractor shall propose a solution to remedy the problem. The proposed solution will need to be reviewed and approved by geotechnical engineer, shoring design engineer, and the building official.
3. After a satisfactory test, each anchor shall be locked-off in accordance with Section 8.4 of PTI 2004.
4. The shoring design engineer shall specify design loads for each anchor.

1812A.5 J406.2.5 Construction: The construction procedure shall address the following:

1. Holes drilled for piles / tie-back anchors shall be done without detrimental loss of ground, sloughing or caving of materials and without endangering previously installed shoring members or existing foundations.
2. Drilling of earth anchor shafts for tie-backs shall occur when the drill bench reaches two to three feet below the level of the tie-back pockets.
3. Casing or other methods shall be used where necessary to prevent loss of ground and collapse of the hole.
4. The drill cuttings from earth anchor shaft shall be removed prior to anchor installation.
5. Unless tremie methods are used, all water and loose materials shall be removed from the holes prior to installing piles / tie-backs.
6. Tie-back anchor rods with attached centralizing devices shall be installed into the shaft or through the drill casing. Centralizing device shall not restrict movement of the grout.
7. After lagging installation, voids between lagging and soil shall be backfilled immediately to the full height of lagging.
8. The soldier piles shall be placed within specified tolerances in the drilled hole and braced against displacement during grouting. Fill shafts with concrete up to top of footing elevation, rest of the shaft can generally be filled with lean concrete. Excavation for lagging shall not be started until concrete has achieved sufficient strength for all anticipated loads as determined by the shoring design engineer.
9. Where boulders and / or cobbles have been identified in the geotechnical reports, contractor shall be prepared to address boulders and / or cobbles that may be encountered during the drilling of soldier piles and Tie-back anchors.
10. The grouting equipment shall produce grout free of lumps and indispensed cement. The grouting equipment shall be sized to enable the grout to be pumped in continuous operation. The mixer shall be capable of continuously agitating the grout.
11. The quantity of grout and grout pressure shall be recorded. The grout pressure shall be controlled to prevent excessive heave in soils or fracturing rock formations.
12. If post-grouting is required, post grouting operation shall be performed after initial grout has set for 24-hours in the bond length only. Tie-backs shall be grouted over a sufficient length (anchor bond length) to transfer the maximum anchor force to the anchor grout.
13. Testing of anchors may be performed after post-grouting operations provided grout has reached strength of 3,000 psi as required by PTI-2004 Section 6.11.
14. Anchor rods shall be tensioned straight and true. Excavation directly below the anchors shall not continue before those anchors are tested.

1812A.6 J106.2.6 Inspection, survey monitoring, and observation

1. The shoring design engineer or his designee shall make periodic inspections of the job site for the purpose of observing the installation of shoring system, testing of tie-back anchors, and monitoring of survey.
2. Testing, inspection, and observation shall be in accordance with testing, inspection and observation requirements approved by the building official. The following activities and materials shall be tested, inspected, or observed by the special inspector and geotechnical engineer:
 - a. Sampling and testing of concrete in soldier pile and tie-back anchor shafts.
 - b. Fabrication of tie-back anchor pockets on soldier beams
 - c. Installation and testing of tie-back anchors.
 - d. Survey monitoring of soldier pile and tie-back load cells.
 - e. Survey Monitoring of existing buildings.
3. A complete and accurate record of all soldier pile locations, depths, concrete strengths, tie-back locations and lengths, tie-back grout strength, quantity of concrete per pile, quantity of grout per tie-back and applied tie-back loads shall be maintained by the special inspector and geotechnical engineer. The shoring design engineer shall be notified of any unusual conditions encountered during installation.
4. Calibration data for each test jack, pressure gauge, and master pressure gauge shall be verified by the special inspector and geotechnical engineer. The calibration tests shall be performed by an independent testing laboratory and within 120 calendar days of the data submitted.
5. Monitoring points shall be established at the top and at the anchor heads of selected soldier piles and at intermediate intervals as considered appropriate by the geotechnical engineer.
6. Control points shall be established outside the area of influence of the shoring system to ensure the accuracy of the monitoring readings.
7. The periodic basis of shoring monitoring, as a minimum, shall be as follows:
 - a. Initial monitoring shall be performed prior to any excavation.
 - b. Once excavation has begun, the periodic readings shall be taken weekly until excavation reaches the estimated subgrade elevation and the permanent foundation is complete.
 - c. If performance of the shoring is within established guidelines, shoring design engineer may permit the periodic readings to be bi-weekly. Once initiated, bi-weekly readings shall continue until the building slab at ground floor level is completed and capable of transmitting lateral loads to the permanent structure. Thereafter, readings can be monthly.
 - d. Where the building has been designed to resist lateral earth pressures, the periodic monitoring of the soldier piles and adjacent structure can be discontinued once the ground floor diaphragm and subterranean portion of the structure is capable of resisting lateral soil loads and approved by the shoring design engineer, geotechnical engineer, and the building official.
 - e. Additional readings shall be taken when requested by special inspector, shoring design engineer, geotechnical engineer, or the building official.
8. Monitoring reading shall be submitted to shoring design engineer, engineer in responsible charge, and the building official within 3 working days after they are conducted. Monitoring readings shall be accurate to within 0.01 feet. Results are to be submitted in tabular form showing at least the initial date of monitoring and reading, current monitoring date and reading and difference between the two readings.
9. If the total cumulative horizontal or vertical movement (from start of construction) of the existing buildings reaches 1/2" or soldier piles reaches 1" all excavation activities shall be suspended. The geotechnical and shoring design engineer shall determine the cause of movement, if any, and recommend corrective measures, if necessary, before excavation continues.
10. If the total cumulative horizontal or vertical movement (from start of construction) of the existing buildings reaches 3/4" or soldier piles reaches 1 1/2" all excavation activities shall be

suspended until the causes, if any, can be determined. Supplemental shoring shall be devised to eliminate further movement and the building official shall review and approve the supplemental shoring before excavation continues.

11. **Monitoring of Tie-back Anchor Loads:**
 - a. Load cells shall be installed at the tie-back heads adjacent to buildings at maximum interval of 50', with a minimum of one load cells per wall.
 - b. Load cell readings shall be taken once a day during excavation and once a week during the remainder of construction.
 - c. Load cell readings shall be submitted to the geotechnical engineer, shoring design engineer, engineer in responsible charge, and the building official.
 - d. Load cell readings can be terminated once the temporary shoring no longer provides support for the buildings.

1812A.7 J406.2.7 Monitoring of existing OSHPD 1 and 4 structures

1. The contractor shall complete a written and photographic log of all existing OSHPD 1 & 4 structures within 100 ft or three times depth of shoring, prior to construction. A licensed surveyor shall document all existing substantial cracks in adjacent existing structures.
2. Contractor shall document existing condition of wall cracks adjacent to shoring walls prior to start of construction.
3. Contractor shall monitor existing walls for movement or cracking that may result from adjacent shoring.
4. If excessive movement or visible cracking occurs, contractor shall stop work and shore / reinforce excavation and contact shoring design engineer and the building official.
5. Monitoring of the existing structure shall be at reasonable intervals as required by the registered design professional subject to approval of the building official. Monitoring shall be performed by a licensed surveyor and shall consist of vertical and lateral movement of the existing structures. Prior to starting shoring installation a pre-construction meeting shall take place between the contractor, shoring design engineer, surveyor, geotechnical engineer, and the building official to identify monitoring locations on existing buildings.
6. If in the opinion of the building official or shoring design engineer, monitoring data indicate excessive movement or other distress, all excavation shall cease until the geotechnical engineer and shoring design engineer investigates the situation and makes recommendations for remediation or continuing.
7. All reading and measurements shall be submitted to the building official and shoring design engineer.

1812A.8 J406.2.8 Tolerances. Following tolerances shall be specified on the construction documents.

1. **Soldier Piles:**
 - i. Horizontal and vertical construction tolerances for the soldier pile locations.
 - ii. Soldier pile plumbness requirements (angle with vertical line).
2. **Tie-back Anchors:**
 - i. Allowable deviation of anchor projected angle from specified vertical and horizontal design projected angle.
 - ii. Anchor clearance to the existing/new utilities and structures.

(Relocated from Section J112)

Section 1813A J442

Vibro Stone Columns for Ground Improvement

1813A.1 J412.1 General. [OSHPD 1, 2, & 4] This section shall apply to Vibro Stone Columns (VSCs) for ground improvement using unbounded aggregate materials. Vibro stone column provisions in this section are intended to increase bearing capacity, reduce settlements, and mitigate liquefaction for shallow foundations. These requirements shall not be used for grouted or bonded stone columns, ground improvement for deep foundation elements, or changing site class. VSCs shall not be considered as a deep foundation element.

Ground improvement shall be installed under the entire building/structure footprint and not under isolated foundation elements only.

Design, construction, testing, and inspection shall satisfy the requirements of this code except as modified in Sections 1813A.2 J412.2 through J412.5 1813A.5.

1813A.2 J412.2 Geotechnical Report. The geotechnical report shall specify vibro stone column requirements to ensure uniformity in total and differential immediate settlement, long term settlement, and earthquake induced settlement.

1. Soil compaction shall be sufficient to mitigate potential for liquefaction as described in California Geological Survey (CGS) Special Publication 117A (SP-117A): Guidelines for Evaluating and Mitigating Seismic Hazard in California.
2. Area replacement ratio for the compaction elements and the basis of its determination shall be explained. Minimum factor of safety for soil compaction shall be in accordance with SP-117A.
3. Depth of soil compaction elements and extent beyond the footprint of structures/foundation shall be defined. Extent beyond the foundation shall be half the depth of the VSCs with a minimum of 10' or an approved alternative.
4. Minimum diameter and maximum spacing of soil compaction elements shall be specified. VSC's shall not be less than 2 feet in diameter and center to center spacing shall not exceed 8 feet.
5. The modulus of subgrade reactions for shallow foundations shall account for the presence of compaction elements.
6. The modulus of subgrade reactions, long-term settlement, and post-earthquake settlement shall be specified along with expected total and differential settlements for design.
7. The acceptance criteria for ~~Friction Cone and Piezocone Penetration Testing Cone Penetration Test (CPT)~~ in accordance with ASTM D 5778 ~~3441~~ complemented by Standard Penetration Test (SPT) in accordance with ASTM D 1586, if necessary, to verify soil improvement shall be specified
8. The requirements for special inspection and observation by the Geotechnical engineer shall be specified.
9. A Final Verified Report (FVR) documenting the installation of the ground improvement system and confirming that the ground improvement acceptance criteria have been met shall be prepared by the Geotechnical Engineer and submitted to the enforcement agency for review and approval.

1813A.3 J412.3 Shallow Foundations. VSCs under the shallow foundation shall be located symmetrically around the centroid of the footing or load.

1. There shall be a minimum of four stone columns under each isolated or continuous/combined footing or approved equivalent.
2. The VSCs or deep foundation elements shall not be used to resist tension or overturning uplift from the shallow foundations.

3. *The foundation design for the shallow foundation shall consider the increased vertical stiffness of the VSCs as point supports for analysis, unless it is substantiated that the installation of the VSCs result in improvement of the surrounding soils such that the modulus of subgrade reaction, long term settlement, and post-earthquake settlement can be considered uniform throughout.*

1813A.4 J412.4 Installation. *VSCs shall be installed with vibratory probes. Vertical columns of compacted unbounded aggregate shall be formed through the soils to be improved by adding gravel near the tip of the vibrator and progressively raising and re-penetrating the vibrator which will results in the gravel being pushed into the surrounding soil.*

Gravel aggregate for VSCs shall be well graded with a maximum size of 6" and not more than 10% smaller than 3/8" after compaction.

1813A.5 J412.5 Construction Documents. *Construction documents for VSCs, as a minimum, shall include the following:*

1. *Size, depth, and location of VSCs.*
2. *Extent of soil improvements along with building/structure foundation outlines.*
3. *Field verification requirements and acceptance criteria using CPT/SPT.*
4. *The locations where CPT/SPT shall be performed.*
5. *The Testing, Inspection and Observation (TIO) program shall indicate the inspection and observation required for the VSCs.*

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 19 CONCRETE

SECTION 1901 GENERAL

1901.1 Scope. The provisions of this chapter shall govern the materials, quality control, design and construction of concrete used in structures.

...

1901.3 Anchorage to concrete. Anchorage to concrete shall be in accordance with ACI 318 as amended in Section 1905, and applies to cast-in (headed bolts, headed studs and hooked J- or L-bolts, post installed expansion (torque controlled and displacement-controlled), undercut and adhesive anchors.

1901.3.1 ~~1908.1.1~~ Power Actuated Fasteners. [OSHPD 2] *Power actuated fasteners qualified in accordance with ICC-ES AC 70 shall be deemed to satisfy the requirements of ASCE 7 Section 13.4.5 ~~this section.~~*

Power actuated fasteners shall be permitted in seismic shear for components exempt from construction documents review by ASCE 7 Section 13.1.4 and for interior non-bearing non-shear wall partitions only. Power actuated fastener shall not be used to anchor seismic bracing, exterior cladding or curtain wall systems.

Exception: *Power actuated fasteners in steel to steel connections prequalified for seismic application by cyclic tests in accordance with ICC-ES AC 70 shall be permitted for seismic design.*

1901.3.2 ~~1909.1.1~~ **Mechanical Anchors and Specialty Inserts. [OSHPD 2]** *Mechanical anchors qualified in accordance with ICC-ES AC 193 shall be deemed to satisfy the requirements of this section.*

Specialty inserts, including cast-in-place specialty inserts, tested in accordance with ICC-ES AC 493 AC 232 or AC 446 shall be deemed to satisfy the requirements of this section.

1901.3.3 ~~1909.1.2~~ **Post-Installed Adhesive Anchors. [OSHPD 2]** *Adhesive anchors qualified in accordance with ICC-ES AC 308 shall be deemed to satisfy the requirements of this section.*

1901.3.4 ~~1909.2~~ **Tests for Post-Installed Anchors in Concrete. [OSHPD 2]** *When post-installed anchors are used in lieu of cast-in place bolts, the installation verification test loads, frequency, and acceptance criteria shall be in accordance with this section.*

1901.3.4.1 ~~1909.2.1~~ **General.** *Test loads or torques and acceptance criteria shall be shown on the construction documents.*

If any anchor fails testing, all anchors of the same type shall be tested, which are installed by the same trade, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency.

1901.3.4.2 ~~1909.2.5~~ **Testing Procedure.** *The test procedure shall be as permitted by an approved test report using criteria adopted in this code. All ~~other~~ post-installed anchors shall be tension tested.*

Exception: *Torque controlled post installed anchors shall be permitted to be tested using torque based on an approved test report using criteria adopted in this code.*

Alternatively, ~~A~~ manufacturer's recommendation for testing may be approved by the enforcement agency based on an approved test report using criteria adopted in this code.

1901.3.4.3 ~~1909.2.3~~ **Test Frequency.** *When post-installed anchors are used for sill plate bolting applications, 10 percent of the anchors shall be tested.*

When post-installed anchors are used for other structural applications, all such anchors shall be ~~tension~~ tested.

When post-installed anchors are used for nonstructural applications such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tested.

The testing of the post-installed anchors shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.

Exceptions:

1. *Undercut anchors that allow visual confirmation of full set shall not require testing.*
2. *Where the factored design tension on anchors is less than 100 lbs. and those anchors are clearly noted on the approved construction documents, only 10 percent of those anchors shall be tested.*
3. *Where adhesive anchor systems are used to install reinforcing dowel bars in*

hardened concrete, only 25% of the dowels shall be tested if all of the following conditions are met:

- a. The dowels are used exclusively to transmit shear forces across joints between existing and new concrete.
- b. The number of dowels in any one member equals or exceeds twelve (12).
- c. The dowels are uniformly distributed across seismic force resisting members (such as shear walls, collectors, and diaphragms).

Anchors to be tested shall be selected at random by the special inspector/Inspector Of Record (IOR).

4. Testing of shear dowels across cold joints in slabs on grade, where the slab is not part of the lateral force-resisting system shall not be required.
5. Testing is not required for power actuated fasteners used to attach tracks of interior non-shear wall partitions for shear only, where there are at least three fasteners per segment of track.

1901.3.4.4 1909.2.2 Test Loads. Required test loads shall be determined by one of the following methods:

1. Twice the maximum allowable tension load or one and a quarter (1- 1/4) times the maximum design strength of anchors as provided in approved test report using criteria adopted in this code or determined in accordance with Chapter 17 Appendix D of ACI 318.

Tension test load need not exceed 80% of the nominal yield strength of the anchor element ($= 0.8 A_{se} f_{ya}$).

2. The manufacturer's recommended installation torque based on approved test report using criteria adopted in this code.

1901.3.4.5 1909.2.4 Test Acceptance Criteria. Acceptance criteria for post-installed anchors shall be based on approved test report using criteria adopted in this code. Field test shall satisfy following minimum requirements.

1. Hydraulic Ram Method:

Anchors tested with a hydraulic jack or spring loaded devices shall maintain the test load for a minimum of 15 seconds and shall exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut.

For adhesive anchors, where other than bond is being tested, the testing device shall not restrict the concrete shear cone type failure mechanism from occurring.

2. Torque Wrench Method:

Torque controlled post installed A anchors tested with a calibrated torque wrench shall must attain the specified torque within ½ turn of the nut; or one-quarter (1/4) turn of the nut for a 3/8 in. sleeve anchor only.

Exceptions:—

- a. ~~Wedge or Sleeve type:—~~
~~One-quarter (1/4) turn of the nut for a 3/8 in. sleeve anchor only.~~

b. Threaded Type:

One-quarter (1/4) turn of the screw after initial seating of the screw head.

...

**(Relocated to Section 1901.3) SECTION 1908
ANCHORAGE TO CONCRETE—
ALLOWABLE STRESS DESIGN**

1908.1.1 Power Actuated Fasteners. [OSHPD 2] *Power actuated fasteners qualified in accordance with ICC-ES AC 70 shall be deemed to satisfy the requirements of this section.*

Power actuated fasteners shall be permitted in seismic shear for components exempt from construction documents review by ASCE 7 Section 13.1.4 and for interior non-bearing non-shear wall partitions. Power actuated fastener shall not be used to anchor exterior cladding or curtain wall systems.

...

**(Relocated to Section 1901.3) SECTION 1909
ANCHORAGE TO CONCRETE—
STRENGTH DESIGN**

...

1909.1.1 Mechanical Anchors and Specialty Inserts. [OSHPD 2] *Mechanical anchors qualified in accordance with ICC-ES AC 193 shall be deemed to satisfy the requirements of this section.*

Specialty inserts, including cast-in-place specialty inserts, tested in accordance with ICC-ES AC 193 shall be deemed to satisfy the requirements of this section.

1909.1.2 Post-Installed Adhesive Anchors. [OSHPD 2] *Adhesive anchors qualified in accordance with ICC-ES AC 308 shall be deemed to satisfy the requirements of this section.*

1909.2 Tests for Post-Installed Anchors in Concrete. [OSHPD 2] *When post-installed anchors are used in lieu of cast-in-place bolts, the installation verification test loads, frequency, and acceptance criteria shall be in accordance with this section.*

1909.2.1 General. *Test loads or torques and acceptance criteria shall be shown on the construction documents.*

If any anchor fails testing, all anchors of the same type shall be tested, which are installed by the same trade, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency.

1909.2.2 Test Loads. *Required test loads shall be determined by one of the following methods:*

1. *Twice the maximum allowable tension load or one and a quarter (1 1/4) times the maximum design strength of anchors as provided in approved test report using criteria adopted in this code or determined in accordance with Appendix D of ACI 318.*

Tension test load need not exceed 80% of the nominal yield strength of the anchor element ($= 0.8 A_{se} f_{ya}$).

2. *The manufacturer's recommended installation torque based on approved test report using criteria adopted in this code.*

1909.2.3 Test Frequency. *When post-installed anchors are used for sill-plate bolting applications, 10 percent of the anchors shall be tested.*

~~When post-installed anchors are used for other structural applications, all such anchors shall be tension tested.~~

~~When post-installed anchors are used for nonstructural applications such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tested.~~

~~The testing of the post-installed anchors shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.~~

Exceptions:

- ~~1. Undercut anchors that allow visual confirmation of full set shall not require testing.~~
- ~~2. Where the factored design tension on anchors is less than 100 lbs. and those anchors are clearly noted on the approved construction documents, only 10 percent of those anchors shall be tested.~~
- ~~3. Where adhesive anchor systems are used to install reinforcing dowel bars in hardened concrete, only 25% of the dowels shall be tested if all of the following conditions are met:
 - ~~a. The dowels are used exclusively to transmit shear forces across joints between existing and new concrete.~~
 - ~~b. The number of dowels in any one member equals or exceeds twelve (12).~~
 - ~~c. The dowels are uniformly distributed across seismic force resisting members (such as shear walls, collectors, and diaphragms).~~~~

~~Anchors to be tested shall be selected at random by the special inspector/Inspector Of Record (IOR).~~

- ~~4. Testing of shear dowels across cold joints in slabs on grade, where the slab is not part of the lateral force-resisting system shall not be required.~~
- ~~5. Testing is not required for power actuated fasteners used to attach tracks of interior non-shear wall partitions for shear only, where there are at least three fasteners per segment of track.~~

~~**1909.2.4 Test Acceptance Criteria.** Acceptance criteria for post-installed anchors shall be based on approved test report using criteria adopted in this code. Field test shall satisfy following minimum requirements.~~

~~2. Hydraulic Ram Method:~~

~~Anchors tested with a hydraulic jack or spring loaded devices shall maintain the test load for a minimum of 15 seconds and shall exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut.~~

~~For adhesive anchors, where other than bond is being tested, the testing device shall not restrict the concrete shear cone type failure mechanism from occurring.~~

~~2. Torque Wrench Method:~~

~~Anchors tested with a calibrated torque wrench must attain the specified torque within ½ turn of the nut~~

Exceptions: —

a. ~~Wedge or Sleeve type:~~

~~One-quarter (1/4) turn of the nut for a 3/8 in. sleeve anchor only.~~

b. ~~Threaded Type:~~

~~One-quarter (1/4) turn of the screw after initial seating of the screw head.~~

~~**1909.2.5 Testing Procedure.** Test procedure shall be as permitted by approved test report using criteria adopted in this code. Torque controlled post installed anchors shall be permitted to be tested using torque based on approved test report using criteria adopted in this code. All other post installed anchors shall be tension tested. Manufacturer's recommendation for testing may be approved by the enforcement agency based on approved test report using criteria adopted in this code.~~

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850

CHAPTER 19A CONCRETE

Italics are used for text within Sections 1903A through 1905A of this code to indicate provisions that differ from ACI 318. State of California amendments in these sections are shown in italics and underlined.

...

SECTION 1901A GENERAL

1901A.1 Scope. The provisions of this chapter shall govern the materials, quality control, design and construction of concrete used in structures.

1901A.1.1 Application. *The scope of application of Chapter 19A is as follows:*

1. **(Reserved for DSA).**
2. *Applications listed in Sections 1.10.1, and 1.10.4, regulated by the Office of Statewide Health Planning and Development (OSHDP). These applications include hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers.*

Exception: **[OSHDP 2]** *Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 19 and any applicable amendments therein.*

1901A.1.2 Amendments in this chapter. *OSHDP adopt this chapter and all amendments.*

Exception: *Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:*

1. **(Reserved for DSA).**
2. *Office of Statewide Health Planning and Development.*
[OSHDP 1] - *For applications listed in Section 1.10.1.*
[OSHDP 4] - *For applications listed in Section 1.10.4.*

...

1901A.5 Construction documents. The *construction documents* for structural concrete construction shall include:

1. The specified compressive strength of concrete at the stated ages or stages of construction for which each concrete element is designed.
2. The specified strength or grade of reinforcement.
3. The size and location of structural elements, reinforcement and anchors.
4. Provision for dimensional changes resulting from creep, shrinkage and temperature.
5. The magnitude and location of prestressing forces.
6. Anchorage length of reinforcement and location and length of lap splices.
7. Type and location of mechanical and welded splices of reinforcement.
8. Details and location of contraction or isolation joints specified for plain concrete.
9. Minimum concrete compressive strength at time of posttensioning.
10. Stressing sequence for post-tensioning tendons.
11. For structures assigned to *Seismic Design Category D, E or F*, a statement if slab on grade is designed as a structural diaphragm.
12. *Openings larger than 12 inches (305 mm) in any dimension shall be detailed on the structural drawings.*

...

1901.6 Special inspections and tests. Special inspections and tests of concrete elements of buildings and structures and concreting operations shall be as required by Chapter 17A and Section 1910A.

...

SECTION 1903A SPECIFICATIONS FOR TESTS AND MATERIALS

1903A.1 General. Materials used to produce concrete, concrete itself and testing thereof shall comply with the applicable standards listed in ACI 318.

...

1903A.2 Special Inspections. *Where required, special inspections and tests shall be in accordance with Chapter 17A and Section 1910A.1913A.*

...

1903A.4 Flat wall insulating concrete form (ICF) systems. *Insulating concrete form material used for forming flat concrete walls shall conform to ASTM E 2634. OSHPD 1 & 41 Not Permitted by OSHPD.*

1903A.4 Reporting Requirements – *Modify ACI 318 Section 3.2.1 by adding the following:*

Each component (a) through (g), when present, as a percentage of total cementitious materials shall be reported for each mix design.

1903A.5 1903A.6 Aggregates - *Modify ACI 318 Section ~~3.3.2~~ 26.4.1.2.1(a).(1) as follows: by adding the following:*

Aggregate size limitations waiver shall be approved by the enforcement agency.

Evidence that the aggregate used is not reactive in the presence of alkalis may be required by the enforcement agency. If new aggregate sources are to be used or if past experience indicates problems with existing aggregate sources, test the aggregate for potential alkali-silica reactivity in accordance with to ASTM C 1260 or C 1293 to determine the potential alkali-silica reactivity of the aggregate. If the results indicate an expansion greater than 0.10 percent at 16-days age with ASTM C 1260, or an expansion greater than 0.04 percent at 12 months age with ASTM C 1293,

provide mitigation with one of the cementitious material systems noted below such that an expansion of less than 0.10 percent at 16-days age is obtained with ASTM C 1567:

1. Low alkali portland cement containing not more than 0.6 percent total alkali when calculated as sodium oxide, as determined by the method given in ASTM C 114.
2. Blended hydraulic cement, Type IS or IP, conforming to ASTM C 595, except that Type IS cement shall not contain less than 40 percent slag cement.
3. Replacement of not less than 15 percent by weight of the portland cement with a pozzolan conforming to ASTM C 618 for Class N or F materials (Class C is not permitted).
4. Replacement of not less than 40 percent by weight of the portland cement with slag cement conforming to ASTM C 989.
5. Replacement of not less than 5 percent nor more than 10 percent by weight of Portland cement with silica fume conforming to ASTM C 1240.
6. Replacement of portland cement with a ternary blend of portland cement, slag cement and pozzolan such that the resulting blend contains not more than 70 percent portland cement.

ASTM C 1567 test shall be performed separately on the fine and coarse aggregate with one requiring the higher percentage of supplementary cementitious materials dictating the required replacement.

ASTM C 1260, ASTM C 1293 and ASTM C 1567 tests must have been performed within the past three years.

- (1) **Normal weight aggregate:** Aggregate shall be non-reactive as determined by one of the methods in ASTM C33 Appendix X1: Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate. Aggregates deemed to be deleterious or potentially deleterious may be used with the addition of a material that has been shown to prevent harmful expansion in accordance with Appendix X1 of ASTM C 33, when approved by the building official.

1903A.6 1903A.5 Fly Ash [OSHPD 1 & 4] Limits on Cementitious Materials. Add Modify ACI 318 Section 26.4.2.2(b) and Table 26.4.2.2(b) 3.2.3 as follows:

Fly ash or other pozzolan can be used as a partial substitute for ASTM C 150 portland cement, as follows:

1. Fly ash or other pozzolan shall conform to ASTM C 618 for Class N or Class F materials (Class C is not permitted), and
2. More than 15 percent by weight of fly ash or other pozzolans shall be permitted to be substituted for ASTM C 150 portland cement if the mix design is proportioned per ACI 318 Section 5.3. See Section 1904A for durability requirements.
3. More than 40 percent by weight of ground granulated blast furnace slag conforming to ASTM C 989 shall be permitted to be substituted for ASTM C 150 portland cement if the mix design is proportioned per ACI 318 Section 5.3. See Section 1904A for durability requirements.

The maximum percentage of pozzolans, including fly ash and silica fume, and slag cement in concrete assigned to all exposure categories shall be in accordance with Table 26.4.2.2(b) and (1) and (2).

Where pozzolans are used as cementitious materials, duration for minimum specified compressive strength of concrete (f'_c) that exceeds 28-days shall be considered an alternative system.

1903A.7 ~~1903A.7~~ **Discontinuous Steel Fibers fiber reinforcement** - Not permitted. –Modify ACI 318 Section 3.5.1 by adding the following:

Discontinuous steel fibers are not permitted.

1903A.8 ~~1903A.8~~ **Welding of reinforcing bars** - Modify ACI 318 Section 3.5.2 26.6.4.1(b) by adding the following:

If mill test reports are not available, chemical analysis shall be made of bars representative of the bars to be welded. Bars with a carbon equivalent (C.E.) above 0.75 shall not be welded. Welding shall not be done on or within two bar diameters of any bent portion of a bar that has been bent cold. Welding of crossing bars shall not be permitted for assembly of reinforcement unless authorized by the structural engineer and approved by the enforcement agency per approved procedures.

Shop fusion welded stirrup/tie cage (or spiral assemblies) consisting of low-alloy steel reinforcing stirrups/ties conforming to ASTM A706 and longitudinal holding wires, conforming to ASTM A1064 shall be permitted. The fusion welds shall be made by machines using electric resistance welds. Tack welding of primary reinforcing bars together or to stirrups/ties is not permitted. Fusion welding of holding wires is not permitted on any portion of a reinforcing bar that is or will be bent in accordance with ACI 318 Section 25.3.

...

SECTION 1904A DURABILITY REQUIREMENTS

...

1904A.1 Structural concrete. Structural concrete shall conform to the durability requirements of ACI 318.

Exception: For Group R-2 and R-3 occupancies not more than three stories above grade plane, the specified compressive strength, f'_c , for concrete in basement walls, foundation walls, exterior walls and other vertical surfaces exposed to the weather shall be not less than 3,000 psi (20.7 MPa).

...

SECTION 1905A MODIFICATIONS TO ACI 318

1905A.1 General. The text of ACI 318 shall be modified as indicated in Sections 1905A.1.1 through ~~1905.1.24~~ 1905A.1.16.

1905.1.1 ACI 318, Section 2.3. Modify existing definitions and add the following definitions to ACI 318, Section 2.3.

DESIGN DISPLACEMENT. Total lateral displacement expected for the design-basis earthquake, as specified by Section 12.8.6 of ASCE 7.

DETAILED PLAIN CONCRETE STRUCTURAL WALL. A wall complying with the requirements of Chapter 14, including 14.6.2.

ORDINARY PRECAST STRUCTURAL WALL. A precast wall complying with the requirements of Chapters 1 through 13, 15, 16 and 19 through 26.

ORDINARY REINFORCED CONCRETE STRUCTURAL WALL. A cast-in-place wall complying with the requirements of Chapter 14, excluding 14.6.2.

ORDINARY STRUCTURAL PLAIN CONCRETE WALL. A wall complying with the requirements of Chapter 22, excluding 22.6.7.

SPECIAL STRUCTURAL WALL. A cast-in-place or precast wall complying with the requirements of 18.2.4 through 18.2.8, 18.10 and 18.11, as applicable, in addition to the requirements for ordinary reinforced concrete structural walls or ordinary precast structural walls, as applicable. Where ASCE 7 refers to a "special reinforced concrete structural wall," it shall be deemed to mean a "special structural wall."

1905A.1.1 1905A.1.14 ACI 318 Section 4.12.2.2 18.2.4. Modify ACI 318 Section 4.12.2.2 18.2.4 by adding the following:

Where prestressed concrete elements are restrained from movement, an analysis of the stresses in the prestressed elements and loads in the adjoining structural system induced by the above-described effects shall be made in accordance with PCI Design Handbook, 7TH Edition.

1905A.1.2 1905A.1.13 ACI 318, Section 4.12.2.3 18.2.3. Modify ACI 318 Section 4.12.2.3 18.2.3 by adding the following:

For prestressed concrete members with recessed or dapped ends, an analysis of the connections shall be made in accordance with procedures given in PCI Design Handbook, 7TH Edition.

1905A.1.3 1905A.1.6 ACI 318, Section 9.6.1.3. 10.5.3. Modify ACI 318 Section 9.6.1.3. 10.5.3 by adding the following:

This section shall not be used for members that resist seismic loads, except that reinforcement provided for foundation elements for one-story wood-frame or one-story light steel buildings need not be more than one-third greater than that required by analysis for all loading conditions.

1905A.1.4 1905A.1.8 ACI 318, Section 11.2.4.1 14.2.6. Replace ACI 318 Section 11.2.4.1 14.2.6 as follows:

11.2.4.1 14.2.6 - Walls shall be anchored to intersecting elements such as floors or roofs; or to columns, pilasters, buttresses, or intersecting walls; and footings with reinforcement at least equivalent to No. 4 bars at 12 inches (305 mm) on center for each layer of reinforcement.

1905A.1.5 1905A.1.11 ACI 318 Section 11.7.6 16.11.7. Add Section 11.7.6 16.11.7 to ACI 318 as follows:

11.7.6 16.11.7 - Reinforcement. Perimeters of precast walls shall be reinforced continuously with a minimum of one No. 5 bar extending the full height and width of the wall panel. Bars shall be continuous around corners. Where wall panels do not connect to abut columns or other wall panels to develop at least 75 percent of the horizontal wall steel as noted below, vertical perimeter bars shall be retained by hooked wall bars. Edges of openings in precast walls shall be reinforced with a minimum of one No. 5 bar continuous past corners sufficient to develop the bar.

A continuous tie or bond beam shall be provided at the roof line either as a part of the roof structure or part of the wall panels as described in the next paragraph below. This tie may be designed as the edge member of the roof diaphragm but, in any case, shall not be less than equivalent to two No. 6 bars continuous. A continuous tie equivalent to two No. 5 bars minimum shall also be provided either in the footing or with an enlarged section of the floor slab.

Wall panels of shear wall buildings shall be connected to columns or to each other in such a manner as to develop at least 75 percent of the horizontal wall steel. No more than $H/2$ half of this continuous horizontal reinforcing shall ~~may~~ be concentrated in bond or tie beams at the top and bottom of the walls and at points of intermediate lateral support. If possible, cast in-place joints with reinforcing bars extending from the panels into the joint a sufficient distance to meet the splice requirements of ACI 318 Section ~~25.5.2 42-45~~ for Class A shall be used. The reinforcing bars or welded tie details shall not be spaced over eight times the wall thickness vertically nor fewer than four used in the wall panel height. Where wall panels are designed for their respective overturning forces, the panel connections need not comply with the requirements of this paragraph.

~~Where splicing of reinforcement must be made at points of maximum stress or at closer spacing than permitted by ACI 318 Section 7.6, welding may be used when the entire procedure is suitable for the particular quality of steel used and the ambient conditions. Unless the welds develop 125 percent of the specified yield strength of the steel used, reinforcement in the form of continuous bars or fully anchored dowels shall be added to provide 25 percent excess steel area and the welds shall develop not less than the specified yield strength of the steel.~~

Exception: Nonbearing, nonshear panels such as nonstructural architectural cladding panels or column covers are not required to meet the provisions of this Section.

1905A.1.6 ~~1905A.1.10~~ ACI 318, Section 11.9. 44.9. Modify ACI 318 by adding Section 11.9.44.9 as follows:

11.9.44.9 - Foundation Walls. Horizontal reinforcing of concrete foundation walls for wood-frame or light-steel buildings shall consist of the equivalent of not less than one No. 5 bar located at the top and bottom of the wall. Where such walls exceed 3 feet (914 mm) in height, intermediate horizontal reinforcing shall be provided at spacing not to exceed 2 feet (610 mm) on center. Minimum vertical reinforcing shall consist of No. 3 bars at 24 inches (610 mm) on center.

Where concrete foundation walls or curbs extend above the floor line and support wood-frame or light-steel exterior, bearing or shear walls, they shall be doweled to the foundation wall below with a minimum of No. 3 bars at 24 inches (610 mm) on center. Where the height of the wall above the floor line exceeds 18 inches (457 mm), the wall above and below the floor line shall meet the requirements of ACI 318 Section 11.6 and 11.7. ~~44.3.~~

1905A.1.7 ACI 318, Section 12.7.3. Add Section 12.7.3.4 to ACI 318 as follows:

1905A.1.20 ACI 318, Section 21.11.7. Modify ACI 318 Section 21.11.7 by adding Section 21.11.7.7 as follows:

~~21.11.7.7 – Where boundary members are not required by ACI 318 Section 21.11.7.5, minimum reinforcement parallel to the edges of all diaphragms and the boundaries of all openings shall consist of twice the cross-sectional area of the minimum shear reinforcement required per linear foot of diaphragm.~~

12.7.3.4 – At least two No. 5 bars in diaphragms having two layers of reinforcement in both directions and one No. 5 bar in diaphragms having a single layer of reinforcement in both directions shall be provided around openings larger than 12 inches in any dimension in addition to the minimum reinforcement required by Section 12.6.

1905A.1.8 ~~1905A.1.21~~ (Chapter 19, Section 1905.1.8) ACI 318, Section 17.2.3. Modify ACI 318 Sections 17.2.3.4.2, 17.2.3.4.3(d) and 17.2.3.5.2 to read as follows:

17.2.3.4.2 - Where the tensile component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor tensile force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.2.3.4.3. The anchor design tensile strength shall be determined in accordance with 17.2.3.4.4.

Exception: *Anchors designed to resist wall out-of-plane forces with design strengths equal to or greater than the force determined in accordance with ASCE 7 Equation 12.11-1 or 12.14-10 and Section 1604A.8.2 of this code shall be deemed to satisfy Section 17.2.3.4.3(d).*

17.2.3.4.3(d) - The anchor or group of anchors shall be designed for the maximum tension obtained from design load combinations that include **E**, with **E** increased by Ω_0 . The anchor design tensile strength shall be calculated from 17.2.3.4.4.

17.2.3.5.2 – Where the shear component of the strength-level earthquake force applied to anchors exceeds 20 percent of the total factored anchor shear force associated with the same load combination, anchors and their attachments shall be designed in accordance with 17.2.3.5.3. The anchor design shear strength for resisting earthquake forces shall be determined in accordance with 17.5.

Exceptions:

1. For the calculation of the in-plane shear strength of anchor bolts attaching wood sill plates of bearing or non-bearing walls of light-frame wood structures to foundations or foundation stem walls, the in-plane design shear strength in accordance with 17.5.2 and 17.5.3 need not be computed and 17.2.3.5.3 shall be deemed to be satisfied provided all of the following are met:

1.1. The allowable in-plane shear strength of the anchor is determined in accordance with AWC NDS Table 11E for lateral design values parallel to grain.

1.2. The maximum anchor nominal diameter is $\frac{5}{8}$ inches (16 mm).

1.3. Anchor bolts are embedded into concrete a minimum of 7 inches (178 mm).

1.4. Anchor bolts are located a minimum of $1\frac{3}{4}$ inches (45 mm) from the edge of the concrete parallel to the length of the wood sill plate.

1.5. Anchor bolts are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the wood sill plate.

1.6. The sill plate is 2-inch or 3-inch nominal thickness.

2. For the calculation of the in-plane shear strength of anchor bolts attaching cold-formed steel track of bearing or non-bearing walls of anchor bolts attaching cold-formed steel track of bearing or non-bearing walls of light-frame construction to foundations or foundation stem walls the in-plane design shear strength in accordance with 17.5.2 and 17.5.3 need not be computed and 17.2.3.5.3 shall be deemed to be satisfied provided all of the following are met:

2.1. The maximum anchor nominal diameter is $\frac{5}{8}$ inches (16 mm).

2.2. Anchors are embedded into concrete a minimum of 7 inches (178 mm).

2.3. Anchors are located a minimum of $1\frac{3}{4}$ inches (45 mm) from the edge of the concrete parallel to the length of the track.

2.4. Anchors are located a minimum of 15 anchor diameters from the edge of the concrete perpendicular to the length of the track.

2.5. The track is 33 to 68 mil designation thickness.

Allowable in-plane shear strength of exempt anchors, parallel to the edge of concrete shall be permitted to be determined in accordance with AISI S100 Section E3.3.1.

3. In light-frame construction, bearing or nonbearing walls, shear strength of concrete anchors less than or equal to $\frac{5}{8}$ 1" inch [16mm] in diameter attaching sill plate or track to foundation or foundation stem wall need not satisfy 17.2.3.5.3(a) through (c) when the design strength of the anchors is determined in accordance with 17.5.2.1(c).

1905A.1.9 1905A.1.1 ACI 318, Table 19.2.1.1 Section 5.1.1. Modify ACI 318 Table 19.2.1.1 Section 5.1.1 as follows.

For concrete designed and constructed in accordance with this chapter, f'_c , shall not be less than 3,000 psi (20.7 MPa). Reinforced normal weight concrete with specified compressive strength higher than 8,000 psi (55 MPa) shall require prior approval of structural design method and acceptance criteria by the enforcement agency.

1905A.1.3 ACI 318, Section 8.13.5. Replace ACI 318 Section 8.13.5 as follows:

~~8.13.5 – Permanent burned clay or concrete tile fillers shall be considered only as forms and shall not be included in the calculations involving shear or bending moments.~~

~~The thickness of the concrete slab on the permanent fillers shall be designed as described in ACI 318 Section 8.13.6 as modified in Section 1905A.1.4.~~

1905A.1.4 ACI 318, Section 8.13.6. Replace ACI 318 Section 8.13.6 as follows:

~~8.13.6 – Where removable forms or fillers are used, the thickness of the concrete slab shall not be less than 1/12 of the clear distance between joists and in no case less than 2 1/2 inches (64 mm). Such slab shall be reinforced at right angles to the joists with at least the amount of reinforcement required for flexure, considering load concentrations, if any, but in no case shall the reinforcement be less than that required by ACI 318 Section 7.12.~~

1905A.1.5 ACI 318, Section 8.13. Add Section 8.13.9 to ACI 318 as follows:

~~8.13.9 Concrete bridging. Concrete bridging shall be provided as follows: one near the center of spans for 20 to 30 feet (6096 mm to 9144 mm) spans and two near the third points of spans over 30 feet (9144 mm). Such bridging shall be either:~~

~~(a) A continuous concrete web having a depth equal to the joist and a width not less than 3 1/2 inches (89 mm) reinforced with a minimum of one No. 4 bar in the top and bottom; or~~

~~(b) Any other concrete element capable of transferring a concentrated load of 1,000 pounds (4.5 kN) from any joist to the two adjacent joists.~~

~~Such bridging shall not be required in roof framing if an individual member is capable of carrying dead load plus a concentrated load of 1,500 pounds (6.7 kN) at any point.~~

1905A.1.7 ACI 318, Section 12.14.3. Add Section 12.14.3.6 to ACI 318 as follows:

~~12.14.3.6 – Welded splices and mechanical connections shall maintain the clearance and coverage requirements of ACI Sections 7.6 and 7.7.~~

1905A.1.9 ACI 318, Section 14.5 - Empirical design method. Not permitted by OSHPD.

1905A.1.12 ACI 318, Section 17.5.1. Modify ACI 318 Section 17.5.1 by adding Sections 17.5.1.1 and 17.5.1.2 as follows:

17.5.1.1 - Full transfer of horizontal shear forces may be assumed when all of the following are satisfied:

1. Contact surfaces are clean, free of laitance, and intentionally roughened to full amplitude of approximately 1/4 inch (6.4 mm);
2. Minimum ties are provided in accordance with ACI 318 Section 17.6;
3. Web members are designed to resist total vertical shear, and
4. All shear reinforcement is fully anchored into all interconnected elements.

17.5.1.2 - If any of the requirements of ACI 318 Section 17.5.1.1 is not satisfied, horizontal shear shall be investigated in accordance with ACI 318 Section 17.5.3 or 17.5.4.

1905.1.2 ACI 318, Section 18.2.1. Modify ACI 318 Sections 18.2.1.2 and 18.2.1.6 to read as follows:

18.2.1.2 - Structures assigned to Seismic Design Category A shall satisfy requirements of Chapters 1 through 17 and 19 through 26; Chapter 18 does not apply. Structures assigned to Seismic Design Category B, C, D, E or F also shall satisfy 18.2.1.3 through 18.2.1.7, as applicable. Except for structural elements of plain concrete complying with Section 1905.1.7 of the International Building Code, structural elements of plain concrete are prohibited in structures assigned to Seismic Design Category C, D, E or F.

18.2.1.6 - Structural systems designated as part of the seismic force-resisting system shall be restricted to those permitted by ASCE 7. Except for Seismic Design Category A, for which Chapter 18 does not apply, the following provisions shall be satisfied for each structural system designated as part of the seismic force-resisting system, regardless of the Seismic Design Category:

- (a) Ordinary moment frames shall satisfy 18.3.
- (b) Ordinary reinforced concrete structural walls and ordinary precast structural walls need not satisfy any provisions in Chapter 18.
- (c) Intermediate moment frames shall satisfy 18.4.
- (d) Intermediate precast structural walls shall satisfy 18.5.
- (e) Special moment frames shall satisfy 18.6 through 18.9.
- (f) Special structural walls shall satisfy 18.10.
- ((g) Special structural walls constructed using precast concrete shall satisfy 18.11.

All special moment frames and special structural walls shall also satisfy 18.2.4 through 18.2.8.

1905A.1.18 ACI 318, Section 21.9.4. Modify ACI 318 by adding Section 21.9.4.6 as follows:

21.9.4.6 - Walls and portions of walls with $P_u > 0.35P_g$ shall not be considered to contribute to the calculated strength of the structure for resisting earthquake-induced forces. Such walls shall conform to the requirements of ACI 318 Section 21.13.

1905A.1.10 (Chapter 19, Section 1905.1.3) (Reserved for DSA) 1905.1.3 ACI 318, Section 18.5. Modify ACI 318, Section 18.5, by adding new Section 18.5.2.2 and renumbering existing Sections 18.5.2.2 and 18.5.2.3 to become 18.5.2.3 and 18.5.2.4, respectively:

~~18.5.2.2—Connections that are designed to yield shall be capable of maintaining 80 percent of their design strength at deformation induced by the design displacement or shall use type 2 mechanical splices.~~

~~18.5.2.3—Elements of the connection that are not designed to yield shall develop at least 1.5 S_y .~~

~~18.5.2.4—In structures assigned to SDC D, E or F, Wall piers shall be designed in accordance with 18.10.8 or 18.14 in ACI 318.~~

1905A.1.11 ~~1905A.1.17~~ ACI 318, Section 18.10.6.5 ~~21.9.2.2~~. Modify ACI 318, Section 18.10.6.5 ~~21.9.2.2~~ by adding the following:

~~(c) Where boundary members are not required by ACI 318 Section 18.10.6.2 or 18.10.6.3, 21.9.6, minimum reinforcement parallel to the edges of all structural walls and the boundaries of all openings shall consist of twice the cross-sectional area of the minimum shear reinforcement required per lineal foot of wall. Horizontal extent of boundary element shall be per in accordance with ACI 318 Section 18.10.6.4 (a), (b) and (c). 21.9.6.4 (a) & (b).~~

1908.1.4 ACI 318, Section 18.11. Modify ACI 318, Section 18.11.2.1, to read as follows:

18.11.2.1—Special structural walls constructed using precast concrete shall satisfy all the requirements of 18.10 for cast-in-place special structural walls in addition to Section 18.5.2.

1905A.1.12 ~~1905A.1.19~~ ACI 318, Section 18.12.6 ~~21.11.4~~. Add Section 18.12.6.2 to ACI 318 as follows: ~~Modify ACI 318 Section 21.11.4 by adding the following:~~

~~18.12.6.2 Collector and boundary elements in topping slabs placed over precast floor and roof elements shall not be less than 3 inches (76 mm) or 6 d_b thick, where d_b is the diameter of the largest reinforcement in the topping slab.~~

1905A.1.13 (Chapter 19, Section 1905.1.5) ~~1905.1.5~~ ACI 318, Section 18.13.1.1. Modify ACI 318, Section 18.13.1.1, to read as follows:

18.13.1.1 – Foundations resisting earthquake-induced forces or transferring earthquake-induced forces between a structure and ground shall comply with the requirements of Section 18.13 and other applicable provisions of ACI 318 **~~unless modified by Chapter 18A of the California Building Code.~~**

1905.1.6 ACI 318, Section 14.6. Modify ACI 318, Section 14.6, by adding new Section 14.6.2 to read as follows:

~~14.6.2.1—Detailed plain concrete structural walls.~~

~~14.6.2.1—Detailed plain concrete structural walls are walls conforming to the requirements of ordinary structural plain concrete walls and 14.6.2.2.~~

~~14.6.2.2—Reinforcement shall be provided as follows:~~

~~(a) Vertical reinforcement of at least 0.20 square inch (129 mm²) in cross-sectional area shall be provided continuously from support to support at each corner, at each side of each opening and at the ends of walls. The continuous vertical bar required beside an opening is permitted to substitute for one of the two No. 5 bars required by 14.6.1.~~

~~(b) Horizontal reinforcement at least 0.20 square inch (129 mm²) in cross-sectional area shall be provided:~~

~~1. Continuously at structurally connected roof and floor levels and at the top of walls;~~

~~2. At the bottom of load-bearing walls or in the top of foundations where doweled to the wall; and~~

~~3. At a maximum spacing of 120 inches (3048 mm).~~

Reinforcement at the top and bottom of openings, where used in determining the maximum spacing specified in Item 3 above, shall be continuous in the wall.

1905.1.7 ACI 318, Section 14.1.4. Delete ACI 318, Section 14.1.4, and replace with the following:
 14.1.4 – Plain concrete in structures assigned to Seismic Design Category C, D, E or F.

14.1.4.1 – Structures assigned to Seismic Design Category C, D, E or F shall not have elements of structural plain concrete, except as follows:

(a) Structural plain concrete basement, foundation or other walls below the base are permitted in detached one- and two-family dwellings three stories or less in height constructed with stud-bearing walls. In dwellings assigned to Seismic Design Category D or E, the height of the wall shall not exceed 8 feet (2438 mm), the thickness shall not be less than 7 1/2 inches (190 mm), and the wall shall retain no more than 4 feet (1219 mm) of unbalanced fill. Walls shall have reinforcement in accordance with 14.6.1.

(b) Isolated footings of plain concrete supporting pedestals or columns are permitted, provided the projection of the footing beyond the face of the supported member does not exceed the footing thickness.

Exception: In detached one- and two-family dwellings three stories or less in height, the projection of the footing beyond the face of the supported member is permitted to exceed the footing thickness.

(c) Plain concrete footings supporting walls are permitted, provided the footings have at least two continuous longitudinal reinforcing bars. Bars shall not be smaller than No. 4 and shall have a total area of not less than 0.002 times the gross cross-sectional area of the footing. For footings that exceed 8 inches (203 mm) in thickness, a minimum of one bar shall be provided at the top and bottom of the footing. Continuity of reinforcement shall be provided at corners and intersections.

Exceptions:

1. In Seismic Design Category A, B, and C, detached one- and two-family dwellings three stories or less in height and constructed with stud-bearing walls, plain concrete footings without longitudinal reinforcement supporting walls are permitted.
2. For foundation systems consisting of a plain concrete footing and a plain concrete stemwall, a minimum of one bar shall be provided at the top of the stemwall and at the bottom of the footing.
3. Where a slab on ground is cast monolithically with the footing, one No. 5 bar is permitted to be located at either the top of the slab or bottom of the footing.

1905A.1.14 ACI 318, Table 21.2.2. Replace Table 21.2.2 as follows:

Table 21.2.2 – Strength reduction factor ϕ for moment, axial force, or combined moment and axial force

Net tensile strain ϵ_t	Classification	ϕ			
		Type of transverse reinforcement			
		Spirals conforming to 25.7.3		Other	
$\epsilon_t \leq \epsilon_{ty}$	Compression-controlled	0.75	(a)	0.65	(b)
$\epsilon_{ty} < \epsilon_t < 0.005$	Transition ^{[1][2]}	$0.75 + 0.15 \frac{\epsilon_t - \epsilon_{ty}}{\epsilon_t^* - \epsilon_{ty}}$	(c)	$0.65 + 0.25 \frac{\epsilon_t - \epsilon_{ty}}{\epsilon_t^* - \epsilon_{ty}}$	(d)
$\epsilon_t \geq 0.005$	Tension-controlled ^[3]	0.9	(e)	0.9	(f)

^[1]For sections classified as Transition, it shall be permitted to use ϕ corresponding to compression-controlled sections.

^[2] ϵ_t^* is the greater of net tensile strain calculated for $P_n = 0.1A_g f'_c$ and 0.005.

^[3] For sections with factored axial compression force $P_u \geq 0.1A_g f'_c$, ϕ shall be calculated using equation (c) or (d) for sections classified as Transition, as applicable.

1905A.1.15 ~~1905A.1.15~~ **ACI 318, Section 24.2.1** ~~18.2.7~~. Add Section 24.2.1.1 18.2.7 to ACI 318 as follows:

24.2.1.1 - Span to Depth Ratio. Prestressed Beam and Slab Span to Depth ratios for continuous prestressed concrete members shall not exceed the following, except when calculations of deflections and vibration effects prove that greater values may be used without adverse effects:

Beams	30
One-way Slabs	40
Two-way Floor Slabs.....	40
Two-way Roof Slabs	44

These ratios should be decreased for special conditions such as heavy loads and simple spans.

Maximum deflection criteria shall be in accordance with ACI 318 Section 24.2.2. 9.5.

1905A.1.16 ~~1905A.1.2~~ **ACI 318, Section 5.6.2.1** ~~26.12.2.1(a)~~. Replace ACI 318 Section 5.6.2.1 26.12.2.1(a) by the following.

26.12.2.1(a) 5.6.2.1 Samples for strength tests of each class of concrete placed each day shall be taken not less than once a day, or not less than once for each 50 cubic yards (345m³) of concrete, or not less than once for each 2,000 square feet (186 m²) of surface area for slabs or walls. Additional samples for seven-day compressive strength tests shall be taken for each class of concrete at the beginning of the concrete work or whenever the mix or aggregate is changed.

SECTION 1906A STRUCTURAL PLAIN CONCRETE

Not permitted by OSHPD.

1906.1 Scope. The design and construction of structural plain concrete, both cast-in-place and precast, shall comply with the minimum requirements of ACI 318, as modified in Section 1905.

Exception: For Group R-3 occupancies and buildings of other occupancies less than two stories above grade plane of light frame construction, the required footing thickness of ACI 318 is permitted to be reduced to 6 inches (152 mm), provided that the footing does not extend more than 4 inches (102 mm) on either side of the supported wall.

...

SECTION 1908A SHOTCRETE

1908A.1 General. Shotcrete is mortar or concrete that is pneumatically projected at high velocity onto a surface. Except as specified in this section, shotcrete shall conform to the requirements of this chapter for plain or reinforced concrete and the provisions of ACI 506. The specified compressive strength of shotcrete shall not be less than 3,000 psi (20.69 MPa).

Concrete or masonry to receive shotcrete shall have the entire surface thoroughly cleaned and roughened by sand blasting, and just prior to receiving shotcrete, shall be thoroughly cleaned of all debris, dirt and dust. Concrete and masonry shall be wetted before shotcrete is deposited, but not so wet as to overcome suction. Sand for sand blasting shall be clean, sharp and uniform in size, with no particles that will pass a 50-mesh screen.

...

1908A.3 Aggregate. Coarse aggregate, if used, shall not exceed $\frac{3}{4}$ inch (19.1 mm).

For shear walls, when total rebar in any direction is more than $0.31 \text{ in}^2 / \text{ft.}$ or rebar size is larger than # 5, shotcrete shall conform to course aggregate grading No. 2 per Table 1.1 of ACI 506.

...

1908A.5 Preconstruction tests. ~~Where preconstruction test are required by Section 1908.4, a~~ A test panel shall be shot, cured, cored or sawn, examined and tested prior to commencement of the project. The sample panel shall be representative of the project and simulate job conditions as closely as possible. The panel thickness and reinforcing shall reproduce the thickest and most congested area specified in the structural design. It shall be shot at the same angle, using the same nozzleman and with the same concrete mix design that will be used on the project. The equipment used in preconstruction testing shall be the same equipment used in the work requiring such testing, unless substitute equipment is *approved* by the *building official*. Reports of preconstruction tests shall be submitted to the *building official* as specified in Section 1704A.5.

...

1908A.7 Joints. Except where permitted herein, unfinished work shall not be allowed to stand for more than 30 minutes unless edges are sloped to a thin edge. For structural elements that will be under compression and for construction joints shown on the approved construction documents, square joints are permitted. Before placing additional material adjacent to previously applied work, sloping and square edges shall be cleaned and wetted.

The film of laitance which forms on the surface of the shotcrete shall be removed within approximately two hours after application by brushing with a stiff broom. If this film is not removed within two hours, it shall be removed by thorough wire brushing or sand blasting. Construction joints over eight hours old shall be thoroughly cleaned with air and water prior to receiving shotcrete.

...

1908A.10 Strength tests. Strength tests for shotcrete shall be made *in accordance with ASTM C1604 standards* by an approved agency on specimens that are representative of the work and which have been water soaked for at least 24 hours prior to testing. When the maximum-size aggregate is larger than $\frac{3}{8}$ inch (9.5 mm), specimens shall consist of not less than three 3-inch-diameter (76 mm) cores or 3-inch (76 mm) cubes. When the maximum-size aggregate is $\frac{3}{8}$ inch (9.5 mm) or smaller, specimens shall consist of not less than 2-inch-diameter (51 mm) cores or 2-inch (51 mm) cubes.

1908A.10.1 Sampling. Specimens shall be taken from the in-place work or from test panels, and shall be taken at least once each shift, but not less than one for each 50 cubic yards (38.2 m^3) of shotcrete.

1908A.10.2 Panel criteria. When the maximum-size aggregate is larger than $\frac{3}{8}$ inch (9.5 mm), the test panels shall have minimum dimensions of 18 inches by 18 inches (457 mm by 457 mm). When the maximum-size aggregate is $\frac{3}{8}$ inch (9.5 mm) or smaller, the test panels shall have minimum dimensions of 12 inches by 12 inches (305 mm by 305 mm). Panels shall be shot in the same position as the work, during the course of the work and by the nozzle men doing the work. The conditions under which the panels are cured shall be the same as the work. *Approval from the enforcement agency shall be obtained prior to performing the test panel method.*

...

1908A.11 ~~1910A.11~~ Forms and Ground Wires for Shotcrete. *Forms for shotcrete shall be substantial and rigid. Forms shall be built and placed so as to permit the escape of air and rebound.*

Adequate ground wires, which are to be used as screeds, shall be placed to establish the thickness, surface planes and form of the shotcrete work. All surfaces shall be rodded to these wires.

1908A.12 ~~1910A.12~~ Placing. Shotcrete shall be placed in accordance with ACI 506.

(Relocated to Section 2514) SECTION 1911A
-REINFORCED GYPSUM CONCRETE

1911A.1 General. Reinforced gypsum concrete shall comply with the requirements of ASTM C 317 and ASTM C 956. ~~Reinforced gypsum concrete shall be considered as an alternative system.~~

...

(Amendments in the CBC 2013 Sections 1908A and 1909A are deleted except those relocated as noted below, since model code deleted those sections)

(Relocated to Section 1616A.1.20) 1908A.1.1 Power actuated fasteners. ~~Power actuated fasteners qualified in accordance with ICG-ES AC 70 shall be deemed to satisfy the requirements of this section.~~

~~Power actuated fasteners shall be permitted in seismic shear for components exempt from permit requirements by Section 1616A.1.18 of this code and for interior nonbearing non-shear wall partitions. Power actuated fastener shall not be used to anchor exterior cladding or curtain wall systems.~~

...

(Relocated to Section 1616A.1.19) 1909A.1.1 Specialty inserts. ~~Specialty inserts, including cast-in-place specialty inserts, tested in accordance with ICG-ES AC 193 shall be deemed to satisfy the requirements of this section.~~

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SECTION 1909A
RESERVED

SECTION 1910A 1913A
CONCRETE, REINFORCEMENT AND ANCHOR TESTING

1910A.1 1913A.1 Cementitious material. The concrete supplier shall furnish to the enforcement agency certification that the cement proposed for use on the project has been manufactured and tested in compliance with the requirements of ASTM C 150 for portland cement and ASTM C 595 or ASTM C 1157 for blended hydraulic cement, whichever is applicable. When a mineral admixture or ground granulated blast-furnace slag is proposed for use, the concrete supplier shall furnish to the enforcement agency certification that they have been manufactured and tested in compliance with ASTM C 618 or ASTM C 989, whichever is applicable. The concrete producer shall provide copies of the cementitious material supplier's Certificate of Compliance that represents the materials used by date of shipment for concrete. Cementitious materials without Certification of Compliance shall not be used.

1910A.2 1913A.2 Tests of reinforcing bars. ~~Where following-s~~ Samples are shall be taken from bundles as delivered from the mill, with the bundles identified as to heat number and ~~provided the accompanying mill certificate.~~ analyses accompany the report, ~~One tensile test and one bend test shall be made from a sample specimen from each 10 tons (9080 kg) or fraction thereof of each size of reinforcing steel.~~

~~Where positive identification of the heat number cannot be made or where random samples are to be taken, one series of tests shall be made from each 2 1/2 tons (2270 kg) or fraction thereof of each size of reinforcing steel.~~

~~Tests of reinforcing bars may be waived by the structural engineer with the approval of the Building Official for one-story buildings or non-building structures provided they are identified in the construction documents and certified mill test reports are provided to the inspector of record for each shipment of such reinforcement.~~

1910A.3 1913A.3 Tests for prestressing steel and anchorage. All wires or bars of each size from each mill heat and all strands from each manufactured reel to be shipped to the site shall be assigned an individual lot number and shall be tagged in such a manner that each lot can be accurately identified at the jobsite. Each lot of tendon and anchorage assemblies and bar couplers to be installed shall be likewise identified.

The following samples of materials and tendons selected by the engineer or the designated testing laboratory from the prestressing steel at the plant or jobsite shall be furnished by the contractor and tested by an approved independent testing agency:

1. For wire, strand or bars, 7-foot-long (2134 mm) samples shall be taken of the coil of wire or strand reel or rods. A minimum of one random sample per 5,000 pounds (2270 kg) of each heat or lot used on the job shall be selected.
2. For prefabricated prestressing tendons other than bars, one completely fabricated tendon 10 feet (3048 mm) in length between grips with anchorage assembly at one end shall be furnished for each size and type of tendon and anchorage assembly.

Variations of the bearing plate size need not be considered.

The anchorages of unbonded tendons shall develop at least 95 percent of the minimum specified ultimate strength of the pre-stressing steel. The total elongation of the tendon under ultimate load shall not be less than 2 percent measured in a minimum gage length of 10 feet (3048 mm).

Anchorages of bonded tendons shall develop at least 90 percent of the minimum specified strength of the prestressing steel tested in an unbonded state. All couplings shall develop at least 95 percent of the minimum specified strength of the prestressing steel and shall not reduce the elongation at rupture below the requirements of the tendon itself.

3. If the prestressing tendon is a bar, one 7-foot (2134 mm) length complete with one end anchorage shall be furnished and, in addition, if couplers are to be used with the bar, two 4-foot (1219 mm) lengths of bar fabricated to fit and equipped with one coupler shall be furnished.
4. Mill tests of materials used for end anchorages shall be furnished. In addition, at least one Brinnell hardness test shall be made of each thickness of bearing plate.

1910A.4 1913A.4 Composite construction cores. Cores of the completed composite concrete construction shall be taken to demonstrate the shear strength along the contact surfaces. The cores shall be tested when the cast-in-place concrete is approximately 28 days old and shall be tested by a shear loading parallel to the joint between the precast concrete and the cast-in-place concrete. The minimum unit shear strength of the contact surface area of the core shall not be less than 100 psi (689 kPa).

At least one core shall be taken from each building for each 5,000 square feet (465m²) of area of composite concrete construction and not less than three cores shall be taken from each project. The architect or structural engineer in responsible charge of the project or his or her representative shall designate the location for sampling.

~~**1913A.5 Tests of shotcrete.** Testing of shotcrete shall follow the provisions of Section 1910A and the general requirements of ACI 318 Section 5.6.~~

~~**1913A.6 Gypsum field tests.** Field tests shall be made during construction to verify gypsum strength. One sample consisting of three specimens shall be made for each 5,000 square foot (465 m²) or fraction thereof of all gypsum poured, but not less than one sample shall be taken from each half day's pour.~~

1910A.5 1913A.7 Tests for Post-Installed Anchors in Concrete. When post-installed anchors are used in lieu of cast-in place bolts, the installation verification test loads, frequency, and acceptance criteria shall be in accordance with this section.

1910A.5.1 1913A.7.1 General. Test loads or torques and acceptance criteria shall be shown on the construction documents.

If any anchor fails testing, all anchors of the same type shall be tested, which are installed by the same trade, not previously tested until twenty (20) consecutive anchors pass, then resume the initial test frequency.

1910A.5.2 1913A.7.5 Testing Procedure. The test procedure shall be as permitted by an approved test report using criteria adopted in this code. All ~~other~~ post-installed anchors shall be tension tested.

Exception: [OSHPD 1 & 4] Torque controlled post installed anchors shall be permitted to be tested using torque based on an approved test report using criteria adopted in this code.

Alternatively, ~~A~~ manufacturer's recommendation for testing may be approved by the enforcement agency based on an approved test report using criteria adopted in this code.

1910A.5.3 1913A.7.3 Test Frequency. When post-installed anchors are used for sill plate bolting applications, 10 percent of the anchors shall be tested.

When post-installed anchors are used for other structural applications, all such anchors shall be tested.

When post-installed anchors are used for nonstructural applications such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tested.

The testing of the post-installed anchors shall be done in the presence of the special inspector and a report of the test results shall be submitted to the enforcement agency.

Exceptions:

1. Undercut anchors that allow visual confirmation of full set shall not require testing.
2. Where the factored design tension on anchors is less than 100 lbs. and those anchors are clearly noted on the approved construction documents, only 10 percent of those anchors shall be tested.
3. Where adhesive anchor systems are used to install reinforcing dowel bars in hardened concrete, only 25% of the dowels shall be tested if all of the following conditions are met:
 - a. The dowels are used exclusively to transmit shear forces across joints between existing and new concrete.
 - b. The number of dowels in any one member equals or exceeds 12.
 - c. The dowels are uniformly distributed across seismic force resisting members (such as shear walls, collectors and diaphragms).

Anchors to be tested shall be selected at random by the special inspector/Inspector Of Record (IOR).

4. Testing of shear dowels across cold joints in slabs on grade, where the slab is not part of the lateral force-resisting system shall not be required.

5. Testing is not required for power actuated fasteners used to attach tracks of interior non-shear wall partitions for shear only, where there are at least three fasteners per segment of track.

1910A.5.4 ~~1913A.7.2~~ Test Loads. Required test loads shall be determined by one of the following methods:

1. Twice the maximum allowable tension load or one and a quarter (1- 1/4) times the maximum design strength of anchors as provided in an approved test report using criteria adopted in this code or determined in accordance with Chapter 17 Appendix-D of ACI 318.

Tension test load need not exceed 80% of the nominal yield strength of the anchor element (= $0.8 A_{se} f_{ya}$).

2. The manufacturer's recommended installation torque based on an approved test report using criteria adopted in this code.

1910A.5.5 ~~1913A.7.4~~ Test Acceptance Criteria. Acceptance criteria for post-installed anchors shall be based on an approved test report using criteria adopted in this code. Field tests shall satisfy the following minimum requirements.

1. Hydraulic Ram Method:

Anchors tested with a hydraulic jack or spring loaded ~~devices~~ apparatus shall maintain the test load for a minimum of 15 seconds and shall exhibit no discernable movement during the tension test, e.g., as evidenced by loosening of the washer under the nut.

For adhesive anchors, where other than bond is being tested, the testing apparatus support device shall not be located within 1.5 times the anchor's embedment depth to avoid restricting the concrete shear cone type failure mechanism from occurring.

2. Torque Wrench Method:

Torque controlled post installed A anchors tested with a calibrated torque wrench shall must attain the specified torque within ½ turn of the nut; or one-quarter (1/4) turn of the nut for a 3/8 in. sleeve anchor only.

Exceptions:

a. Wedge or Sleeve type:—

One quarter (1/4) turn of the nut for a 3/8 in. sleeve anchor only.

b. Threaded Type:

One quarter (1/4) turn of the screw after initial seating of the screw head.

SECTION 1911A ~~1914A~~ EXISTING CONCRETE STRUCTURES

1911A.1 ~~1914A.1~~ Existing Concrete Structures.

The structural use of existing concrete with a core strength less than 1,500 psi (10.3MPa) is not permitted in rehabilitation work.

For existing concrete structures, sufficient cores shall be taken at representative locations throughout the structure, as designated by the architect or structural engineer, so that knowledge will be had of the in-place strength of the concrete. At least three cores shall be taken from each building for each 4,000 square feet (372 m2) of floor area, or fraction thereof. Cores shall be at least 4 inches (102 mm) in diameter. Cores as small as 2.75 inches (70 mm) in diameter may be allowed by the enforcement

agency when reinforcement is closely spaced and the coarse aggregate does not exceed 3/4 inch (19 mm).

1911A.2 1914A.2 Crack Repair by Epoxy Injection. Crack Repair of concrete and masonry member by epoxy injection shall conform to all requirements of ACI 503.7.

1911A.3 1914A.3 Concrete Strengthening by Externally Bonded Fiber Reinforced Polymer (FRP). Design and construction of externally bonded FRP systems for strengthening concrete structures shall be in accordance with ACI 440.2R.

Exceptions: 1) Near-Surface Mounted (NSM) FRP bars shall not be permitted.
2) Strengthening of shear walls and diaphragms (including chords and collectors) shall be considered as an alternative system.

Design capacities, reliability, serviceability of FRP materials shall be permitted to be established in accordance with ICC-ES AC 125. Minimum inspection requirements of FRP composite systems shall be in accordance with ICC-ES AC 178.

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 20 ALUMINUM

SECTION 2001 GENERAL

2001.1 Scope. This chapter shall govern the quality, design, fabrication and erection of aluminum.

SECTION 2002 MATERIALS

2002.1 General. Aluminum used for structural purposes in buildings and structures shall comply with AA ASM 35 and AA ADM 1. The nominal loads shall be the minimum design loads required by Chapter 16.

SECTION 2003 - INSPECTION

2003.1 Inspection. [OSHPD 1 & 4] Inspection of Aluminum shall be required in accordance with the requirements for steel in Chapter 17A.

(All existing amendments are continued without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 21 MASONRY

(All existing amendments that are not revised shall continue without any change)

NOTATION:
Authority: Health and Safety Code Section 129850
Reference: Health and Safety Code Sections 1275 and 129850

CHAPTER 21A MASONRY

...

SECTION 2101A GENERAL

2101A.1 Scope. This chapter shall govern the materials, design, construction and quality of masonry.

2101A.1.1 Application. *The scope of application of Chapter 21A is as follows:*

1. **(Reserved for DSA).**
2. *Applications listed in Section 1.10.1, and 1.10.4 regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.*

Exception: [OSHPD 2] *Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 21 and any applicable amendments therein.*

2101A.1.2 Amendments in this chapter. *OSHPD adopt this chapter and all amendments.*

Exception: *Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:*

1. **(Reserved for DSA).**
2. *Office of Statewide Health Planning and Development:*
[OSHPD 1] - *For applications listed in Section 1.10.1.*
[OSHPD 4] - *For applications listed in Section 1.10.4.*

2101A.1.3 Prohibition: *The following design methods, systems, and materials are not permitted by OSHPD:*

1. *Unreinforced Masonry.*
2. *Autoclaved Aerated Concrete (AAC) Masonry.*
3. *Empirical Design of Masonry.*
4. *Adobe Construction.*
5. *Ordinary Reinforced Masonry Shear Walls.*
6. *Intermediate Reinforced Masonry Shear Walls.*
7. *Prestressed Masonry Shear Walls.*
8. *Direct Design of Masonry.*

...

2101A.2 Design methods. *Masonry shall comply with the provisions of TMS402/ACI 530/ASCE 5 or TMS 403 as well as applicable requirements of this chapter.*

...

SECTION 2102A DEFINITIONS AND NOTATIONS

2102A.1 General. *The following terms are defined in Chapter 2, except those defined below which shall, for the purposes of this chapter, have the meanings shown herein:*

...

WALL. ...

Hollow-unit Masonry Wall. Type of construction made with hollow masonry units in which the units are laid and set in mortar, reinforced, and grouted. ~~solid, except as provided in Section 2114A.~~

...

SECTION 2103A MASONRY CONSTRUCTION MATERIALS

2103A.1 Masonry units. Concrete masonry units, clay or shale masonry units, stone masonry units and glass unit masonry ~~and AAC masonry units~~ shall comply with Article 2.3 of TMS 602/ACI530.1/ASCE 6. Architectural cast stone shall conform to ASTM C 1364.

...

2103A.3 Grout. Grout shall comply with Article 2.2 of TMS 602/ACI 530.1/ASCE 6.

~~**2103A.13.1 Water.** Water content shall be adjusted to provide proper workability and to enable proper placement under existing field conditions, without segregation~~

~~**2103A.13.2 Selecting Proportions.** Proportions of ingredients and any additives shall be based on laboratory or field experience with the grout ingredients and the masonry units to be used. Coarse grout proportioned by weight shall contain not less than 564 pounds of cementitious material per cubic yard (335 kg / m³).~~

~~**2103A.3.1 2103A.13.3 Aggregate.** Coarse grout shall be used in grout spaces between wythes 2 inches (51 mm) or more in width as determined in accordance with TMS 602 Table 7, footnote 3, and in all ~~filled-cell~~ grouted cells of hollow unit masonry construction.~~

...

~~**2103A.15 Additives and Admixtures.**~~

~~**2103A.15.1 General.** Additives and admixtures to mortar or grout shall not be used unless approved by the enforcement agency.~~

~~**2103A.15.2 Antifreeze compounds.** Antifreeze liquids, chloride salts or other such substances shall not be used in mortar or grout.~~

~~**2103A.5 2103A.15.3 Air entrainment.** Air-entraining substances shall not be used in mortar or grout unless tests are conducted to determine compliance with the requirements of this code.~~

SECTION 2104A CONSTRUCTION

2104A.1 Masonry construction. Masonry construction shall comply with the requirements of Sections 2104A.1.1 and ~~2104A.1.2~~ through 2104A.1.3 and with TMS 602/ACI 530.1/ASCE 6.

...

~~**2104A.1.3 2104A.5 Grouted Masonry.**~~

~~**2104A.1.3.1 2104A.5.1 General conditions.** Grouted masonry shall be constructed in such a manner that all elements of the masonry act together as a structural element. At the time of laying, all masonry units shall be free of dust and dirt. Prior to grouting, the grout space shall be clean so that all spaces to be filled with grout do not contain mortar projections greater than 1/4 inch (6.4 mm), mortar droppings and other foreign material. Grout shall be placed so that all spaces to be grouted do not contain voids.~~

Grout materials and water content shall be controlled to provide adequate fluidity for placement without segregation of the constituents, and shall be mixed thoroughly. Segregation of the grout materials and damage to the masonry shall be avoided during the grouting process.

Reinforcement and embedded items shall be clean, properly positioned and securely anchored against movement prior to grouting. Bolts shall be accurately set with templates or by approved equivalent means and held in place to prevent dislocation during grouting. Reinforcement, embedded items and bolts shall be solidly embedded in grout. Anchor bolts in the face shells of hollow masonry units shall be positioned to maintain a minimum of ½ in. of grout between the bolt and the face shell.

The grouting of any section of wall shall be completed in one day with no interruptions greater than one hour.

Grout pours greater than 12 inches (300 mm) in height shall be consolidated by mechanical vibration during placement before loss of plasticity in a manner to fill the grout space, and reconsolidated by mechanical vibration to minimize voids due to water loss. Grout pours less than 12 inches in height may be puddled.

Between grout pours or where grouting has been stopped more than an hour, a horizontal construction joint shall be formed by stopping all wythes at the same elevation and with the grout stopping a minimum of 1 1/2 inches (38 mm) below a mortar joint, except at the top of the wall. Where bond beams occur, the grout pour shall be stopped a minimum of 1/2 inch (12.7 mm) below the top of the masonry.

Grout shall not be handled nor pumped utilizing aluminum equipment unless it can be demonstrated with the materials and equipment to be used that there will be no deleterious effect on the strength of the grout.

2104A.1.3.1.1 2104A.5.1.1 Reinforced grouted masonry.

2104A.1.3.1.1.1 2104A.5.1.1.1 General. Reinforced grouted masonry is that form of construction made with clay or shale brick or made with solid concrete building brick in which interior joints of masonry are filled by pouring grout around reinforcement therein as the work progresses.

2104A.1.3.1.1.1.1 2104A.5.1.1.1.1 Low-lift grouted construction. Requirements for construction shall be as follows:

1. All units in the two outer wythes shall be laid with full-shoved head joint and bed mortar joints. Masonry headers shall not project into the grout space.
2. The minimum grout space for low-lift grout masonry shall be 2 1/2 inches (64 mm). All reinforcement and wire ties shall be embedded in the grout. The thickness of the grout between masonry units and reinforcement shall be a minimum of one bar diameter.
3. One tier of a grouted reinforced masonry wall may be carried up 12 inches (305 mm) before grouting, but the other tier shall be laid up and grouted in lifts not to exceed one masonry unit in height. All grout shall be puddled with a mechanical vibrator or wood stick immediately after placing so as to completely fill all voids and to consolidate the grout. All vertical and horizontal steel shall be held firmly in place by a frame or suitable devices.
4. Tothing of masonry walls is prohibited. Racking is to be held to a minimum.

2104A.1.3.1.1.2 2104A.5.1.1.1.2 High-lift grouted construction. Where high-lift grouting is used, the method shall be subject to the approval of the enforcement agency. Requirements for construction shall be as follows:

1. All units in the two wythes shall be laid with full head and bed mortar joints.
2. The two wythes shall be bonded together with wall ties. Ties shall not be less than No. 9 wire in the form of rectangles 4 inches (102 mm) wide and 2 inches (51 mm) in length less than the overall wall thickness. Kinks, water drips, or deformations shall not be permitted in the ties. One tier of the wall shall be built up not more than 16 inches (406 mm) ahead of the other tier. Ties shall be laid not to exceed 24 inches (610 mm) on center horizontally and 16 inches (406 mm) on center vertically for running bond, and not more than 24 inches (610 mm) on center horizontally and 12 inches (305 mm) on center vertically for stack bond.
3. Cleanouts shall be provided for each pour by leaving out every other unit in the bottom tier of the section being poured or by cleanout openings in the foundation. The foundation or other horizontal construction joints shall be cleaned of all loose material and mortar droppings before each pour. The cleanouts shall be sealed after inspection and before grouting.
4. The grout space in high-lift grouted masonry shall be a minimum of 3 1/2 inches (89 mm). All reinforcement and wire ties shall be embedded in the grout. The thickness of the grout between masonry units and reinforcement shall be a minimum of one bar diameter.
5. Vertical grout barriers or dams of solid masonry shall be built across the grout space the entire height of the wall to control the flow of the grout horizontally. Grout barriers shall not more than 30 feet (9144 mm) apart.
6. An approved admixture of a type that reduces early water loss and produces an expansive action shall be used in high-lift grout.
7. Grouting shall be done in a continuous pour in lifts not exceeding 4 feet (1219 mm). Grout shall be consolidated by mechanical vibration only, and shall be reconsolidated after excess moisture has been absorbed, but before plasticity is lost. The grouting of any section of a wall between control barriers shall be completed in one day, with no interruptions greater than one hour.

2104A.1.3.1.2 2104A.5.1.2 Reinforced hollow-unit masonry.

2104A.1.3.1.2.1 2104A.5.1.2.1 General. Reinforced hollow-unit masonry is that type of construction made with hollow-masonry units in which cells are continuously filled with grout, and in which reinforcement is embedded. All cells shall be solidly filled with grout in reinforced hollow-unit masonry, ~~except as provided in Section 2114A.1.~~

Exception: ~~(Relocated from 2013 CBC 2114A.1)~~ Reinforced hollow-unit masonry laid in running bond used for freestanding site walls ~~fences and~~ or interior nonbearing non-shear wall partitions may be ~~of hollow-unit masonry construction~~ grouted only in cells containing vertical and horizontal reinforcement.

Construction shall be one of the two following methods: The low-lift method where the maximum height of construction laid before grouting is 4 feet (1220 mm), or the high-lift method where the full height of construction between horizontal cold joints is grouted in one operation. General requirements for construction shall be as follows:

1. Bond shall be provided by lapping units in successive vertical courses. Where stack bond is used in reinforced hollow-unit masonry, the open-end type of unit shall be used with vertical reinforcement spaced a maximum of 16 inches (406 mm) on center.
2. Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear grout space dimension of unobstructed, continuous vertical cell measuring not less than 2 inches by 3 inches (51 mm by 76 mm), except the minimum cell dimension for high-lift grout shall be 3 inches (76 mm), as determined in accordance with TMS 602 Table 7, footnote 3.
3. Grout shall be a workable mix suitable for placing without segregation and shall be thoroughly mixed. Grout shall be placed by pumping or an approved alternate method and shall be placed before initial set or hardening occurs. Grout shall be consolidated by mechanical vibration during placing and reconsolidated after excess moisture has been absorbed, but before workability is lost.
4. All reinforcement and wire ties shall be embedded in the grout. The space between masonry unit surfaces and reinforcement shall be a minimum of one bar diameter.
5. Horizontal reinforcement shall be placed in bond beam units with a minimum grout cover of 1 inch (25 mm) above steel for each grout pour. The depth of the bond beam channel below the top of the unit shall be a minimum of 1 1/2 inches (38 mm) and the width shall be 3 inches (76 mm) minimum.

2104A.1.3.1.2.2 2104A.5.1.2.2 Low-lift grouted construction. Units shall be laid a maximum of 4 feet (1220 mm) before grouting. Grouting shall follow each 4 feet (1220 mm) of construction laid and shall be consolidated so as to completely fill all voids and embed all reinforcing steel. Horizontal reinforcement shall be fully embedded in grout in an uninterrupted pour.

2104A.1.3.1.2.3 2104A.5.1.2.3 High-lift grouted construction. Where high-lift grouting is used, the method shall be approved by the enforcement agency. Cleanout openings shall be provided in every cell at the bottom of each pour of grout. Alternatively, if the course at the bottom of the pour is constructed entirely of inverted double open-end bond beam units, cleanout openings need only be provided for access to ~~#~~ every reinforced cell at the bottom of each pour of grout. The cleanouts shall be sealed before grouting. An approved admixture that reduces early water loss and produces an expansive action shall be used in the grout.

SECTION 2105A QUALITY ASSURANCE

...

2105A.2 Compressive Strength, f'_m . The specified compressive strength, f'_m , assumed in design shall be 2000 psi (13.79MPa) ~~1,500 psi (10.34 MPa)~~ for all masonry construction using materials and details of construction required herein. Testing of the constructed masonry shall be provided in accordance with Section 2105A.4. ~~[OSHPD 1 & 4].~~

EXCEPTION: [OSHPD 1 & 4] Subject to the approval of the enforcement agency, higher values of f'_m may be used in the design of reinforced grouted masonry and reinforced hollow-unit masonry. The approval shall be based on prism test results submitted by the architect or engineer which demonstrate the ability of the proposed construction to meet prescribed performance criteria for strength and stiffness. The design ~~shall assume that the reinforcement will be placed in a location that will produce the largest stresses within the tolerances allowed~~

~~in Section 2104A.1.1 and shall take into account the mortar joint depth. In no case shall the f'_m assumed in design exceed 3,000 psi (20.7MPa).~~

~~Where an f'_m greater than 2000 psi (13.79MPa) 1,500 psi (10.34 MPa) is approved, the architect or structural engineer shall establish a method of quality control of the masonry construction acceptable to the enforcement agency which shall be described in the contract specifications. Compliance with the requirements for the specified strength of constructed masonry shall be provided using prism test method in accordance with Sections 2105A.2.2.2, and core shear testing in accordance with Section 2105A.4. Substantiation for the specified compressive strength prior to the start of construction shall be obtained by using prism test method in accordance with Sections 2105A.2.2.2.2 and Section 2105A.3. 2105A.2.2.1.4.~~

2105A.3 2105A.2.2.1.4 Mortar and grout tests. These tests are to establish whether the masonry components meet the specified component strengths.

~~At the beginning of all masonry work, at least one test sample of the mortar and grout shall be taken on three successive working days and at least at one-week intervals thereafter. Samples of grout shall be taken for each mix design, each day grout is placed, and not less than every 5,000 square feet of masonry wall area. They shall meet the minimum strength requirement given in ASTM C270 Table 1 and ASTM C476/TMS 602 Section 2.2 ~~Sections 2103A.9 and 2103A.13~~ for mortar and grout respectively. Additional samples shall be taken whenever any change in materials or job conditions occur, as determined by the building official. ~~or whenever in the judgment of the architect, structural engineer or the enforcement agency such tests are necessary to determine the quality of the material.~~ When the prism test method of ~~Section 2105A.2.2.2~~ is used during construction, the tests in this section are not required.~~

Test specimens for mortar and grout shall be made as set forth in ASTM C 1586 and ASTM C 1019.

Exception: For non-bearing non-shear masonry walls not exceeding total wall height of 12' above wall base, mortar test shall be permitted to be limited to those at the beginning of masonry work for each mix design.

2105A.4 Masonry core testing. [OSHPD 1 & 4] ~~Not less than two cores shall be taken from each building for each 5,000 square feet (465 m²) of the greater of the masonry wall area or the floor area or fraction thereof. The architect or structural engineer in responsible charge of the project or his/her representative or the inspector of record shall select the areas for sampling. The inspector of record approved agency shall perform or observe the coring of the masonry walls and sample locations shall be subject to approval of the registered design professional.~~

Cores ~~samples~~ shall comply with the following:

1. Cored no sooner than 7 days after grouting of the selected area;
2. ~~Be~~ Be a minimum of 3-3/4" in nominal diameter; and
3. ~~Sampled shall be taken~~ Sampled shall be taken in such a manner as to exclude any masonry unit webs, mortar joint, or and reinforcing steel. If all cells contain reinforcement, alternate core locations or means to detect void or delamination shall be selected by the registered design professional and approved by the building official.

~~Visual examination of all cores shall be made by an approved agency a laboratory acceptable to the building official and the condition of the cores reported as required by the California Administrative Code. One half of the number of cores taken shall be tested in s Shear test both joints between the grout core and the outside wythes or face shell of the masonry 28 days after grouting of the sample area using a shear test apparatus acceptable to the enforcement agency. Shear testing apparatus shall be of a design approved by the enforcement agency. Core samples shall not be soaked before testing. Core samples to be tested shall be stored in sealed plastic bags or non-absorbent containers immediately after coring and for at least 5 days prior to testing. The average unit shear value for each pair of cores (4 shear tests) from each 5,000 square feet of wall area (or less) on the cross section of the core shall not be less than $2.5 \sqrt{f'_m}$ psi.~~

All cores shall be submitted to an approved agency ~~the laboratory, acceptable to the building official,~~ for examination, ~~regardless of whether~~ even where the core specimens failed during the cutting operation. The approved agency laboratory shall report the location where each core was taken, the findings of their visual examination of each core, identify which cores were selected for shear testing, and the results of the shear tests.

Exceptions:

1. Core sampling and testing is not required for non-bearing non-shear masonry walls, not exceeding total wall height of 12' above wall base, built with single-wythe hollow unit concrete masonry that attaches opposite face shells using webs cast as single unit, when designed using an f'_m not exceeding 2000 psi (13.79MPa).
2. An infrared thermographic survey or other nondestructive test procedures, shall be permitted to be approved as an alternative system to detect voids or delamination in grouted masonry in-lieu of core sampling and testing.

**SECTION 2106A
SEISMIC DESIGN**

2106A.1 Seismic design requirements for masonry. Masonry structures and components shall comply with the requirements in Chapter 7 of TMS 402/ACI 530/ASCE 5 depending on the structure's Seismic Design Category.

2106A.1.1 Modifications to TMS 402 / ACI 530 / ASCE 5. Modify TMS 402 / ACI 530 / ASCE 5 Section 7.4.4 ~~4.18~~ as follows:

1. Minimum reinforcement requirements for Masonry Walls The total area of reinforcement in reinforced masonry walls shall not be less than 0.003 times the sectional area of the wall. Neither the horizontal nor the vertical reinforcement shall be less than one third of the total. Horizontal and vertical reinforcement shall be spaced at not more than 24 inches (610 mm) center to center. The minimum reinforcing shall be No. 4, except that No. 3 bars may be used for ties and stirrups. Vertical wall reinforcement shall have dowels of equal size and equal matched spacing in all footings. Reinforcement shall be continuous around wall corners and through intersections. Only reinforcement which is continuous in the wall shall be considered in computing the minimum area of reinforcement. Reinforcement with splices conforming to TMS 402 / ACI 530 / ASCE 5 ~~as modified by Section 2107A and 2108A~~ shall be considered as continuous reinforcement.

Horizontal reinforcing ~~ement~~ bars in bond beams shall be provided in the top of footings, at the top of wall openings, at roof and floor levels, and at the top of parapet walls. For walls 12 inches (nominal) (305 mm) or more in thickness, horizontal and vertical reinforcement shall be equally divided into two layers, except where designed as retaining walls. Where reinforcement is added above the minimum requirements, such additional reinforcement need not be so divided.

In bearing walls of every type of reinforced masonry, there shall be trim reinforcement of not less than one No. 5 bar or two No. 4 bars on all sides of, and adjacent to, every opening which exceeds 16 inches (406 mm) in either direction, and such bars shall extend not less than 48 diameters, but in no case less than 24 inches (610 mm) beyond the corners of the opening. The bars required by this paragraph shall be in addition to the minimum reinforcement elsewhere required.

When the reinforcement in bearing walls is designed, placed and anchored in position as for columns, the allowable stresses shall be as for columns.

Joint reinforcement shall not used as principal reinforcement in masonry. ~~designed by the strength design method.~~

2. Minimum reinforcement for masonry columns. The spacing of column ties shall be as follows: not greater than 8 bar diameters, 24 tie diameters, or one half the least dimension of the column for the full column height. Ties shall be at least 3/8" in diameter and shall be embedded in grout. Top tie shall be within 2 inches (51 mm) of the top of the column or of the bottom of the horizontal bar in the supported beam.

3. Lateral support. Lateral support of masonry may be provided by cross walls, columns, pilasters, counterforts or buttresses where spanning horizontally or by floors, beams, girts or roofs where spanning vertically. Where walls are supported laterally by vertical elements, the stiffness of each vertical element shall exceed that of the tributary area of the wall.

4. Anchor Bolts. Bent bar anchor bolts shall not be allowed. The maximum size anchor shall be 1/2-inch (13 mm) diameter for 6-inch (152 mm) nominal masonry, 3/4-inch (19 mm) diameter for 8-inch (203 mm) nominal masonry, 7/8-inch (22 mm) diameter for 10-inch (254 mm) nominal masonry, and 1-inch (25mm) diameter for 12-inch (304.8 mm) nominal masonry.

SECTION 2107A ALLOWABLE STRESS DESIGN

2107A.1 General. The design of masonry structures using *allowable stress design* shall comply with Section 2106A and the requirements of Chapters 1 through 8 of TMS 402/ACI 530/ASCE 5 except as modified by Sections 2107A.2 through 2107A.4 2107A.6.

...

2107A.2 TMS 402/ACI 530/ASCE 5, Section 8.1.6.7.1.1, lap splices. As an alternative to Section 8.1.6.7.1.1, it shall be permitted to design lap splices in accordance with Section 2107A.2.1.

2107A.2.1 Lap splices. The minimum length of lap splices for reinforcing bars in tension or compression, l_d , shall be

$$l_d = 0.002d_b f_s \quad \text{(Equation 21A-1)}$$

For SI: $l_d = 0.29d_b f_s$

but not less than 12 inches (305 mm). In no case shall the length of the lapped splice be less than 40 bar diameters, and need not be greater than 72 bar diameters.

where:

...

2107A.5 Modify TMS 402 / ACI 530/ASCE 5 by adding Section 8.1.7 2-1.8 as follows:

8.1.7 2-1.8 - Walls and Piers.

Thickness of Walls. For thickness limitations of walls as specified in this chapter, nominal thickness shall be used. Stresses shall be determined on the basis of the net thickness of the masonry, with consideration for reduction, such as raked joints.

The thickness of masonry walls shall be designed so that allowable maximum stresses specified in this chapter are not exceeded. Also, no masonry wall shall exceed the height or length-to-thickness ratio or the minimum thickness as specified in this chapter and as set forth in Table 2107A.5. ~~below.~~

Piers. Every pier or wall section which width is less than three times its thickness shall be designed and constructed as required for columns if such pier is a structural member. Every pier

or wall section which width is between three and five times its thickness or less than one half the height of adjacent openings shall have all horizontal steel in the form of ties except that in walls 12 inches (305 mm) or less in thickness such steel may be in the form of hair-pins.

TABLE 2107A.5 - MINIMUM THICKNESS OF MASONRY WALLS^{1, 2}

TYPE OF MASONRY	MAXIMUM RATIO UNSUPPORTED HEIGHT OR LENGTH TO THICKNESS ^{2,3}	NOMINAL MINIMUM THICKNESS (inches)
BEARING OR SHEAR WALLS:		
1. Stone masonry	14	16
2. Reinforced grouted masonry	25	6
3. Reinforced hollow-unit masonry	25	6
NONBEARING WALLS:		
4. Exterior reinforced walls	30	6
5. Interior partitions reinforced	36	4

¹For walls of varying thickness, use the least thickness when determining the height or length to thickness ratio.

²In determining the height or length-to-thickness ratio of a cantilevered wall, the dimension to be used shall be twice the dimension of the end of the wall from the lateral support.

³Cantilevered walls not part of a building and not carrying applied vertical loads need not meet these minimum requirements but their design must comply with stress and overturning requirements.

2107A.6 2107A.8 [OSHPD 1 & 4] Modify TMS402/ACI 530/ASCE 5, Section 8.3.4.4 2-3.4.4 by the following:

All reinforced masonry components that are subjected to in-plane forces shall have a maximum reinforcement ratio, ρ_{max} , not greater than that computed by equation 8-23. 2-23.

**SECTION 2108A
STRENGTH DESIGN OF MASONRY**

2108A.1 General. The design of masonry structures using strength design shall comply with Section 2106A and the requirements of Chapters 1 through 7 and Chapter 9 of TMS 402/ACI 530/ASCE 5, except as modified by Sections 2108A.2 through 2108A.3.

Exception: AAC masonry shall comply with the requirements of Chapters 1 through 7 and Chapter 11 of TMS 402/ACI 530/ASCE 5.

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**SECTION 2109A
EMPIRICAL DESIGN OF MASONRY**

Not permitted by OSHPD.

(Existing amendment deleting Section 2109 of IBC is retained and deleted Section 2109 is not shown here for clarity)

**SECTION 2110A
GLASS UNIT MASONRY**

2110A.1 General. Glass unit masonry construction shall comply with Chapter 13 of TMS402/ACI 530/ASCE 5 and this section.

Masonry of glass blocks walls or panels shall be designed for seismic forces, permitted in non-load-bearing exterior or interior walls and shall conform to the requirements of Section 2115A. Stresses in glass block shall not be utilized. Glass block may be solid or hollow and may contain inserts.

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SECTION 2114A NONBEARING WALLS

2114A.1 General. All nonbearing masonry walls shall be reinforced as specified in Section 2106A.1.1. Fences and interior nonbearing nonshear walls may be of hollow unit masonry construction grouted in cells containing vertical and horizontal reinforcement. Nonbearing walls may be used to carry a superimposed load of not more than 200 pounds per linear foot (2.92 kN/m).

- 1. Thickness.** Every nonbearing masonry wall shall be so constructed and have a sufficient thickness to withstand all vertical loads and horizontal loads, but in no case shall the thickness of such walls be less than the values set forth in Table 2107A.5. Plaster shall not be considered as contributing to the thickness of a wall in computing the height-to-thickness ratio.
- 2. Anchorage.** All nonbearing walls shall be anchored as required by Sections 1604A.8.2 and ASCE 7 Chapter 13. Suspended ceilings or other nonstructural elements shall not be used to provide anchorage for masonry walls.

SECTION 2115A MASONRY SCREEN WALLS

2115A.1 General. Masonry units may be used in nonbearing decorative screen walls. Units may be laid up in panels with units on edge with the open pattern of the unit exposed in the completed wall.

- 1. Horizontal Forces.** The panels shall be capable of spanning between supports to resist the horizontal forces specified in Chapter 16A. Wind loads shall be based on gross projected area of the block.
- 2. Mortar Joints.** Horizontal and vertical joints shall not be less than 1/4 inch (6 mm) thick. All joints shall be completely filled with mortar and shall be "shoved joint" work. The units of a panel shall be so arranged that either the horizontal or the vertical joint containing reinforcing is continuous without offset. This continuous joint shall be reinforced with a minimum of 0.03 square inch (19 mm²) of reinforcing steel and maximum spacing of 16 inches on center. Reinforcement may be embedded in mortar.
- 3. Reinforcement.** Joint reinforcement may be composed of two wires made with welded ladder or trussed wire cross ties. In calculating the resisting capacity of the system, compression and tension in the spaced wires may be utilized. Ladder wire reinforcement shall not be spliced and shall be the widest that the mortar joint will accommodate, allowing 1/2 inch (13 mm) of mortar cover.
- 4. Size of Panels.** The maximum size of panels shall be 144 square feet (13.4 m²), with the maximum dimension in either direction of 15 feet (4572 mm). The specified thickness of the units for exterior applications shall not be less than 3 7/8 inches.
- 5. Panel Support.** Each panel shall be supported on all edges by a structural member of concrete, masonry or steel. Supports at the top and ends of the panel shall be by means of confinement of the masonry by at least 1 inch (25 mm) into and between the flanges of a steel channel. The space between the end of the panel and the web of the channel shall be filled with resilient material. The use of equivalent configuration in other steel section or in masonry or concrete is acceptable.

(All existing amendments, except where section is deleted in the model code, that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 22 STEEL

(This chapter is adopted without any amendments)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275 and 129850

CHAPTER 22A STEEL

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SECTION 2201A GENERAL

2201A.1 Scope. The provisions of this chapter govern the quality, design, fabrication and erection of steel construction.

2201A.1.1 Application. *The scope of application of Chapter 22A is as follows:*

1. (Reserved for DSA).
2. Structures regulated by the Office of Statewide Health Planning and Development (OSHPD), which include those applications listed in Section 1.10.2, and 1.10.4. These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.

Exception: [OSHPD 2] Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 22 and any applicable amendments therein.

2201A.1.2 Identification of amendments. OSHPD adopt this chapter and all amendments.

Exception: Amendments adopted by only one agency appear in this chapter preceded with the appropriate acronym of the adopting agency, as follows:

1. (Reserved for DSA).
2. Office of Statewide Health Planning and Development:
[OSHPD 1] - For applications listed in Section 1.10.1.
[OSHPD 4] - For applications listed in Section 1.10.4.

...

SECTION 2204A CONNECTIONS

2204A.1 Welding. The details of design, workmanship and technique for welding and qualification of welding personnel shall be in accordance with the specifications listed in Sections 2205A, 2206A, 2207A, 2208A, 2210A and 2211A. For *Special inspection* of welding, see Section 1705A.2.

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2204A.4 2204A.2.2 Column base plate. When shear and / or tensile forces are intended to be transferred between column base plates and anchor bolts, provision shall be made in the design to eliminate the effects of oversized holes permitted in base plates by AISC 360 by use of shear lugs and / or welded shear transfer plates or other means acceptable to the enforcement agency, when the oversized holes are larger than the anchor bolt by more than 1/8 inch (3.2 mm). When welded shear transfer plates and shear lugs or other means acceptable to the enforcement agency are not used, the anchor bolts shall be checked for the induced bending stresses in combination with the shear stresses.

SECTION 2205A STRUCTURAL STEEL

2205A.1 General. The design, fabrication and erection of structural steel elements in buildings, structures and portions thereof shall be in accordance with AISC 360.

Exceptions: [OSHPD 1 & 4]

- 1) For members designed on the basis of tension, the slenderness ratio (L/r) shall not exceed 300, except for design of hangers and bracing in accordance with NFPA 13 and for rod hangers in tension.
- 2) For members designed on the basis of compression, the slenderness ratio (KL/r) shall not exceed 200, except for design of hangers and bracing in accordance with NFPA 13.

2205A.2 Seismic Design. Where required, the seismic design, fabrication and erection of buildings, structures and portions thereof shall be in accordance with Section 2205A.2.1 or 2205A.2.2.

2205A.2.1 Structural steel seismic force-resisting system. The design, detailing, fabrication and erection of structural steel seismic force-resisting systems shall be in accordance with the provisions of Section 2205A.2.1.1 or 2205A.2.1.2, as applicable.

2205A.2.1.1 Seismic Design Category B or C. ~~Not permitted by OSHPD. Structures assigned to Seismic Design Category B or C shall be of any construction permitted in Section 2205. Where a response modification coefficient, R , in accordance with ASCE 7, Table 12.2-1 is used for the design of structural steel structures assigned to Seismic Design Category B or C, the structures shall be designed and detailed in accordance with the requirements of AISC 341.~~

Exception: ~~The response modification coefficient, R , designated for "Steel systems not specifically detailed for seismic resistance, excluding cantilever column systems" in ASCE 7, Table 12.2-1 shall be permitted for systems designed and detailed in accordance with AISC 360, and need not be designed and detailed in accordance with AISC 341.~~

2205A.2.1.2 Seismic Design Category D, E or F. Structures assigned to *Seismic Design Category D, E or F* shall be designed and detailed in accordance with AISC 341. ~~except as permitted in ASCE 7, Table 15.4-1.~~

2205A.2.2 Structural steel elements. The design, detailing, fabrication and erection of structural steel elements in seismic force-resisting system other than those covered in Section 2205A.2.1, including struts, collectors, chords and foundation elements shall be in accordance with AISC 341. ~~where either of following applies:~~

1. ~~The structure is assigned to seismic design category D, E or F, except as permitted in ASCE 7, Table 15.4-1.~~
2. ~~A response modification coefficient, R , greater than 3 in accordance with ASCE 7, Table 12.2-1, is used for the design of structure assigned to seismic design category B or C.~~

2205A.3 (Reserved for DSA).

2205A.4 MODIFICATIONS TO AISC 341. [OSHPD 1 & 4]

2205A.4.1 Glossary. Modify Glossary by adding the following:

Inelastic Rotation: The permanent or plastic portion of the rotation angle between a beam and the column, or between a Link and the column of the Test Specimen, measured in radians. The Inelastic Rotation shall be computed based upon an analysis of the Test Specimen deformations. Sources of Inelastic Rotation include yielding of members and connectors, yielding of connection elements and slip between members and connection elements. For beam-to-column moment connections in Special Moment Frames, the inelastic rotation is represented by the plastic chord rotation angle calculated as the plastic deflection of the beam or girder, at the center of its span divided by the distance between the center of the beam span and the centerline of the panel zone of the beam-column connection. For link-to-column connections in Eccentrically Braced Frames, inelastic rotation shall be computed based upon the assumption that inelastic action is concentrated at a single point located at the intersection of the centerline of the link with the face of the column.

2205A.4.2 Section E2. Replace Section E2.6c Item # a by the following:

(a) Use of IMF connections designed in accordance with ANSI/AISC 358 shall be as modified in Section 2205A.5.2.

2205A.4.3 ~~2205A.4.2~~ Section E3. Replace Section E3.6b Item 1 by the following:

(1) The connection shall be capable of sustaining an interstory drift angle of at least 0.04 radians and an inelastic rotation of 0.03 radians.

2205A.4.4 ~~2205A.4.3~~ Section E3. Replace Section E3.6c Item # a by the following:

(a) Use of SMF connections designed in accordance with ANSI /AISC 358 shall be as modified in Section 2205A.5. 4.

2205A.4.5 ~~2205A.4.4~~ Section F2. Special Concentrically Braced Frames (SCBF) modifications

5b. Diagonal Braces, Add a new section as follows.

(4) The use of rectangular or square HSS are not permitted for bracing members, unless filled solid with cement grout having a minimum compressive strength of 3000 psi at 28 days. The effects of composite action in the filled composite brace shall be considered in the sectional properties of the system where it results in the more severe loading condition or detailing.

2205A.4.6 ~~2205A.4.5~~ Section F3. Modify Section F3.6e Item 2 as follows:

Exception is not permitted.

2205A.4.7 ~~2205A.4.6~~ Section K2. Replace Section K2.3b as follows:

The size of the beam or Link used in the Test Specimen shall be within the following limits:

1. At least one of the test beams or Links shall be no less than 100% of the depth of the prototype beam or Link. For the remaining specimens, the depth of the test

beam or Link shall be no less than 90 percent of the depth of the Prototype beam or Link.

2. At least one of the test beams or Links shall be no less than 100% of the weight per foot of the prototype beam or Link. For the remaining specimens, the weight per foot of the test beam or Link shall be no less than 75 percent of the weight per foot of the Prototype beam or Link.

The size of the column used in the test specimen shall properly represent the inelastic action in the column, as per the requirements in Section K2.3a. In addition, the depth of the test column shall be no less than 90% of the depth of the prototype column.

Extrapolation beyond the limitations stated in this section shall be permitted subject to peer review and approval by the enforcement agency.

2205A.4.8 ~~2205A.4.7~~ Section K2. Modify Section K2.8 by the following:

The test specimen must sustain the required interstory drift angle, or link rotation angle, and inelastic rotation for at least two complete loading cycles.

2205A.5 MODIFICATIONS TO AISC 358. [OSHPD 1 & 4]

2205A.5.1-2. Design Requirements, 2.1 Special and Intermediate Moment Frame Connection Types, Table 2-1 Prequalified Moment Connections modifications

The prequalified bolted moment connections are not permitted in buildings.

Exceptions:

1. Erection bolts are permitted.
2. The approved moment connection in accordance with AISC 358 Chapter 10 as permitted by the exception to Section 2206A.2.

2205A.5.2 Moment Connection - Chapter 11. The welded side plate steel moment connection shall be permitted provided:

1. The beams shall consist of either rolled or built-up wide flange sections.
2. The biaxial dual-strong axis and column minor axis configurations of the moment connection shall be considered as an alternative system.
3. For SMF and IMF systems, U-shaped cover plates shall be used and the hinge-to-hinge span to beam depth, L_r/d , shall be greater than or equal to 5.
4. The width-to-thickness ratios for beam flanges shall not be less than 3.
5. The spacing for lateral bracing of wide flange beams, L_b , shall include the length of the side plate at beam ends.
6. The extension of the side plates beyond the face of the column shall be within the range of $0.77d$ to $1.0d$.
7. The gap-to-side plate thickness ratio shall range from 2.1 to 2.3.

**SECTION 2206A
COMPOSITE STRUCTURAL STEEL AND
CONCRETE STRUCTURES**

2206A.1 General. Systems of structural steel elements acting compositely with reinforced concrete shall be designed in accordance with AISC 360 and ACI 318, excluding ACI 318 Chapter 14.

2206A.2 Seismic Design. Where required, the seismic design, fabrication and erection of composite steel and concrete systems shall be in accordance with the additional provisions of Section 2206A.2.1.

2206A.2.1 Seismic requirements for composite structural steel and concrete construction.

Where a response modification coefficient, R , in accordance with ASCE 7, Table 12.2-1 is used for the design of systems of structural steel acting compositely with reinforced concrete, the structures shall be designed and detailed in accordance with the requirements of AISC 341 *and shall be considered as an alternative system.*

Exception: *Steel and concrete composite special moment frame with the approved moment connections in accordance with AISC 358 Chapter 10 shall be permitted provided:*

- 1. Beams are provided with Reduced Beam Sections (RBS),*
- 2. Columns shall be Hollow Structural Sections (HSS) and completely filled with structural concrete having unit weight not less than 110 pounds per cubic foot (17 kN/m³). Concrete shall have 28-day compressive strength not less than 4,000 psi (28 MPa).*
- 3. Web extension to beam web two sided fillet welds are sized to develop expected strength of the beam web and shall not be less than a ¼ inch fillet weld, and*
- 4. The high strength bolt design shall consider interaction between shear and tension as required by AISC 360, and*
- 3. 5. The built-up box column wall thickness shall not be less than 1.25" and the HSS column wall thickness shall not be less than ½ inch.*

...

**SECTION 2207A
STEEL JOISTS**

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2207A.4 Steel joist drawings. Steel joist placement plans shall be provided to show the steel joist products as specified on the *approved construction documents* and are to be utilized for field installation in accordance with specific project requirements as stated in Section 2207A.2. Steel joist placement plans shall include, at a minimum, the following:

...

~~Steel joist placement plans do not require the seal and signature of the joist manufacturer's registered design professional.~~

...

2207A.6 Joist Chord Bracing. *The chords of all joists shall be laterally supported at all points where the chords change direction.*

...

**SECTION 2208A
STEEL CABLE STRUCTURES**

2208A.1 General. The design, fabrication and erection including related connections, and protective coatings of steel cables for buildings shall be in accordance with ASCE 19.

~~2208.2 Seismic requirements for steel cable.~~ ~~The design strength of steel cables shall be determined by the provisions of ASCE 19 except as modified by these provisions.~~

- ~~1. A load factor of 1.1 shall be applied to the prestress force included in T_3 and T_4 as defined in Section 3.12.~~
- ~~2. In Section 3.2.1, Item (c) shall be replaced with "1.5 T_3 " and Item (d) shall be replaced with "1.5 T_4 ."~~

...

SECTION 2210A COLD-FORMED STEEL

2210A.1 General. The design of cold-formed carbon and low alloy steel structural members shall be in accordance with AISI S100. The design of cold-formed stainless-steel structural members shall be in accordance with ASCE 8. Cold formed steel light-frame construction shall also comply with Section 2211A. Where required, the seismic design of cold formed steel structures shall be in accordance with the additional provisions of Section 2210A.2.

2210A.1.1 Steel decks. The design and construction of cold formed steel decks shall be in accordance with this section.

2210A.1.1.1 Noncomposite steel floor decks. Noncomposite steel floor decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-NC1.0.

2210A.1.1.2 Steel roof deck. Steel roof decks shall be permitted to be designed and constructed in accordance with ANSI/SDI-RD1.0. *The base material thickness of steel deck shall not be less than 0.0359 inch (0.9 mm) (20 gage).*

2210A.1.1.3 Composite slabs on steel decks. Composite slabs of concrete and steel deck shall be permitted to be designed and constructed in accordance with ANSI/SDI-C.

2210A.2 Seismic requirements for cold-formed steel structures. Where a response modification coefficient, R , in accordance with ASCE 7, Table 12.2-1 is used for the design of cold-formed steel structures, the structures shall be designed and detailed in accordance with the requirements of AISI S100, and ASCE 8. ~~or, for cold-formed steel special bolted moment frames, AISI S110.~~

SECTION 2211A COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION

2211A.1 General. The design and installation of structural and nonstructural members utilized in cold-formed steel light-frame construction where the specified minimum base steel thickness is not greater than 0.1180 inches (2.997 mm) shall be in accordance with AISI S200 and Sections 2211A.2 through 2211A.7, or AISI S220, as applicable.

...

2211A.3 Truss design. Cold-formed steel trusses shall be designed in accordance with AISI S214, Sections 2211A.3.1 through 2211A.3.4 and accepted engineering practice.

Complete engineering analysis and truss design drawings shall accompany the construction documents submitted to the enforcement agency for approval. When load testing is required, the test report shall be submitted with the truss design drawings and engineering analysis to the enforcement agency.

2211A.3.1 Truss design drawings. The truss design drawings shall conform to the requirements of Section B2.3 of AISI S214 and shall be provided with the shipment of trusses delivered to the job site. The truss design drawings shall include the details of permanent individual truss member restraint/bracing in accordance with Section B ~~6(a) or B 6(c)~~ of AISI S214 where these methods are utilized to provide restraint/bracing.

2211A.3.2 Deferred submittals. ~~AISI S214 Section B4.2 shall be deleted.~~ *Not permitted by OSHPD.*

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2211A.4 Structural wall stud design. Structural wall studs shall be designed in accordance with either AISI S211 or AISI S100.

Cold formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with Section 2304.3.4, Item 2.

2211A.6 Lateral design. Light-frame shear walls, diagonal strap bracing that is part of a structural wall and diaphragms used to resist wind, seismic and other in-plane lateral loads shall be designed in accordance with AISI S213.

Shear wall assemblies in accordance with ~~per~~ Section C2.2.3 of AISI S213 are not permitted within the seismic force-resisting system of buildings.

2211A.7 Prescriptive framing. *Not permitted by OSHPD. Detached one- and two-family dwellings and townhouses, less than or equal to three stories above grade plane, shall be permitted to be constructed in accordance with AISI S230 subject to the limitations therein.*

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SECTION 2213A TESTING AND FIELD VERIFICATION

2213A.1 Tests of High-strength Bolts, Nuts and Washers. *High-strength bolts, nuts and washers shall be sampled and tested by an approved independent testing laboratory for conformance with the requirements of applicable ASTM standards.*

[OSHPD 1 & 4] *A minimum of 3-samples per lot, as defined in the ASTM standards for bolts [& not nuts and washers], shall be tested for tensile properties in accordance with ASTM F606, but need not exceed 3-samples per 400-bolts.*

2213A.2 Tests of End-welded Studs. *End-welded studs shall be tested in accordance with ~~per~~ the requirements of the AWS D1.1, Sections 7.7 and 7.8.*

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 23 WOOD

...

SECTION 2301 GENERAL

2301.1 Scope. The provisions of this chapter shall govern the materials, design, construction and quality of wood members and their fasteners.

2301.1.1 Application. **[OSHPD 1, 2 & 4]** *The scope of application of Chapter 23 is as follows:*

1. **(Reserved for DSA).**
2. *Applications listed in Section 1.10, regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities and correctional treatment centers.*

Exception: For applications listed in Section 1.10.3 (Licensed Clinics), the provisions of this chapter without OSHPD amendments identified in accordance with Section 2301.1.2 shall apply.

2301.1.2 Identification of amendments. [OSHPD 1, 2 & 4] Office of Statewide Health Planning and Development amendments appear in this chapter preceded with the appropriate acronym, as follows:

1. **(Reserved for DSA).**
2. Office of Statewide Health Planning and Development:
[OSHPD 1] - For applications listed in Section 1.10.1.
[OSHPD 2] - For applications listed in Section 1.10.2.
[OSHPD 4] - For applications listed in Section 1.10.4.

2301.1.3 Reference to other chapters.

2301.1.3.1 **[OSHPD 1 & 4]** Where reference within this chapter is made to sections in Chapters 16, 17, 18, 19, 21, ~~and 22, and 34,~~ the provisions in Chapters 16A, 17A, 18A, 19A, 21A, ~~and 22A, and 34A~~ respectively shall apply instead.

2301.1.3.2 (Reserved for DSA).

2301.1.4 (Relocated from Section 2305.1.2) Prohibition. [OSHPD 1, 2 & 4] The following design methods, systems, and materials are not permitted by OSHPD:

1. Straight-sheathed horizontal lumber diaphragms. ~~are not permitted.~~
2. Gypsum-based sheathing shear walls and portland cement plaster shear walls. ~~are not permitted.~~
3. Shear wall foundation anchor bolt washers ~~shall be provided in accordance with AF & PA SDPWS Section 4.3.6.4.3. The exception to AF & PA AWC SDPWS Section 4.3.6.4.3, shall not apply.~~
4. Wood structural panel shear walls and diaphragms using staples as fasteners. ~~are not permitted.~~
5. Unblocked shear walls. ~~are not permitted.~~
6. Any wood structural panel sheathing used for diaphragms and shear walls, that are part of the seismic force-resisting system, ~~shall be not applied directly to framing members.~~
7. Single and double diagonally sheathed lumber walls ~~shall not be used to resist seismic forces.~~
8. **(Relocated from Section 2301.2)** Log structures in accordance with ICC 400. ~~are not permitted by OSHPD.~~
9. Cross-laminated timber used as part of the seismic force resisting system, unless approved as an alternative system in accordance with Section 104.11.

2301.2 General design requirements. The design of structural elements or systems, constructed partially or wholly of wood or wood-based products, shall be in accordance with one of the following methods:

...

5. The design and construction of log structures shall be in accordance with the provisions of ICC 400.

(Relocated to Section 2301.1.4). Exception: [OSHPD 1, 2, & 4] Log structures are not permitted by OSHPD.

...

SECTION 2302 DEFINITIONS

2302.1 Definitions. The following terms are defined in Chapter 2:

...

NATURALLY DURABLE WOOD.

Decay resistant.

Termite resistant.

...

**SECTION 2303
MINIMUM STANDARDS AND QUALITY**

2303.1 General. Structural sawn lumber; end-jointed lumber; prefabricated wood I-joists; structural glued-laminated timber; wood structural panels, fiberboard sheathing (when used structurally); hardboard siding (when used structurally); particleboard; preservative-treated wood; structural log members; structural composite lumber; round timber poles and piles; fire-retardant-treated wood; hardwood plywood; wood trusses; joist hangers; nails; and staples shall conform to the applicable provisions of this section.

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2303.1.3 Structural glued-laminated timber. Glued-laminated timbers shall be manufactured and identified as required in ANSI/APA A190.1 and ASTM D 3737.

2303.1.3.1 Additional requirements. [OSHPD 1, 2 and 4] *The construction documents shall indicate the following:*

1. *Dry or wet service conditions.*
2. *Laminating combinations and stress requirements.*
3. *Species group.*
4. *Preservative material and retention, when preservative treatment is required.*
5. *Provisions for protection during shipping and field handling, such as sealing and wrapping in accordance with AITC 111.*

When mechanical reinforcement such as radial tension reinforcement is required, such reinforcement shall comply with AITC 404 and shall be detailed accordingly in the construction documents. Construction documents shall specify that the moisture content of laminations at the time of manufacture shall not exceed 12% for dry conditions of use.

The design of fasteners and connections shall comply with AITC 117, Section I, Item 6 (Connection Design), and NDS Appendix E.

Refer to Section 1705A.5.4 for special inspection requirements during fabrication of structural glued laminated timbers.

2303.1.4 Structural glued cross-laminated timber. Cross-laminated timbers shall be manufactured and identified as required in ANSI/APA PRG 320.

2303.1.4.1 Additional requirements. [OSHPD 1, 2 and 4] Requirements in Section 2303.1.3.1 shall apply to glued cross-laminated timber.

...

2303.4.1.4.1 Truss design drawings. Where required by the *registered design professional*, the *building official*, or the statutes of the jurisdiction in which the project is to be constructed, each individual truss design drawing shall bear the seal and signature of the truss designer.

Exceptions:

1. Where a cover sheet and truss index sheet are combined into a single sheet and attached to the set of truss design drawings, the single cover/truss index sheet is the only document required to be signed and sealed by the truss designer.
2. When a cover sheet and a truss index sheet are separately provided and attached to the set of truss design drawings, the cover sheet and the truss index sheet are the only documents required to be signed and sealed by the truss designer.
3. **[OSHPD 1, 2, and 4]** *Exceptions 1 and 2 are not permitted by OSHPD.*

2303.4.2 Truss placement diagram. The truss manufacturer shall provide a truss placement diagram that identifies the proposed location for each individually designated truss and references the corresponding truss design drawing. The truss placement diagram shall be provided as part of the truss submittal package, and with the shipment of trusses delivered to the job site. Truss placement diagrams that serve only as a guide for installation and do not deviate from the *permit* submittal drawings shall not be required to bear the seal or signature of the truss designer.

2303.4.3 Truss submittal package. The truss submittal package provided by the truss manufacturer shall consist of each individual truss design drawing, the truss placement diagram, the permanent individual truss member restraint/bracing method and details and any other structural details germane to the trusses; as applicable, the cover/truss index sheet.

2303.4.3.1 Additional Requirements. [OSHPD 1, 2, and 4] In addition to Sections 2303.4.1 and 2303.4.2, the following requirements apply:

1. **Construction Documents.** The construction documents prepared by the registered engineer or licensed architect for the project shall indicate all requirements for the truss design, including:

1.1 Deflection criteria.

1.2 Connection details to structural and non-structural elements (e.g. non-bearing partitions).

2. **Requirements for Approval.** The truss design drawings and engineering analysis shall be provided to the enforcement agency and approved prior to truss fabrication, in accordance with the California Administrative Code. Alterations to the approved truss design drawings or manufactured trusses are subject to the approval of the enforcement agency.

~~3. **Special inspection during truss manufacture.** Refer to Section 1705A.5.5 for special inspection requirements during the manufacture of open web trusses~~

2303.4.4 Anchorage. The design for the transfer of loads and anchorage of each truss to the supporting structure is the responsibility of the *registered design professional*.

2303.4.5 Alterations to trusses. Truss members and components shall not be cut, notched, drilled, spliced or otherwise altered in any way without written concurrence and approval of a *registered design professional*. Alterations resulting in the addition of loads to any member (e.g., HVAC equipment, piping, additional roofing or insulation, etc.) shall not be permitted without verification that the truss is capable of supporting such additional loading.

2303.4.6 TPI 1 Specifications. In addition to Sections 2303.4.1 through 2303.4.5, the design, manufacture and quality assurance of metal-plate-connected wood trusses shall be in accordance with TPI 1. Job-site inspections shall be in compliance with Section 110.4, as applicable.

2303.4.7 Truss quality assurance. Trusses not part of a manufacturing process in accordance with either Section 2303.4.6 or a standard listed in Chapter 35, which provides requirements for quality control done under the supervision of a third-party quality control agency, shall be manufactured in compliance with Sections 1704.2 and 1704.6, as applicable.

...

SECTION 2304 GENERAL CONSTRUCTION REQUIREMENTS

2304.1 General. The provisions of this section apply to design methods specified in Section 2301.2.

2304.2 Size of structural members. Computations to determine the required sizes of members shall be based on the net dimensions (actual sizes) and not nominal sizes.

2304.3 Wall framing. The framing of exterior and interior walls shall be in accordance with the provisions specified in Section 2308 unless a specific design is furnished.

2304.3.1 Bottom plates. Studs shall have full bearing on a 2-inch-thick (actual 1½-inch, 38 mm) or larger plate or sill having a width at least equal to the width of the studs.

2304.3.2 Framing over openings. Headers, double joists, trusses or other approved assemblies that are of adequate size to transfer loads to the vertical members shall be provided over window and door openings in load-bearing walls and partitions.

2304.3.3 Shrinkage. Wood walls and bearing partitions shall not support more than two floors and a roof unless an analysis satisfactory to the building official shows that shrinkage of the wood framing will not have adverse effects on the structure or any plumbing, electrical or mechanical systems, or other equipment installed therein due to excessive shrinkage or differential movements caused by shrinkage. The analysis shall also show that the roof drainage system and the foregoing systems or equipment will not be adversely affected or, as an alternate, such systems shall be designed to accommodate the differential shrinkage or movements.

2304.3.4 Additional requirements. [OSHPD 1, 2, and 4] The following additional requirements apply:

1. *Engineering analysis shall be furnished that demonstrates compliance of wall framing elements and connections with Section 2301.2, Item 1 or 2.*
2. *Construction documents shall include detailing of sill plate anchorage to supporting masonry or concrete for all exterior and interior bearing, non-bearing and shear walls. Unless specifically designed in accordance with item 1 above, sills under exterior walls, bearing walls and shear walls shall be bolted to masonry or concrete with 5/8" diameter by 12 inch (16 mm by 305 mm) bolts spaced not more than four (4) feet (1219 mm) on center, with a minimum of two (2) bolts for each piece of sill plate. Anchor bolts shall have a 4 inch minimum and a 12 inch maximum clearance to the end of the sill plate, and 7 inch minimum embedment into concrete or masonry.*

Unless specifically designed in accordance with item 1 above, sill plates under non-bearing interior partitions on concrete floor slabs shall be anchored at not more than four (4) feet (1219 mm) on center to resist a minimum allowable stress shear of 100 pounds per linear foot (1.4 kN/m) acting either parallel or perpendicular to the wall.

3. *Construction documents shall include detailing and limitations for notches and bored holes in wall studs, plates and sills.*

2304.4 Floor and roof framing. The framing of wood-joisted floors and wood framed roofs shall be in accordance with the provisions specified in Section 2308 unless a specific design is furnished.

2304.4.1 Additional requirements. [OSHPD 1, 2, and 4] The following additional requirements apply:

1. *Engineering analysis shall be furnished that demonstrates compliance of floor, roof and ceiling framing elements and connections with Section 2301.2, Items 1 or 2.*
2. *Construction documents shall include detailing and limitations for notches and bored holes in floor and roof framing members.*

...

2304.6.1 Wood structural panel sheathing.

...

~~**Exception:** [OSHPD 1 & 4] Wind pressure shall be calculated in accordance with Section 1609A.~~

...

2304.10 Connections and fasteners.

...

2304.10.1 Fastener requirements. Connections for wood members shall be designed in accordance with the appropriate methodology in Section 2301.2. The number and size of fasteners connecting wood members shall not be less than that set forth in Table 2304.10.1.

2304.10.1.1 2304.9.1.1 Additional requirements. [OSHPD 1, 2 and 4] Fasteners used for the attachment of exterior wall coverings shall be of hot-dipped zinc-coated galvanized steel, mechanically deposited zinc-coated steel, stainless steel, silicon bronze or copper. The coating weights for hot-dipped zinc-coated fasteners shall be in accordance with ASTM A 153. The coating weights for mechanically deposited zinc coated fasteners shall be in accordance with ASTM B 695, Class 55 minimum.

...

2304.12.1.2 Wood supported by exterior foundation walls. Wood framing members, including wood sheathing, that rest on exterior foundation walls and are less than 8 inches (203 mm) from exposed earth shall be of naturally durable or preservative-treated wood.

Exception: [OSHPD 1, 2 and 4] At exterior walls where the earth is paved with an asphalt or concrete slab at least 18 inches (457 mm) wide and draining away from the building, the bottom of sills are permitted to be 6 inches (152 mm) above the top of such slab. Other equivalent means of termite and decay protection may be accepted by the enforcement agency.

...

2304.12.1.4 Sleepers and sills. Sleepers and sills on a concrete or masonry slab that is in direct contact with earth shall be of naturally durable or preservative-treated wood.

2304.12.1.4 2304.11.2.4.1 Additional Requirements. [OSHPD 1, 2, and 4] Stud walls or partitions at shower or toilet rooms with more than two fixtures, and stud walls adjacent to unroofed paved areas shall rest on a concrete curb extending at least 6 inches (152 mm) above finished floor or pavement level.

...

SECTION 2305

GENERAL DESIGN REQUIREMENTS FOR LATERAL-FORCE-RESISTING SYSTEMS

...

2305.1.1 Openings in shear panels. Openings in shear panels that materially affect their strength shall be detailed on the plans, and shall have their edges adequately reinforced to transfer all shearing stresses.

2305.1.2 Additional Requirements. See Section 2301.1.4 for modifications to AWC SDPWS. (Relocated to Section 2301.1.4). **[OSHPD 1, 2 and 4]** The following limitations shall apply:

- ~~1. Straight sheathed horizontal lumber diaphragms are not permitted.~~
- ~~2. Gypsum-based sheathing shear walls and portland cement plaster shear walls are not permitted.~~
- ~~3. Shear wall foundation anchor bolt washers shall be provided in accordance with AF & PA SDPWS Section 4.3.6.4.3. The exception to AF & PA SDPWS Section 4.3.6.4.3 shall not apply.~~
- ~~4. Wood structural panel shear walls and diaphragms using staples as fasteners are not permitted.~~
- ~~5. Unblocked shear walls are not permitted.~~
- ~~6. Any wood structural panel sheathing used for diaphragms and shear walls that are part of the seismic force-resisting system shall be applied directly to framing members.~~
- ~~7. Single and double diagonally sheathed lumber walls shall not be used to resist seismic forces.~~

2305.2 Diaphragm deflection.

...

~~**Exception:** [OSHPD 1, 2 & 4] Section 2305.2 is not permitted by OSHPD.~~

...

2305.3 Shear wall deflection

...

~~**Exception:** [OSHPD 1, 2 & 4] Section 2305.3 is not permitted by OSHPD.~~

...

SECTION 2306 ALLOWABLE STRESS DESIGN

2306.1 Allowable stress design. The structural analysis and construction of wood elements in structures using *allowable stress design* shall be in accordance with the following applicable standards:

...

2306.2 Wood-frame diaphragms. Wood-frame diaphragms shall be designed and constructed in accordance with AWC SDPWS. Where panels are fastened to framing members with staples, requirements and limitations of AWC SDPWS shall be met and the allowable shear values set forth in Table 2306.2(1) or 2306.2(2) shall be permitted. The allowable shear values in Tables 2306.2(1) and 2306.2(2) are permitted to be increased 40 percent for wind design.

~~**Exception:** [OSHPD 1, 2 & 4] Wood structural panel diaphragms using staples as fasteners are not permitted by OSHPD.~~

...

2306.3 Wood-frame shear walls. Wood-frame shear walls shall be designed and constructed in accordance with AWC SDPWS. Where panels are fastened to framing members with staples, requirements and limitations of AWC SDPWS shall be met and the allowable shear values set forth in Table 2306.3(1), 2306.3(2) or 2306.3(3) shall be permitted. The allowable shear values in Tables 2306.3(1) and 2306.3(2) are permitted to be increased 40 percent for wind design. Panels complying with ANSI/APA PRP-210 shall be permitted to use design values for Plywood Siding in the AWC SDPWS.

~~**Exception:** [OSHPD 1, 2 & 4] Wood structural panel shear walls using staples as fasteners are not permitted by OSHPD.~~

...

SECTION 2308 CONVENTIONAL LIGHT-FRAME CONSTRUCTION

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2308.2.7 & Additional requirements [OSHPD 2] The use of conventional light-frame construction provisions in this section is permitted, subject to the following conditions:

- ~~1.~~ ~~8-1.~~ The design and construction shall also comply with Section 2304 and Section 2305.
- ~~2.~~ ~~8-2.~~ In conjunction with the use of provisions in Section ~~2308.6~~ ~~2308.3~~ (~~Braced Wall Lines Wall Bracing~~), engineering analysis shall be furnished that demonstrates compliance of lateral-force-resisting systems with Section 2305.
- ~~3.~~ ~~8-3.~~ In addition to the use of provisions in Section ~~2308.4~~ ~~2308.8~~ (~~Floor framing Joists~~), engineering analysis shall be furnished that demonstrates compliance of floor framing elements and connections with Section 2301.2, Item 1 or 2.
- ~~4.~~ ~~8-4.~~ In addition to the use of provisions in Section ~~2308.5~~ ~~2308.9~~ (~~Wall construction Framing~~), engineering analysis shall be furnished that demonstrates compliance of wall framing elements and connections with Section 2301.2, Item 1 or 2.

5. ~~8.5.~~ *In addition to the use of provisions in Section 2308.7 ~~2308.10~~ (Roof and Ceiling Framing), engineering analysis shall be furnished demonstrating compliance of roof and ceiling framing elements and connections with Section 2301.2, Item 1 or 2.*

...

SECTION 2309 WOOD FRAME CONSTRUCTION MANUAL

2309.1 Wood Frame Construction Manual. Structural design in accordance with AWC WFCM shall be permitted for buildings assigned to Risk Category I or II subject to the limitations of Section 1.1.3 of the AWC WFCM and the load assumption contained therein. Structural elements beyond these limitations shall be designed in accordance with accepted engineering practice.

2309.1.1 Additional requirements [OSHPD 2] *The use of the AWC WFCM is permitted provided the design and construction also comply with Sections 2304, 2305, and 2301.2, Item 1 or 2 and engineering analysis is furnished demonstrating compliance.*

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 24 GLASS AND GLAZING

...

SECTION 2401 GENERAL

2401.1 Scope. The provisions of this chapter shall govern the materials, design, construction and quality of glass, light-transmitting ceramic and light-transmitting plastic panels for exterior and interior use in both vertical and sloped applications in buildings and structures.

...

SECTION 2403 GENERAL REQUIREMENTS FOR GLASS

2403.1 Identification. Each pane shall bear the manufacturer's mark designating the type and thickness of the glass or glazing material. The identification shall not be omitted unless approved and an affidavit is furnished by the glazing contractor certifying that each light is glazed in accordance with approved construction documents that comply with the provisions of this chapter. Safety glazing shall be identified in accordance with Section 2406.2.

...

2403.2 Glass supports. Where one or more sides of any pane of glass are not firmly supported, or are subjected to unusual load conditions, detailed construction documents, detailed shop drawings and analysis or test data ensuring safe performance for the specific installation shall be prepared by a registered design professional.

2403.2.1 Additional Requirements. [OSHPD 1 and 4] *In addition to the requirements of Section 2403.2, glass supports shall comply with the following:*

- 1. The construction documents and analysis or test data required per Section 2403.2 shall be submitted to the enforcement agency for approval.*
- 2. Glass firmly supported on all four edges shall be glazed with minimum laps and edge clearances set forth in Table 2403.2.1.*

**TABLE 2403.2.1
MINIMUM GLAZING REQUIREMENTS**

Fixed Windows and Operable Windows Other Than Horizontal Siding					
GLASS AREA	UP TO 6 SQ. FT.	6 TO 14 SQ. FT.	14 TO 32 SQ. FT.	32 TO 50 SQ. FT.	OVER 50 SQ. FT.
× 0.0929 for m ² , × 25.4 for mm					
1. Minimum Frame Lap	1/4"	1/4"	5/16"	3/8"	1/2"
2. Minimum Glass Edge Clearance	1/8" ^{1,2}	1/8" ^{1,2}	3/16" ¹	1/4"	1/4" ¹
3. Continuous Glazing Rabbet and Glass Retainer ³	Required				
4. Resilient Setting Material ⁴	Not Required	Required			
Sliding Doors and Horizontal Sliding Windows					
GLASS AREA	UP TO 14 SQ. FT.	14 TO 32 SQ. FT.	32 TO 50 SQ. FT.	OVER 50 SQ. FT.	
× 0.0929 for m ² , × 25.4 for mm					
5. Minimum Glass Frame Lap	1/4"	5/16"	3/8"	1/2"	
6. Minimum Glass Edge Clearance	1/8" ²	3/16"	1/4"	1/4"	
7. Continuous Glazing Rabbet and Glass Retainer ³	Required above third story	Required			
8. Resilient Setting Material ⁴	Not Required		Required		

¹ Glass edge clearance in fixed openings shall not be less than required to provide for wind and earthquake drift.

² Glass edge clearance at all sides of pane shall be a minimum of 3/16 inch (4.8 mm) where height of glass exceeds 3 feet (914 mm).

³ Glass retainers such as metal, wood or vinyl face stops, glazing beads, gaskets, glazing clips and glazing channels shall be of sufficient strength and fixation to serve this purpose.

⁴ Resilient setting material shall include preformed rubber or vinyl plastic gaskets or other materials which are proved to the satisfaction of the building official to remain resilient.

...

**SECTION 2410 [OSHPD 1 & 4]
STRUCTURAL SEALANT GLAZING (SSG)**

2410.1 General. The requirements of this section address the use of Structural Sealant Glazing (SSG). These requirements shall not be used for butt joint glazing, point supported glass, and glass fins.

Design, construction, testing, and inspection shall satisfy the requirements of this code except as modified in Sections 2410.1.1 through 2410.1.4.

2410.1.1 Design. Design of Structural Sealant Glazing (SSG) shall satisfy the following requirements:

1. SSG shall be weather tight and serviceable, as defined in AAMA 501.4, under design story drifts associated with the Design Earthquake and no glass fallout shall occur at the drifts determined by ASCE 7 Section 13.5.9.
2. The sealant utilized in the insulated glass units used in SSG shall be designed in accordance with ASTM C 1249. The insulated glass unit design shall be in accordance with ASTM C 1249 Section 6.7.2.

3. *Allowable stress for SSG shall not exceed 20 psi and shall have a minimum factor of safety of 5 in accordance with ASTM C 1401.*
4. *Design methodology shall address seismic movement in accordance with ASTM C 1401 Section 30.3.4.*
5. *SSG systems shall be supported for self-weight and lateral loading at each floor level of the building.*
6. *Unitized SSG framing shall be anchored to the building floor bearing plate by screws or bolts and shall not rely upon gravity or frictional forces for attachment.*
7. *Framing shall satisfy the out-of-plane deflection requirements of this code.*

2410.1.2 Testing and Inspection. *Testing and inspection of Structural Sealant Glazing (SSG) shall satisfy the following requirements:*

- a. *The seismic drift capability of structural sealant glazing shall be determined by tests in accordance with AAMA 501.6, AAMA 501.4 and ASCE 7 Section 13.5.9.2.*
- b. *The applicability of the specific AAMA 501.6 and AAMA 501.4 testing shall be subject to approval by the building official.*
- c. *The panel test specimens used in the AAMA 501.6 and AAMA 501.4 testing shall include all glass types (annealed, heat strengthened, laminated, tempered) and insulated glass units that comprise more than 5% of the total glass curtain wall area used in the building.*
- d. *AAMA 501.4 test specimen shall include the same materials, sections, connections, and attachment details to the test apparatus as used in the building.*
- e. *Serviceability tests of SSG test specimen shall be performed in accordance with AAMA 501.4 after seismic displacement tests to the design story drift.*
- f. *The window wall system using structural sealant by different manufacturer/product category shall be qualified in accordance with AAMA 501.6 and AAMA 501.4 testing for the seismic drift required. Analysis as an alternative to testing is not acceptable for the purposes of satisfying the seismic drift requirements of the SSG system.*
- g. *Where unitized SSG is used with horizontal stack joints at each floor level and split vertical mullions that can move independently, only a story height single unit need to be tested under AAMA 501.6. Where continuous horizontal bands of SSG are used in the building, either two or four sided, the aspect ratio (height-to-length) of the test specimen shall be less than 1.0, contain not less than two interior vertical joints and all joints (vertical in the case of two sided), including the perimeter of the glass, shall be glazed with SSG.*
- h. *Where SSG continues around corners, the AAMA 501.4 test specimen shall include one corner panel to verify the kinematics of the corner condition under seismic drift.*
- i. *Quality assurance and inspection requirements shall include formalized post-installation tests using the Point Load Testing procedure in accordance with ASTM C 1392. The Point Load Tests shall be done after the initial installation. ~~then once every year for 3 years, not less than one test per elevation each time.~~*

- j. Where the SSG is field assembled, hand pull tab tests in accordance with ASTM C1401 Section X2.1, one test every 100 linear feet, but not less than one test for each building elevation view shall be required.

Existing AAMA 501.4 and 501.6 test results satisfying the requirements of this section shall be permitted, in lieu of project specific tests, when approved by the building official.

2410.1.3 Monitoring. Short and Long term periodic performance monitoring shall be provided in accordance with ASTM C 1401, C 1392, and C 1394. Inspection frequencies recommended in ASTM C 1392 Section 5.1 shall be followed.

~~After every significant seismic event, where the ground shaking acceleration at the site exceeds 0.3g, or the acceleration at any monitored building level (if any) exceeds 0.8g, as measured by the seismic monitoring system in the building, the owner shall retain a structural engineer to make an inspection of the SSG system. The inspection shall include viewing the performance of the panel, structural sealant, glass, reviewing the strong motion records, and a visual examination of the overall performance for deterioration, offset or physical damage. A report for each inspection, including conclusions on the continuing adequacy of the SSG system, shall be submitted to the enforcement agency.~~

2410.1.4 Construction Documents. Complete design of the SSG system for gravity, wind, and seismic forces shall be subject to review by the enforcement agency. Construction documents shall show structural details of glass and curtain wall system including:

1. A design narrative explaining how the SSG is supported by the building and the mechanism used to accommodate seismic racking.
2. Type of SSG and whether field or shop built.
3. The means of supporting the glass during structural sealant curing time shall be shown in the construction documents.
4. Typical curtain wall panel elevation, plan view, and sections.
5. Details of building corner joint to verify how the corner vertical mullion will move to accommodate the seismic drift.
6. Joints between panel and floors at top and bottom.
7. Joint between panels – including vertical & horizontal stack joints at intermediate and edge mullion.
8. Member sizes for curtain wall panels.
9. Glass pane sizes, thickness and type of glass.
10. Contact width and thickness of structural sealant and sealant materials for shop and field installation/re-glazing.
11. Glass to aluminum joints (including primers, if any).
12. Maximum roof/floor dead and live load deflection of the roof/floor framing members supporting the exterior curtain wall system.
13. Required seismic separation or gap distance between the structural sealant glazing curtain wall and other adjacent cladding units.
14. Mitigation of galvanic reactions between the roof/floor slab anchors, steel screw connections of aluminum sections and the aluminum anchorage components, if any.

(All existing amendments that are not revised above shall continue without any change)

Notation:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

CHAPTER 25 GYPSUM BOARD, GYPSUM PANEL PRODUCTS AND PLASTER

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**SECTION 2501
GENERAL**

2501.1 Scope. Provisions of this chapter shall govern the materials, design, construction and quality of gypsum board, gypsum panel products, lath, gypsum plaster, cement plaster and reinforced gypsum concrete.

...

2501.1.1 2501.2 Additional Requirements. [OSHPD 1 and 4] *Details of attachment for wall and ceiling coverings which are not provided for in this code ~~these regulations~~ shall be detailed in the approved construction documents.*

...

**SECTION 2503
INSPECTION**

2503.1 Inspection. Lath, gypsum board and gypsum panel products shall be inspected in accordance with Section 110.3.5.

2503.2 Additional requirements for inspection and testing. [OSHPD 1 and 4]

1. *Lath, ~~and gypsum board and gypsum panel products~~ shall be inspected in accordance with Chapter 17A and the California Administrative Code.*
2. *No lath, gypsum board and gypsum panel products ~~or gypsum wallboard~~ or their attachments shall be covered or finished until it has been inspected and approved by the inspector of record and/or special inspector.*
3. *The enforcement agency may require tests in accordance with Table 2506.2 to determine compliance with the provisions of this code. ~~these regulations~~.*
4. *The testing of gypsum board and gypsum panel ~~and gypsum~~ products shall conform with standards listed in Table 2506.2.*

...

**SECTION 2504
VERTICAL AND HORIZONTAL ASSEMBLIES**

2504.1 Scope. The following requirements shall be met where construction involves gypsum board, gypsum panel products or lath and plaster in vertical and horizontal assemblies.

...

2504.2 Additional Requirements. [OSHPD 1 and 4] *In addition to the requirements of this section, the horizontal and vertical assemblies of plaster, ~~or gypsum board or gypsum panel products~~ shall be designed to resist the loads specified in this code. ~~For suspended acoustical ceiling systems, see Section 2506. For gypsum construction, see Section 2508.~~*

2504.2.1 Wood Furring Strips. *Wood furring strips for ceilings fastened to floor or ceiling joist shall be nailed at each bearing with two common wire nails, one of which shall be a slant nail and the other a face nail, or by one nail having spirally grooved or annular grooved shanks approved by the enforcement agency for this purpose. All stripping nails shall penetrate not less than 1 3/4 inches (44.5 mm) into the member receiving the point. Holes in stripping at joints shall be subdrilled to prevent splitting.*

Where common wire nails are used to support horizontal wood stripping for plaster ceilings, such stripping shall be wire tied to the joists 4 feet (1219 mm) on center with two strands of No. 18 W&M gage galvanized annealed wire to an 8d common wire nail driven into each side of the joist

2 inches (51 mm) above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches (51 mm) above the bottom of the joist, and the ends of the wire secured together with three twists of the wire.

SECTION 2505 SHEAR WALL CONSTRUCTION

...

2505.3 [OSHPD 1 and 4] Section 2505.1 and 2505.2 are not permitted. ~~by OSHPD.~~

...

SECTION 2507 LATHING AND PLASTERING

2507.1 General. Lathing and plastering materials and accessories shall be marked by the manufacturer's designation to indicate compliance with the appropriate standards referenced in this section and stored in such a manner to protect them from the weather.

2507.2 Standards. Lathing and plastering materials shall conform to the standards listed in Table 2507.2 and Chapter 35 and, where required for fire protection, shall also conform to the provisions of Chapter 7.

2507.3 Lath attachment to horizontal wood supports. [OSHPD 1 and 4] Where interior or exterior lath is attached to horizontal wood supports, either of the following attachments shall be used in addition to the methods of attachment described in referenced standards listed in Table 2507.2.

1. Secure lath to alternate supports with ties consisting of a double strand of No. 18 W & M gage galvanized annealed wire at one edge of each sheet of lath. Wire ties shall be installed not less than 3 inches (76 mm) back from the edge of each sheet and shall be looped around stripping, or attached to an 8d common wire nail driven into each side of the joist 2 inches (51 mm) above the bottom of the joist or to each end of a 16d common wire nail driven horizontally through the joist 2 inches (51 mm) above the bottom of the joist and the ends of the wire secured together with three twists of the wire.
2. Secure lath to each support with 1/2-inch-wide (12.7 mm), 1 1/2-inch-long (38mm) No. 9 W & M gage, ring shank, hook staple placed around a 10d common nail laid flat under the surface of the lath not more than 3 inches (76 mm) from edge of each sheet. Such staples may be placed over ribs of 3/8-inch (9.5 mm) rib lath or over back wire of welded wire fabric or other approved lath, omitting the 10d nails.

SECTION 2508 GYPSUM CONSTRUCTION

2508.1 General.

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2508.5.6 Diaphragm ceiling connection to partitions. [OSHPD 1 and 4] Gypsum board shall not be used in diaphragm ceilings to resist lateral forces imposed by partitions. Connection of diaphragm ceiling to the vertical lateral force resisting elements shall be designed and detailed to transfer lateral forces.

...

SECTION 2514 REINFORCED GYPSUM CONCRETE

2514.1 General. Reinforced gypsum concrete shall comply with the requirements of ASTM C 317 and ASTM C 956.

Exception: *(Relocated from Section 1911A) [OSHPD 1 and 4] Reinforced gypsum concrete shall be considered as an alternative system.*

...

(All existing amendments are continued without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850, and 129790

CHAPTER 34

RESERVED

Action taken during the 2012 Code Development Process removed Chapter 34, Existing Structures, from the IBC. The provisions of this chapter are contained in the International Existing Building Code. See Section 101.4.7.

CHAPTER 34A EXISTING STRUCTURES

SECTION 3401A GENERAL

3401A.1 Scope. ~~The provisions of this chapter shall control the alteration, repair, addition, and change of occupancy of existing structures for applications listed in Sections 1.10.1 [OSHPD 1] and 1.10.4 [OSHPD 4] regulated by the Office of Statewide Health Planning and Development (OSHPD). These applications include hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers. Exception: [OSHPD 2] Single-story Type V skilled nursing or intermediate care facilities utilizing wood-frame or light-steel-frame construction as defined in Health and Safety Code Section 129725, which shall comply with Chapter 34 and any applicable amendments therein.~~

~~For SFM and DSA-AC requirements for existing structures shall be enforced by the Office of Statewide Health Planning and Development (OSHPD), refer to Chapter 34.~~

3401A.1.1 Additions, alterations and repairs. The additions, alterations and repairs shall follow one of the three procedures listed below:

1. Provisions in Sections 3403A, 3404A and 3405A; or
2. Nonconforming buildings provisions in Section 3411A; or
3. Performance based or prescriptive provisions in Section 3412A.

Items 1 through 3 above shall not be applied in combination with each other, except when explicitly permitted.

The services/systems, utilities and means of egress shall satisfy requirements in Sections 3416A and 3417A.

3401A.2 Maintenance. Buildings and structures, and parts thereof, shall be maintained in a safe and sanitary condition. Devices or safeguards which are required by this code shall be maintained in conformance with the code edition under which they were installed. The owner or the owner's designated agent shall be responsible for the maintenance of buildings and structures. To determine compliance with this subsection, the building official shall have the authority to require a building or structure to be re-inspected. The requirements of this chapter shall not provide the basis for removal or abrogation of fire protection and safety systems and devices in existing structures.

3401A.3 Compliance. Alterations, repairs, additions and changes of occupancy to, or relocation of, existing buildings and structures shall comply with the provisions for alterations, repairs, additions and changes of occupancy or relocation, respectively, in the California Fire Code, California Mechanical Code, California Plumbing Code, and California Electrical Code. Where provisions of the other codes conflict with provisions of this chapter, the provisions of this chapter shall take precedence.

3401A.4 Building materials and systems. Building materials, equipment, and systems shall comply with the requirements of this section.

3401A.4.1 Existing materials and equipment. Materials and equipment already in use in a building in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the building official to be unsafe ~~per~~ in accordance with Section 116.

3401A.4.2 New and replacement materials and equipment. Except as otherwise required or permitted by this code, materials and equipment permitted by the applicable code for new construction shall be used. Like materials shall be permitted for repairs and alterations, provided no hazard to life, health or property is created. Hazardous materials shall not be used where the code for new construction would not permit their use in building of similar occupancy, purpose, and location.

3401A.4.3 Existing seismic force-resisting systems. Where the existing seismic force-resisting system is a type that can be designated ordinary or is a welded steel moment frame constructed under a permit issued prior to October 25, 1994, values of R , Ω_0 , and C_d for the existing seismic force-resisting system shall be those specified by this code for an ordinary system unless it is demonstrated that the existing system will provide performance equivalent to that of a detailed, intermediate or special system.

3401A.5 Dangerous conditions. The building official shall have the authority to require the elimination of conditions deemed dangerous.

SECTION 3402A DEFINITIONS

3402A.1 Definitions. The following terms are defined in chapter 2.

DANGEROUS.

PRIMARY FUNCTION.

SUBSTANTIAL STRUCTURAL DAMAGE.

TECHNICALLY INFEASIBLE.

3402A.2 Definitions for this Chapter. The following words and terms shall, for the purposes of this chapter and as used elsewhere in the code, have the meanings shown herein. Definition provided in Section 1613A.2, ASCE 7 Section 11.2 and ASCE 41 shall apply when appropriate in addition to terms defined in this section:

CHANGE IN FUNCTION. A change in function is a change in activity, service or licensed service provided, within the project limits, that does not necessarily change the use, specific use, and/or occupancy. Conversion of a space that results in a change in activity such that the space will be required to satisfy the functional space requirements under a different code sub-section than that of the prior use is considered a change in function.

~~ASSOCIATED STRUCTURAL ALTERATIONS~~ ~~means any change affecting existing structural elements or requiring new structural elements for vertical or lateral support of an otherwise nonstructural alteration.~~

EXISTING STRUCTURE. A structure that has a valid certificate of occupancy issued by the building official.

GENERAL ACUTE CARE HOSPITAL. See Section 1224.3.

NONSTRUCTURAL ALTERATION is any alteration which neither affects existing structural elements nor requires new structural elements for vertical or lateral support and which does not increase the lateral shear force in any story by more than 5 percent.

PEER REVIEW refers to procedure contained in Section 3414A.

REPAIR as used in this chapter means all the design and construction work affecting existing or requiring new structural elements undertaken to restore or enhance the structural and nonstructural load resisting system participating in vertical or lateral response of a structure primarily intended to correct the effects of deterioration or impending or actual failure, regardless of cause.

[Relocated from Section 3418A] SPC SEISMIC SEPARATION. Means a building separation in accordance with the California Administrative Code, Chapter 6 Section 3.4.

Unreinforced Masonry as used in this chapter means masonry construction where reinforcements in any direction is less than minimum reinforcement specified in TMS 402 Section 7.3.2.6.

Unreinforced Concrete as used in this chapter means plain concrete as defined in ACI 318 Section 2.3.

VOLUNTARY STRUCTURAL ALTERATION is any alteration of existing structural element or addition of new structural elements which is not necessary for vertical or lateral support of other work and is initiated by the applicant primarily for the purpose of increasing the vertical or lateral load-carrying strength or stiffness of an existing building.

SECTION 3403A ADDITIONS

3403A.1 General. Additions to any building or structure shall comply with the requirements of this code for new construction. Alterations to the existing building or structure shall be made to ensure that the existing building or structure together with the addition are no less conforming with the provisions of this code than the existing building or structure was prior to the addition. An existing building together with its additions shall comply with the height and area provisions of Chapter 5.

3403A.2 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612A.3, any addition that constitutes substantial improvement of the existing structure, as defined in Section ~~202 1612A.2~~, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in flood hazard areas established in Section 1612A.3, any additions that do not constitute substantial improvement of the existing structure, as defined in Section ~~202 1612A.2~~, are not required to comply with the flood design requirements for new construction.

3403A.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an addition and its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased shall be considered an altered element subject to the requirements of Section 3404A.3. Any existing element that will form part of the lateral load path for any part of the addition shall be considered an existing lateral load-carrying structural element subject to the requirements of Section 3403A.4.

3403A.3.1 Design live load. Where the addition does not result in increased design live load, existing gravity load carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the addition. If the approved live load is less than that

required by Section 1607A, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the addition does result in increased design live load, the live load required by Section 1607A shall be used.

3403A.4 Existing structural elements carrying lateral load. Where the addition is structurally independent of the existing structure, existing lateral load-carrying structural elements shall be permitted to remain unaltered. Where the addition is not structurally independent of the existing structure, the existing structure and its addition acting together as a single structure shall be shown to meet the requirements of Sections 1609A and 1613A.

Exceptions: *For incidental and minor additions:*

- 1) Any existing lateral load-carrying structural element whose demand-capacity ratio with the addition considered is no more than 10 percent greater than its demand-capacity ratio with the addition ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces in accordance with Sections 1609A and 1613A. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces and capacities shall account for the cumulative effects of additions and alterations since original construction.
- 2) ~~For incidental additions,~~ *Drift limits based on original design code shall be permitted to be used in lieu of the drift limits required by ASCE 7.*

SECTION 3404A ALTERATIONS

3404A.1 General. Except as provided by this section, alterations to any building or structure shall comply with the requirements of this code for new construction. Alterations shall be such that the existing building or structure is no less conforming with the provisions of this code than the existing building or structure was prior to the alteration.

Exceptions:

1. An existing stairway shall not be required to comply with the requirements of Section 1011 where the existing space and construction does not allow a reduction in pitch or slope.
2. Handrails otherwise required to comply with Section 1011.11 shall not be required to comply with the requirements of Section 1014.6 regarding full extension of the handrails where such extensions would be hazardous due to plan configuration.

3404A.2 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612A.3, any alteration that constitutes substantial improvement of the existing structure, as defined in Section ~~202 1612A.2~~, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in flood hazard areas established in Section 1612A.3, any alterations that do not constitute substantial improvement of the existing structure, as defined in Section ~~202 1612A.2~~, are not required to comply with the flood design requirements for new construction.

3404A.3 Existing structural elements carrying gravity load. Any existing gravity load-carrying structural element for which an alteration causes an increase in design gravity load of more than 5 percent shall be strengthened, supplemented, replaced or otherwise altered as needed to carry the increased gravity load required by this code for new structures. Any existing gravity load-carrying structural element whose gravity load-carrying capacity is decreased as part of the alteration shall be

shown to have the capacity to resist the applicable design gravity loads required by this code for new structures.

3404A.3.1 Design live load. Where the alteration does not result in increased design live load, existing gravity load carrying structural elements shall be permitted to be evaluated and designed for live loads approved prior to the alteration. If the approved live load is less than that required by Section 1607A, the area designed for the nonconforming live load shall be posted with placards of approved design indicating the approved live load. Where the alteration does result in increased design live load, the live load required by Section 1607A shall be used.

3404A.4 Existing structural elements carrying lateral load. Except as permitted by Section 3404A.5, where the alteration increases design lateral loads in accordance with Section 1609A or 1613A, or where the alteration results in a prohibited structural irregularity as defined in this code ASCE 7, or where the alteration decreases the capacity of any existing lateral load-carrying structural element, the structure of the altered building or structure shall be shown to meet the requirements of Sections 1609A and 1613A.

Exceptions: For incidental and minor alterations:

- 1) Any existing lateral load-carrying structural element whose demand-capacity ratio with the alteration considered is no more than 10 percent greater than its demand-capacity ratio with the alteration ignored shall be permitted to remain unaltered. For purposes of calculating demand-capacity ratios, the demand shall consider applicable load combinations with design lateral loads or forces per Sections 1609A and 1613A. For purposes of this exception, comparisons of demand-capacity ratios and calculation of design lateral loads, forces, and capacities shall account for the cumulative effects of additions and alterations since original construction.
- 2) ~~For incidental alterations,~~ Drift limits based on original design code shall be permitted to be used in lieu of the drift limits required by ASCE 7.

3404A.5 Voluntary seismic improvements. Alterations to existing structural elements or additions of new structural elements that are not otherwise required by this chapter and are initiated for the purpose of improving the performance of the seismic force-resisting system of an existing structure or the performance of seismic bracing or anchorage of existing nonstructural elements shall be permitted, provided that an engineering analysis is submitted demonstrating the following:

1. The altered structure, and the altered structural and nonstructural elements are no less conforming with the provisions of this code with respect to earthquake design than they were prior to the alteration.
2. New structural elements are designed, detailed and connected to the existing structural elements as required by Chapter 16A. Alterations of existing structural elements shall be based on design demand required by Chapter 16A. ~~but~~ Demands for new or altered existing structural elements need not exceed the maximum load effect that can be transferred to the elements by the system.

Exception: ~~Seismic design in accordance with Sections 3411A and 3412A shall be permitted.~~

3. New, relocated or altered nonstructural elements are designed, detailed and connected to existing or new structural elements as required by Chapter 16A.
4. The alterations do not create a structural irregularity as defined in ASCE 7 or make an existing structural irregularity more severe.

SECTION 3405A REPAIRS

3405A.1 General. Buildings and structures, and parts thereof, shall be repaired in conformance with Section 3401A.2. Work on non-damaged components that is necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to the requirements for alterations in this chapter. Routine maintenance required by Section 3401A.2, ordinary repairs exempt from permit in accordance with Section 105.2, and abatement of wear due to normal service conditions shall not be subject to the requirements for repairs in this section.

3405A.2 Substantial structural damage to vertical elements of the lateral-force-resisting system. A building that has sustained substantial structural damage to the vertical elements of its lateral-force-resisting system shall be evaluated and repaired in accordance with the applicable provisions of Sections 3404A.2.1 through 3404A.2.3.

3405A.2.1 Evaluation. The building shall be evaluated by a registered design professional, and the evaluation findings shall be submitted to the building official. The evaluation shall establish whether the damaged building, if repaired to its pre-damage state, would comply with the provisions of this code for wind and earthquake loads. Wind loads for this evaluation shall be those prescribed in Section 1609A. Earthquake loads for this evaluation, if required, shall be permitted to be 75 percent of those prescribed in Section 1613A.

3405A.2.2 Extent of repair for compliant buildings. If the evaluation establishes compliance of the pre-damage building in accordance with Section 3405A.2.1, then repairs shall be permitted that restore the building to its pre-damage state. ~~based on material properties and design strengths applicable at the time of original construction.~~

3405A.2.3 Extent of repair for noncompliant buildings. If the evaluation does not establish compliance of the pre-damage building in accordance with Section 3405A.2.1, then the building shall be rehabilitated to comply with applicable provisions of this code for load combinations, including wind or seismic loads. The wind loads for the repair shall be as required by the building code in effect at the time of original construction, unless the damage was caused by wind, in which case the wind loads shall be as required by this code. Earthquake loads for this rehabilitation design shall be those required for the design of the pre-damage building, but not less than ninety percent of those prescribed in Section 1613A. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

3405A.3 Substantial structural damage to gravity load-carrying components. Gravity load-carrying components that have sustained substantial structural damage shall be rehabilitated to comply with the applicable provisions of this code for dead and live loads. Snow loads shall be considered if the substantial structural damage was caused by or related to snow load effects. Existing gravity load-carrying structural elements shall be permitted to be designed for live loads approved prior to the damage. If the approved live load is less than that required by Section 1607A, the area designed for the nonconforming live load shall be posted with placards of approved design, indicating the approved live load. Non-damaged gravity load-carrying components that receive dead, live or snow loads from rehabilitated components shall also be rehabilitated or shown to have the capacity to carry the design loads of the rehabilitation design. New structural members and connections required by this rehabilitation design shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

3405A.3.1 Lateral force-resisting elements. Regardless of the level of damage to vertical elements of the lateral force-resisting system, if substantial structural damage to gravity load-carrying components was caused primarily by wind or earthquake effects, then the building shall

be evaluated in accordance with Section 3404A.2.1 and, if noncompliant, rehabilitated in accordance with Section 3404A.2.3.

3405A.4 Less than substantial structural damage. For damage less than substantial structural damage, repairs shall be allowed that restore the building to its pre-damage state. ~~—based on material properties and design strengths applicable at the time of original construction.~~ New structural members and connections used for this repair shall comply with the detailing provisions of this code for new buildings of similar structure, purpose and location.

3405.5 Flood hazard areas. For buildings and structures in flood hazard areas established in Section 1612A.3, any repair that constitutes substantial improvement of the existing structure, as defined in Section ~~202~~ 1612A.2, shall comply with the flood design requirements for new construction, and all aspects of the existing structure shall be brought into compliance with the requirements for new construction for flood design.

For buildings and structures in flood hazard areas established in Section 1612A.3, any repairs that do not constitute substantial improvement or repair of substantial damage of the existing structure, as defined in Section ~~202~~ 1612A.2, are not required to comply with the flood design requirements for new construction.

SECTION 3406A **Reserved**

SECTION 3407A **GLASS REPLACEMENT**

3407A.1 Conformance. The installation or replacement of glass shall be as required for new installations.

SECTION 3408A **CHANGE OF OCCUPANCY OR FUNCTION**

3408A.1 Conformance. No change shall be made in the use or occupancy of any building, that would place the building in a different division of the same group of occupancy or in a different group of occupancies, unless such building is made to comply with the requirements of this code for the use such division or group of occupancy. Subject to the approval of the building official, the use or occupancy of existing buildings shall be permitted to be changed and the building is allowed to be occupied for purposes in other groups without conforming to all the requirements of this code for those groups, provided the new or proposed use is less hazardous, based on life and fire risk, than the existing use.

3408A.1.1 Change in function. A change in function shall require compliance with all the functional requirements for new construction in this code, including requirements in Sections 1224, 1225, 1226, and 1227.

3408A.2 Certificate of occupancy. A certificate of occupancy shall be issued where it has been determined that the requirements for the new occupancy classification have been met.

3408A.3 Stairways. Existing stairways in an existing structure shall not be required to comply with the requirements of a new stairway as outlined in Section 1009 where the existing space and construction will not allow a reduction in pitch or slope.

3408A.4 Structural. Seismic. When a change of occupancy results in a structure being reclassified to a higher risk category, the structure shall conform to the seismic requirements for a new structure of the higher risk category.

Exceptions: Specific seismic detailing requirements of Section 1613A for a new structure shall not be required to be met where it can be shown that the level of performance is equivalent to that of a new structure. A demonstration of equivalence shall consider the regularity, over strength, redundancy, and ductility of the structure.

SECTION 3409A

Reserved

SECTION 3410A MOVED STRUCTURES

3410.1 Conformance. Structures moved into or within the jurisdiction shall comply with the provisions of this code for new structures.

SECTION 3411A ADDITIONS, ALTERATIONS, REPAIRS, AND SEISMIC RETROFIT TO EXISTING BUILDINGS OR STRUCTURES DESIGNED IN ACCORDANCE WITH PRE-1973 BUILDING CODE.

3411A. 1 General. Provisions of this section shall apply to hospital buildings which were originally designed to pre-1973 building code and not designated as SPC 3 or higher in accordance with Chapter 6 of the California Administrative Code.

3411A.1.1 Incidental and minor structural alteration, additions or repairs. Incidental and minor structural additions shall be permitted, provided the additions meet this code for new construction using importance factor, I_e , equal to or greater than 1.0. Alterations, or repair to existing gravity and lateral load force-resisting systems shall be made to conform to the requirements of Sections 3404A or 3405A respectively using importance factor, I_e , equal to or greater than 1.0.

3411A.1.1.1 Nonstructural Components. Component importance factor, I_p , shall be permitted to be 1.0.

Exception: Components required for life-safety purposes after an earthquake, including emergency and standby power systems, mechanical smoke removal systems, fire protection sprinkler systems, fire alarm control panels, and egress stairways shall have a component importance factor (I_p) of 1.5.

3411A.1.2 Major structural alteration, additions, or repairs. Major structural alterations, additions, or repairs shall be in accordance with Sections ~~3403A, 3404A, or 3405A~~ respectively 3412A.1.1.a or 3412A.1.1.c, as applicable.

SECTION 3412A COMPLIANCE ALTERNATIVES FOR ADDITIONS, ALTERATIONS, REPAIRS, AND SEISMIC RETROFIT TO EXISTING STRUCTURES

3412A.1 Adoption of ASCE 41. Except for the modifications as set forth in Sections 3412A and 3413A all additions, alterations, repairs and seismic retrofit to existing structures or portions thereof shall be permitted to be designed in accordance with the provisions of ASCE 41. ~~When~~ For load combinations which do not include seismic forces are required, the new building code provisions of this code shall be applicable.

3412A.1.1 ASCE 41 Section 1.4 – Rehabilitation Performance Objectives. Target building performance level shall be as follows:

a. For general acute care hospitals buildings along with all structures required for their continuous operation or access/egress:

- I. – Immediate Occupancy (IO) Structural Performance Level (S-1) as defined in Section ~~2.3.1.1~~ ~~4.5.1.1~~ at Basic Safety Earthquake 1N (BSE-1N) Seismic Hazard Level; ~~as defined in Section 1.6.1.2 and Collapse Prevention~~
- II. Life Safety (LS) Structural Performance Level (S-3 5) per as defined in Section 2.3.1.3 ~~4.5.1.5~~ at Basic Safety Earthquake 2N (BSE-2N) Seismic Hazard Level; ~~as defined in Section 1.6.1.4. and~~
- III. The nonstructural performance level components shall satisfy the requirements of this code for new construction. ~~hospital buildings.~~

~~**Exceptions:** Buildings satisfying requirements of Sections 3411A or 3412A.2.~~

Exception: Performance objectives for upgrading nonconforming hospital buildings to SPC-4D and for incidental or minor alterations or repairs of SPC-4D buildings shall be in accordance with Section 3412A.2.3.2 of this code.

b. For incidental and minor additions, alterations or repairs of pre-1973 Hospital Buildings which will not be used for general acute care services after January 1, 2030:

~~—Basic Safety Objective (BSO) Level as defined Section 1.4.1. BSO level includes~~

- I. Life Safety Building Structural Performance Level (S-3 -C) as defined in ASCE 41 Section 2.3.1.3 ~~4.5.3.3~~ at the Basic Safety Earthquake 1E (BSE-1E) Seismic Hazard Level; ~~as defined in Section 1.6.1.2 and~~
- II. Collapse Prevention (CP) building performance level (5-D E) per in accordance with Section 2.3.3.4 ~~4.5.3.4~~ at the Basic Safety Earthquake 2E (BSE-2E) Seismic Hazard Level; ~~as defined in Section 1.6.1.4. and~~
- III. The nonstructural components shall satisfy the requirements of Position Retention Nonstructural Performance Level (N-B) in accordance with ASCE 41 Section 2.3.2.2 at BSE-1E Seismic Hazard Level.

~~**Exceptions:** Buildings satisfying requirements of Sections 3411A or 3412A.2.~~

c. All others Hospital Buildings:

- I. - Immediate Occupancy (IO) Operational Building Performance Level of (1-A B) as defined in Section 2.3.3.1 ~~4.5.3.2~~ at Basic Safety Earthquake 1N (BSE-1N) Seismic Hazard Level; ~~as defined in Section 1.6.1.2 and~~
- II. Collapse Prevention (CP) Life Safety (LS) building performance level (S-3 5-E) per as defined in Section 2.3.1.3 ~~4.5.3.4~~ at Basic Safety Earthquake 2N (BSE-2N) Seismic Hazard Level. ~~as defined in Section 1.6.1.4.~~

3412A.1.2 Material Testing Required. Use of material properties based on historical information as default values shall not be permitted.

3412A.1.3 Analysis Procedure. The selection of a particular analysis procedure from ASCE 41 shall be subject to the approval of the enforcement ~~agent~~ agency.

3412A.1.4 Structural Design Criteria. Prior to implementation of ASCE 41 Nonlinear Dynamic Procedure, the ground motion, analysis and design methods, material assumptions, and acceptance criteria proposed by the engineer shall be reviewed by the enforcement ~~agent~~ agency.

3412A.1.5 Alternative Modeling Parameters and Acceptance Criteria. Where analysis/modeling parameters or acceptance criteria for structural elements are not provided in ASCE 41 or are considered to be inadequate, the analysis/modeling parameters or acceptance criteria shall be permitted to be established on the basis of test, using a criteria acceptable to the building official, and ASCE 41 Section 7.6.3.

3412A.1.6 3412A.1.5 Construction, S structural observation, testing, and inspections.

Construction, testing, inspection, and structural observation requirements shall be as required for new construction.

3412A.2 Seismic Evaluation and Retrofit of General Acute Care Hospitals for Compliance with the California Administrative Code, Chapter 6.

Notwithstanding any other requirements of this code, existing general acute care hospitals shall comply with the seismic evaluation requirements specified in Chapter 6, of the California Administrative Code, when applicable. Seismic retrofit to comply with requirements specified in Chapter 6 of the California Administrative Code shall be permitted to be in accordance with this section. When For load combinations which do not include seismic forces are required, the new building provisions of this code shall be applicable.

3412A.2.1 SPC 5 and NPC 4/NPC 5. *Structures and nonstructural components and systems satisfying the requirements of this Code for new buildings for Risk Category IV shall be considered to satisfy the requirements of SPC 5 and NPC 4. NPC 4 buildings satisfying operational requirements for NPC 5 of Table 11.1, Chapter 6 of the California Administrative Code shall be placed in non-structural performance category NPC 5.*

New general acute care hospitals (facility) and or new building(s), larger than 4000 sft., required for general acute care services designed and built to the requirements of this code for general acute care hospital buildings shall be considered to satisfy the requirements of SPC 5 and NPC 5.

3412A.2.2 SPC 5 using ASCE 41. *Structures shall be considered to comply with SPC 5 requirements of Table 2.5.3, Chapter 6 of the California Administrative Code where all of the following are satisfied: satisfying the requirements of*

- I. Immediate Occupancy structural performance level (S-1) in accordance with Section 2.3.1.1 4.5.1.4 of ASCE 41 at BSE-1N;*
- II. Life Safety Collapse prevention performance level S-3 S-5 in accordance with Section 2.3.1.3 4.5.1.5 of ASCE 41 at BSE-2N; and*
- III. Items identified in Chapter 6, Article 10 of the California Administrative Code, satisfying the requirements of Immediate Occupancy Operational Nonstructural performance level (N-A B) per in accordance with Section 2.3.2.1 4.5.2.2 of ASCE 41 at BSE-1N. shall be considered to comply with SPC 5 requirements of Table 2.5.3, Chapter 6 of the California Administrative Code.*

3412A.2.3 SPC-4D. *Nonconforming hospital buildings satisfying the following requirements and one of Sections 3412A.2.3.1, 3412A.2.3.2 or 3412A.2.3.3, but not a combination thereof, shall be considered to satisfy the requirements of SPC-4D.*

- 1. Approval of construction documents based on building characterization in accordance with the California Administrative Code (CAC) Chapter 6 Section 2.1.2.1, material properties in accordance with the CAC Chapter 6 Section 2.1.2.2 and Section 3413A.1.3 of this code, and a complete rational structural analysis shall be required.*
- 2. Where the SPC-4D upgrade involves construction, a building permit prior to construction shall be required.*
- 3. Where multiple building permits are used to upgrade a building to SPC-4D, a complete rational structural analysis to justify compliance with SPC-4D for the building in its final configuration, shall be submitted as part of the construction documents submittal to the Office for the last project.*
- 4. Where the SPC-4D upgrade involves construction, buildings shall be assigned to SPC-4D after all projects required for SPC-4D are closed in compliance.*

3412A.2.3.1 Prescriptive compliance provisions for SPC-4D using the California Building Code, 1980 (CBC 1980). *Nonconforming Buildings shall satisfy the following requirements:*

- 1. The California Building Code, 1980 (CBC 1980), as used in this chapter, consists of the Uniform Building Code, 1979 (UBC 1979) along with requirements contained in:*

- a) California Code of Regulations, Title 24- Building Standards, dated February 2, 1980 (Revision record for Register 80, No. 5).
 - b) California Code of Regulations, Title 22 – Social Security, dated October 13, 1979 (Revision Record for Register 79, No 41).
 - c) California Code of Regulations, Title 17 – Public Health, dated October 13, 1979 (Revision Record for Register 79, No 41-B).
2. All existing structural elements of Seismic Force Resisting System (SFRS) shall satisfy the detailing requirements in the CBC 1980 or demonstrate that the level of seismic performance is equivalent to that given in the CBC 1980, as determined by the building official.
 3. A continuous load path or paths with adequate strength and stiffness to transfer all the forces from the point of origin to final point of resistance shall be justified by analysis.
 4. Site data report in accordance with the CBC 1980 shall establish that seismically induced differential settlement does not exceed 1" in 40'.
 5. Adjacent buildings shall satisfy the SPC building separation requirements in accordance with the California Administrative Code, Chapter 6 Section 3.4.
 6. The addition of new structural elements or strengthening of existing structural elements for retrofit of nonconforming buildings to SPC-4D shall comply with the following:
 - a) The seismic demand (forces or displacements) shall be in accordance with the CBC 1980;
 - b) Capacity, detailing and connections for new structural elements shall satisfy the requirements in this code (CBC 2016) for new construction; and
 - c) The strengthening of existing structural elements shall use capacities determined in accordance with this code (CBC 2016) for new construction consistent with the detailing and connections used in the strengthened member.
 7. All construction, quality assurance and quality control shall be in accordance with the new construction provisions of this code (CBC 2016).
 8. Elements not part of the Seismic Force Resisting System (SFRS), including those identified in the California Administrative Code Chapter 6, Article 10, shall be evaluated using seismic forces and the requirements of the CBC 1980.
 9. Any column or wall that forms part of two or more intersecting SFRS and is subjected to axial load due to seismic forces acting along either principal plan axis equaling or exceeding 20 percent of the axial design strength of the column or wall shall be evaluated for the most critical load effect due to application of seismic force in any direction. The most critical load effect may be deemed to be satisfied if members and their foundations are evaluated for 100 percent of the forces for one direction plus 30 percent of the forces for the perpendicular direction, whereby the combination produces the maximum effect.

Exceptions: The following buildings (with structural irregularities or unusual configuration/system) shall not be eligible for the SPC-4D upgrade using the prescriptive provisions in this section:

1. Buildings with prohibited irregularities in accordance with Section 1616A.1.10 of this code.

2. Buildings taller than 5-stories or 65' height above the base having horizontal or vertical irregularities in accordance with ASCE 7 Tables 12.3-1 Items # 1a, 1b and 3 or 12.3-2 Items #1a, 1b, 5a and 5b.
3. Buildings with unusual configuration or structural system, as determined by the building official.

3412A.2.3.2 SPC-4D using ASCE 41. Structures shall be deemed to comply with the SPC-4D requirements of Table 2.5.3, Chapter 6 of the California Administrative Code, when all of the following are satisfied:

1. Damage control structural performance level (S-2) in accordance with Section 2.3.1.2.1 of ASCE 41 at BSE-1E;
2. Collapse Prevention Structural Performance Level (S-5) in accordance with Section 2.3.1.5 of ASCE 41 at BSE-2E; and
3. Items identified in Chapter 6, Article 10 of the California Administrative Code satisfy the requirements of Position Retention nonstructural performance level (N-B) in accordance with Section 2.3.2.2 at BSE-1E.

3412A.2.3.3 Prescriptive compliance provisions for SPC-4D using the new building design requirements of this code. Structures satisfying the requirements of this code for new general acute care hospital buildings design shall be deemed to satisfy the SPC-4D requirements of Table 2.5.3, Chapter 6 of the California Administrative Code.

All existing structural elements of Seismic Force Resisting System (SFRS) shall satisfy the detailing requirements of this code for new construction or demonstrate that the level of seismic performance is equivalent, as determined by the building official. A demonstration of equivalence shall consider the regularity, overstrength, redundancy, and ductility of the structure.

Elements not part of the Seismic Force Resisting System (SFRS), including those identified in the California Administrative Code Chapter 6, Article 10, shall be evaluated using seismic forces and the requirements of this code for new general acute care hospital buildings.

3412A.2.4 3412A.2.3 SPC 2 using ASCE 41. Structures shall be considered to comply with SPC 2 requirements of Table 2.5.3, Chapter 6 of the California Administrative Code, when all of the following are satisfied: ~~satisfying the requirements of~~

- I. Life Safety structural performance level (S-3) in accordance with ~~per~~ Section 2.3.1.3 4.5.1.3 of ASCE 41 at BSE-1E; and
- II. Items identified in Chapter 6, Article 10 of the California Administrative Code satisfying the requirements of Position Retention ~~life safety~~ nonstructural performance level (N-B ~~C~~) ~~per~~ in accordance with Section 2.3.2.2 4.5.2.3 of ASCE 44 at BSE-1E, shall be considered to comply with SPC 2 requirements of Table 2.5.3, Chapter 6 of the California Administrative Code.

3412A.2.5 3412A.2.4 NPC. A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be verified. Local elements of the supporting structure shall be verified for the component loads where they control the design of the elements or their connections.

3412A.2.5.1 NPC-4 and NPC-5 using ASCE 41: ~~Non-structural components for Immediate Occupancy Operational Nonstructural performance level (N-A B) in Section 2.3.2.1 or NPC-4 4.5.2.2 shall meet satisfy the requirements of this Code for new construction, buildings. Non-structural components for Operational Nonstructural performance level (NPC-5) in Section 4.5.2.4 shall meet satisfy Operational performance level N-A/NPC-4 B and Section 1616A.1.40 Items 1 & 2 of this code. 3413A.1.30. Building satisfying the requirements of non-structural performance level NPC-5 and N- B as described in this section shall be considered to satisfy the requirements of NPC 5 & NPC 4 of Table 11.1, Chapter 6 of the California Administrative Code respectively.~~

3412A.2.5.2 NPC-2, NPC-3 and NPC-3R using ASCE 41: Operational ~~Immediate Occupancy~~
~~Nonstructural performance level (N-A B) in Section 1.5.2.2 and Position Retention Life Safety~~
~~Nonstructural performance level (N-B C) in Section 1.5.2.3 of ASCE 41 at BSE-1N shall be~~
considered equivalent to NPC 3/NPC 2 and NPC 3R requirements respectively of Table 11.1,
Chapter 6 of the California Administrative Code. For NPC 3/NPC 3R /NPC 2, only
components listed in Table 11.1, Chapter 6 of the California Administrative Code for NPC
3/NPC 3R/NPC 2 need to satisfy the requirements specified above.

Exceptions:

- 1) ~~Evaluation procedure in~~ Article 11, Chapter 6 of the California Administrative Code shall be used for seismic evaluation of NPC 2, NPC 3/NPC 3R, NPC 4 and NPC 5, where specific procedure is not outlined in ASCE 41. Administrative and permitting provisions outlined in Article 11, Chapter 6 of the California Administrative Code shall apply.
- 2) ~~Supports and attachments Anchorage and bracing~~ of nonstructural components, except those listed in item 4 below, in buildings in seismic performance categories SPC 1 and SPC 2 with a performance level of NPC 3R shall be permitted to comply with the provisions of Section 1630A of the 1995 California Building Code using an importance factor $I_p=1.0$. The capacity of welds, anchors and fasteners shall be determined in accordance with requirements of this Code.
- 3) ~~Supports and attachments Anchorage and bracing~~ of nonstructural components, except those listed in item 4 below, in buildings in seismic performance categories SPC 1 or SPC 2 with a performance level of NPC 3 or higher, and SPC 3, or SPC 4, or SPC-4D, shall be permitted to comply with the provisions of Section 1630B of the 1998 California Building Code using an importance factor $I_p=1.5$. The capacity of welds, anchors and fasteners shall be determined in accordance with requirements of this code.
- 4) Supports and attachments for systems listed under NPC-2 and NPC-5 (excluding those specifically listed for NPC-3/NPC-3R and NPC-4) in the California Administrative Code, Chapter 6, Table 11.1 shall satisfy the requirements of this code for new construction and items 2 and 3 above shall not be applicable.
- 5) ~~A continuous load path of sufficient strength and stiffness between the component and the supporting structure shall be verified. Local elements of the supporting structure shall be verified for the component loads where they control the design of the elements or their connections. Increases in F_p due to anchorage conditions (for example shallow anchors) need not be considered. For NPC 3R, the adequacy of load path for nonstructural elements need only be verified when the total reaction at the point of support (including the application of F_p) exceeds the following limits:~~
 1. 250 pounds for components or equipment attached to light frame walls. For the purposes of this requirement, the sum of the absolute value of all reactions due to component loads on a single stud shall not exceed 250 pounds.
 2. 1,000 pounds for components or equipment attached to roofs, or walls of reinforced concrete or masonry construction.
 3. 2,000 pounds for components or equipment attached to floors or slabs-on-grade.

Exception: If the anchorage or bracing is configured in a manner that results in significant torsion on a supporting structural element, the effects of the nonstructural reaction force on the structural element shall be considered in the anchorage design.

**SECTION 3413A
MODIFICATIONS TO ASCE 41**

3413A.1 GENERAL. The text of ASCE 41 shall be modified as indicated in Sections 3413A.1.1 through ~~3413A.1.14.~~ ~~3413A.1.32.~~

3413A.1.1 ASCE 41 Section 1.1. Modify ASCE 41 Section 1.1 with the following:
Seismic evaluations shall be performed for performance objective specified in Section 3412A of this code (CBC) using procedure of this standard (ASCE 41) as follows: ~~and criteria of ASCE 41.~~

1. Structural components shall be evaluated in accordance with Tier 3 systematic evaluations procedure in Chapter 6.
2. Nonstructural components shall be evaluated in accordance with Chapter 13.

Exception: ~~except f~~ For general acute care hospitals, ~~which shall be evaluated per seismic evaluation shall be permitted to be in accordance with~~ Chapter 6 of the California Administrative Code (CAC) when required ~~per~~ by provisions of that chapter.

3413A.1.2 ASCE 41 Section 2.4 ~~4.6~~ Seismic Hazard. Modify ASCE 41 Section ~~2.4~~ ~~4.6~~ with by the following:

Response spectra and acceleration time histories shall be constructed in accordance with Sections 1613A, 1616A, and 1803A.6. ~~Basic Safety Earthquake 2 (BSE-2) in ASCE 41 shall be same as Maximum Considered Earthquake (MCE_R) in ASCE 7. Basic Safety Earthquake 1 (BSE-1) shall be 2/3rd of BSE-2.~~

~~3413A.1.29 ASCE 41 Chapter 10.~~ Replace ASCE 41 Chapter 10 as follows:
Simplified Rehabilitation. Not permitted by OSHPD.

3413A.1.3 ~~3413A.1.3~~ ASCE 41 Section 6.2, ~~2.2.6~~. Modify ASCE 41 Section 6.2 ~~2.2.6~~ with the following:

Data Collection Requirements. The extent of data collection shall be at Comprehensive level for all structures, including structures upgraded to SPC-4D. ~~except that data collection at Usual level shall be permitted for structures with BSO or lower target performance objective.~~ A testing program for materials properties testing program shall be pre-approved by the enforcement agent prior to commencement of material testing work. Previously approved material test results shall be permitted to be used to satisfy part of the comprehensive data collection requirements.

Exception: Data collection at Usual level shall be permitted for structures with SPC-2 or lower target performance objective.

Tension testing of reinforcing bars shall be in accordance with ASTM A370 Annex A9. All test specimens shall be the full section of the bar as rolled (8-in. gage length) and shall not be reduced.

At test sample locations, structural members, slabs and walls shall be repaired to a state that is equivalent to their original condition. ~~at test sample locations.~~

For buildings built under an OSHPD permit based on the 1976 or later edition of the CBC, where materials properties are shown on design drawings and original materials test data are available, no materials testing shall be required when approved by the enforcement agent.

3413A.1.4 ASCE 41 Section 2.4.1.1. Modify ASCE 41 Section 2.4.1.1 with the following:

1. ~~If one or more component DCRs exceed 1.5 for the Immediate Occupancy Structural Performance Level (S-1) or 2.0 for the Life Safety Structural Performance level (S-3) and any irregularity described in Section 2.4.1.1.1 through 2.4.1.1.4 is present, then linear procedures are not applicable and shall not be used.~~
2. Linear procedures are not applicable to moment resisting frames where plastic hinges do not form in either the beam at the face of column or in the column panel zone.

~~3413A.1.7 ASCE 41 Section 3.2.10.1. Modify ASCE 41 Section 3.2.10.1 with the Following:~~

~~**Linear Procedures.** Equation 3-5 is not permitted by OSHPD.~~

~~3413A.1.4 3413A.1.5 ASCE 41 Section 7.3.2.1 ~~2.4.2.1~~ Modify ASCE 41 Section 7.3.2.1 ~~2.4.2.1~~ with the following:~~

~~**Nonlinear Static Procedure.** If higher mode effects are significant and building is taller than 75 feet above the base, the Nonlinear Dynamic Procedure shall be used.~~

~~3413A.1.8 ASCE 41 Section 3.3.1.3.5. Replace ASCE 41 Section 3.3.1.3.5 as follows:
Unreinforced Masonry Buildings. Unreinforced Masonry not permitted by OSHPD.~~

~~3413A.1.5 3413A.1.10 ASCE 41 Section 7.5.1 ~~3.4.2.2~~. Modify ASCE 41 Section 7.5.1 ~~3.4.2.2~~ with the following:~~

~~**Acceptance Criteria for Linear Procedures— Drift Limitations.** The interstory drift ratio shall not exceed the drift limits for Risk Category IV buildings in ASCE 7 Table 12.12-1 due to forces corresponding to BSE-1E or BSE-1N, as applicable. , except that buildings designed to BSO or lower performance levels are permitted to meet the drift limits for Risk Category II buildings. For dual systems, the least interstory drift ratio shall control.~~

~~**Exception:** Larger interstory drift ratios shall be permitted where justified by rational analysis that both structural and non-structural elements can tolerate such drift and approved by the enforcement agent.~~

~~3413A.1.6 3413A.1.6 ASCE 41 Section 7.5.1.4 ~~2.4.4.5~~. Modify ASCE 41 Section 7.5.1.4 ~~2.4.4.5~~ by the following:~~

~~**Material Properties.** Expected material properties are not permitted to be determined by multiplying lower bound values by the assumed factors specified in Chapters 8 ~~5~~ through 12 ~~8~~. and shall be based exclusively on materials tests.~~

~~3413A.1.9 ASCE 41 Section 3.3.3.2.2 Modify ASCE 41 Section 3.3.3.2.2 with the following:~~

~~**Simplified NSP Analysis.** Not permitted by OSHPD.~~

~~3413A.1.11 Reserved.~~

~~ASCE 41 Section 3.4.3.2.1. Modify ASCE 41 Section 3.4.3.2.1 with the following:~~

~~**Deformation-Controlled Actions.** For any building required to meet the Operational Building Performance level, 1-A or Immediate Occupancy Building Performance Level, 1-B, primary components shall be within the acceptance criteria for primary components and secondary components shall be within the acceptance criteria for secondary components.~~

~~3413A.1.7 3413A.1.12 ASCE 41 Section 8.4 ~~4.4~~. Modify ASCE 41 Section 8.4 ~~4.4~~ with the followings:~~

~~**Foundation Strength and Stiffness.** Foundation and soil strength shall be used to evaluate potential overturning, uplift, and sliding for fixed base assumptions, and stiffness for flexible base assumptions, including deformations associated with those actions.~~

~~3413A.1.13 ASCE 41 Section 4.4.1.1. Replace ASCE 41 Section 4.4.1.1 as follows:~~

~~**Presumptive Capacities.** Not permitted by OSHPD.~~

3413A.1.8 ~~3413A.1.14~~ ASCE 41 Section 8.4.1.1. ~~4.4.1.2.~~ Replace ASCE 41 Section 8.4.1.1 4.4.1.2 as follows:

Prescriptive Expected Capacities. Not permitted by OSHPD.

3413A.1.15 ASCE 41 Section 4.4.3.2.2. Modify ASCE 41 Section 4.4.3.2.2 with the following:

Flexible Base Assumption. ~~The soil strength shall be evaluated.~~

3413A.1.9 ASCE 41 Section 8.5. Modify ASCE 41 Section 8.5 with the following:

The product of RRS_{bsa} x RRS_{e} , shall not be less than 0.7.

The combined effect of kinematic interaction and foundation damping shall meet the following:

1. The site specific response spectrum modified for soil-structure interaction effects shall not be taken as less than 80 percent of the spectral acceleration as determined from a site-specific response spectrum in accordance with ASCE 7 Section 21.3, or
2. The site specific response spectrum modified for soil-structure interaction effects shall not be taken as less than 70 percent of the spectral acceleration as determined from the design response spectrum and MCE_R response spectrum in accordance and with ASCE 7 Sections 11.4.5 and 11.4.6 respectively.

Exception: For the seismic retrofit of existing nonconforming buildings, design ground motion shall be consistent with performance objectives in Section 3412A.

3413A.1.10 ~~3413A.1.16~~ ASCE 41 Section 8.6. 4.5. Modify ASCE 41 Section 8.6 4.5 with the following:

Seismic Earth Pressure. Where the grade difference from one side of the building to another exceeds one-half story height, the seismic increment of earth pressure shall be added to the gravity lateral earth pressure to evaluate the building overturning and sliding stability and the lateral force resisting system below grade in combination with the building seismic forces.

3413A.1.17 ASCE 41 Table 5.6. Modify ASCE 41 Table 5.6 with the following:

~~**Acceptance Criteria for Nonlinear Procedures – Structural Steel Components.** For fully and partially restrained moment connections designed to 1989 or prior edition of the California Building Code shall be verified for the presence of welds using E70T-4 electrodes or other electrodes with equivalent aluminum content. Where E70T-4 or equivalent electrodes are present, the plastic rotation angles and residual strength ratios used shall be substantiated by the statistical analysis of three or more applicable cyclic test results subject to the approval of the enforcement agent.~~

3413A.1.11 ~~3413A.1.18~~ ASCE 41 Section 10.7.1.1. ~~6-7.1.1.~~ Modify ASCE 41 Section 10.7.1.1 6-7.1.1 with the following:

Monolithic Reinforced Concrete Shear Walls and Wall Segments. For nonlinear procedures, shear walls or wall segments with axial loads greater than $0.35 P_o$ shall be included in the model as primary elements with appropriate strength and stiffness degrading properties assigned to those components subject to the approval of the enforcement agent. For linear procedures, the effects of deformation compatibility shall be investigated using moment-curvature section analyses and cyclic testing results of similar components to determine whether strengthening is necessary to maintain the gravity load carrying capacity of that component.

Horizontal wall segments or spandrels reinforced similar to vertical wall segments or piers shall be classified as wall segments, not shear wall coupling beams, in Tables 10-19 6-18 through 6-24 10-22.

3413A.1.12 ASCE 41 Section 11.1. Modify ASCE 41 Section 11.1 by the following:

Scope: Unreinforced Masonry walls (including unreinforced infill walls) and partitions are not permitted for General Acute Care (GAC) hospital buildings.

3413A.1.19 ASCE 41 Section 7.3.2. Replace ASCE 41 Section 7.3.2 as follows:

Unreinforced Masonry Walls and Piers In-plane. Not permitted by OSHPD.

3413A.1.20 ASCE 41 Section 7.3.3. Replace ASCE 41 Section 7.3.3 as follows:

Unreinforced Masonry Walls Out-of-plane. Not permitted by OSHPD.

3413A.1.21 ASCE 41 7.3.4.2.2. Shear Strength of Walls and Piers. Modify ASCE 41 Section 7.3.4.2.2 with the following:

The spacing of shear reinforcing, S, shall be less than or equal to the wall pier clear height divided by 2 or the story height divided by 2, whichever is smaller.

3413A.1.22 ASCE 41 Section 9.2.4. Modify ASCE 41 Section 9.2.4 with the following:

Linear Procedures. Verification of the interstory lateral displacements, isolator displacements, the strength adequacy of the seismic force resisting system and isolation system, and anchorage to the foundation shall be accomplished using the Nonlinear Dynamic Procedure.

3413A.1.23 ASCE 41 Section 9.2.5.1. Modify ASCE 41 Section 9.2.5.1 with the following:

Nonlinear Static Procedure. Verification of the interstory lateral displacements, isolator displacements, the strength adequacy of the seismic force resisting system and isolation system, and anchorage to the foundation shall be accomplished using the Nonlinear Dynamic Procedure.

3413A.1.13 ASCE 41 Section 14.1. Modify ASCE 41 Section 14.1 by the following:

Scope: For buildings located in Seismic Design Category F, verification of the interstory lateral displacements, the strength adequacy of the seismic force resisting system and anchorage to the foundation shall be accomplished using the Nonlinear Dynamic Procedure.

3413A.1.26 ASCE 41 Section 9.3.4. Modify ASCE 41 Section 14.3.4 9.3.4 with the following:

Linear Procedures. Verification of the interstory lateral displacements, damper relative velocities and displacements, the strength adequacy of the seismic force resisting system and damping system, and anchorage to the foundation shall be accomplished using the Nonlinear Dynamic Procedure.

3413A.1.27 ASCE 41 Section 9.3.5.1. Modify ASCE 41 Section 9.3.5.1 with the following:

Nonlinear Static Procedure. Verification of the interstory lateral displacements, damper relative velocities and displacements, the strength adequacy of the seismic force resisting system and damping system, and anchorage to the foundation shall be accomplished using the Nonlinear Dynamic Procedure.

3413A.1.28 Reserved.

3413A.1.30 ASCE 41 Section 11.3.2. Modify ASCE 41 Section 11.3.2 with the following:

Operational Nonstructural Performance Level (NPC-5) Requirements. All Structures shall meet Immediate Occupancy Nonstructural Performance Level (N-B) and facility shall have on-site supplies of water and holding tanks for sewage and liquid waste, sufficient to support 72 hours emergency operations, are integrated into the building plumbing systems in accordance with the California Plumbing code. An on-site emergency system as defined in the California Electrical

~~Code is incorporated into the building electrical system for critical care areas. Additionally, the system shall provide for radiological service and an onsite fuel supply for 72 hours of acute care operation.~~

3413A.1.31 ASCE 41 Section 11.9.4.3.1. ~~Modify ASCE 41 Section 11.9.4.3.1 with the following:~~

~~Coilings in all Categories shall satisfy requirements for coilings in Category C specified in this section.~~

3413A.1.32 ASCE 41 Section 11.10.2.4. ~~Modify ASCE 41 Section 11.10.2.4 by the following:~~

~~For general acute care hospital, Nonstructural Evaluation shall comply with requirements of Section 11.2, Chapter 6 of the California Administrative Code.~~

3413A.1.14 ASCE 41 Chapter 15. ~~Not permitted by OSHPD.~~

SECTION 3414A PEER REVIEW REQUIREMENTS

3414A.1 General. Independent peer review is an objective technical review by knowledgeable reviewer(s) experienced in structural design, analysis and performance issues involved. The reviewer(s) shall examine the available information on the condition of the building, basic engineering concept employed and recommendations for action.

3414A.2 Timing of Independent Review. The independent reviewer (s) shall be selected prior to initiation of substantial portion of the design and analysis work that is to be reviewed, and review shall start as soon as practical and sufficient information defining the project is available.

3414A.3 Qualifications and Terms of Employment. The reviewer shall be independent from the design and construction team.

3414A.3.1 The reviewer(s) shall have no other involvement in the project before, during or after the review, except in a review capacity.

3414A.3.2 The reviewer shall be selected and paid by owner and shall have technical expertise ~~in repair of buildings~~ similar to the project ~~one~~ being reviewed, as determined by enforcement agent.

3414A.3.3 The reviewer (in case of review team, the chair) shall be a California-licensed structural engineer who is familiar with technical issues and regulations governing the work to be reviewed.

3414A.3.4 The reviewer shall serve through completion of the project and shall not be terminated except for failure to perform the duties specified herein. Such termination shall be in writing with copies to enforcement agent, owner, and the engineer of record. When a reviewer is terminated or resigns, a qualified replacement shall be appointed within 10 working days or a timeframe mutually agreed to by the Owner, Registered Design Professional (RDP) and the Office.

3414A.4 Scope of Review. Review activities shall include, where appropriate, available construction documents, design criteria, observation of the condition of structure, all new and original inspection reports, including methods of sampling, analyses prepared by the engineer of record and consultants, and the retrofit or repair design. Review shall include consideration of the proposed design approach, method, materials and details.

3414A.5 Reports. The reviewer(s) shall prepare a written report to the owner and responsible enforcement agent that covers all aspect of the review performed including conclusions reached by the reviewer. Report shall be issued after the schematic phase, during design development, and at the completion of construction documents, but prior to their issuance of permit. Such report shall include, at the minimum, statement of the following:

1. *Scope of engineering design peer review with limitations defined.*
2. *The status of the project documents at each review stage.*
3. *Ability of selected materials and framing systems to meet the performance criteria with given loads and configuration.*
4. *Degree of structural system redundancy and the deformation compatibility among structural and non-structural elements.*
5. *Basic constructability of the retrofit or repair system.*
6. *Other recommendation that will be appropriate for the specific project.*
7. *Presentation of the conclusions of the reviewer identifying any areas that need further review, investigation and / or clarification.*
8. *Recommendations.*

3414A.6 Responses and Corrective Actions. *The engineer of record shall review the report from the reviewer(s) and shall develop corrective actions and other responses as appropriate. Changes observed during construction that affect the seismic-resisting system shall be reported to the reviewer in writing for review and recommendations. All reports, responses and corrective actions prepared pursuant to this section shall be submitted to the responsible enforcement agent and the owner along with other plans, specifications and calculations required. If the reviewer resigns or is terminated by the owner prior to completion of the project, then the reviewer shall submit copies of all reports, notes, and the correspondence to the responsible enforcement agent, the owner, and the engineer of record within 10 working days of such termination.*

SECTION 3415A EARTHQUAKE MONITORING INSTRUMENTS FOR EXISTING BUILDINGS

3415A.1 Earthquake recording instrumentation of existing buildings. *All owners of existing structures, selected by the enforcement agency for the installation of earthquake-recording instruments, shall provide space for the installation and access to such instruments. Location of said instruments shall be determined by the enforcement agency. The enforcement agency shall make arrangements to provide, maintain, and service the instruments. Data shall be the property of the enforcement agency, but copies of individual records shall be made available to the public on request and the payment of an appropriate fee.*

SECTION 3416A COMPLIANCE ALTERNATIVES FOR SERVICES/SYSTEMS AND UTILITIES

3416A.1 General. *The provisions of this section are intended to maintain or increase the current degree of public safety, health and general welfare in existing buildings while permitting repair, alteration, addition and change of occupancy without requiring full compliance with Chapters 2 through 33, or Sections 3401A.3, and 3403A through 3408A, except where compliance with other provisions of this code is specifically required in this section.*

Services/systems and utilities that originate in and pass through or under buildings and are necessary to the operation ~~of the hospital buildings an acute care hospital, skilled nursing facility, intermediate care facility, or correctional treatment center~~ shall meet the structural requirements of this section. Examples of services/systems and utilities include but are not limited to normal power; emergency power; nurse call; fire alarm; communication and data systems; space-heating systems; process load systems; cooling systems; domestic hot and cold water systems; means of egress systems; fire-suppression systems; building drain and sewer systems; and medical gas systems that support basic and supplemental services.

After January 1, 2030, services/systems and utilities for acute care hospital buildings shall not originate in or pass through or under a non-hospital or Hospital building unless it has approved performance categories of SPC- 3 or higher and NPC-5.

3416A.1.1 Services/systems and utilities. Services/systems and utilities that are necessary to the operation of ~~the hospital buildings an acute care hospital, skilled nursing facility, intermediate care facility, or correctional treatment center~~ shall meet the structural requirements of this section, based upon the approved Structural Performance Category (SPC) of the building receiving the services/systems and utilities.

Services from ~~a conforming building an acute care hospital, skilled nursing facility, a correctional treatment center~~ shall be permitted to serve a nonconforming building with prior approval of the Office. The services/systems and utilities in the nonconforming building shall be equipped with fail safe valves, switches, or other equivalent devices that allow the nonconforming building to be isolated from the ~~acute care hospital buildings~~ conforming building.

Exception: Remodel projects that use available existing services/systems and utilities are exempted from the requirements of this section. The enforcing agency shall be permitted to exempt minor addition, minor alteration, and minor remodel projects and projects to upgrade existing services/systems and utilities from the requirements of this section.

3416A.1.1.1 Services/systems and utilities for hospital buildings.

3416A.1.1.1.1 New hospital buildings, additions, alterations, and remodels of conforming (SPC-3, -4, -4D, or -5) hospital buildings. Services/systems and utilities for new hospital buildings and additions, alterations or remodels to existing conforming buildings shall originate in hospital buildings that are conforming or have approved performance categories of SPC-3 or higher, and NPC-4 or higher. The services/systems and utilities shall not pass through or under buildings that do not have approved performance categories of SPC-2 or higher and NPC-4 or higher.

Exceptions:

Services/systems and utilities shall be permitted to pass through or under buildings that have approved nonstructural performance categories of NPC-3 or higher or NPC-2, provided that the building has an approved extension to the NPC-3 deadline. The services/systems and utilities feeding the new building addition, alteration, or remodel shall conform to the new building provisions of this code and shall be deemed by OSHPD to be free of adverse seismic interactions that could be caused by potential failure of overhead or adjacent components.

3416A.1.1.1.2 Additions, alterations, and remodels of SPC-2 hospital buildings. Services/systems and utilities for additions, alterations, or remodels of SPC-2 hospital buildings shall be permitted to originate in and pass through or under SPC-2 or higher buildings that have an approved nonstructural performance category of NPC-3 or higher.

Exception: Services/systems and utilities shall be permitted to pass through or under buildings that have approved nonstructural performance categories of NPC-2, provided that the building has an approved extension to the NPC-3 deadline. Services/systems and utilities feeding the addition, alteration or remodel shall conform to the nonstructural bracing requirements for new buildings.

3416A.1.1.1.3 Alterations and remodels of SPC-1 hospital buildings.

Services/systems and utilities for alterations or remodels of SPC-1 hospital buildings shall be permitted to originate in and pass through or under SPC-1 or higher buildings that have an approved nonstructural performance category of NPC-2 or higher.

3416A.1.1.1.4 Buildings without SPC/NPC ratings. When services/systems and utilities for new buildings, additions, alterations, or remodels pass through or under hospital buildings which would not otherwise require evaluation for an SPC rating, such buildings shall be evaluated in accordance with the requirements of Section 1.3, Chapter 6, of the California Administrative Code, to determine the appropriate ratings, or shall be shown to meet the structural requirements of these regulations for new hospital buildings. The services/systems and utilities feeding the new building addition, alteration, or remodel shall conform with new building provisions of this code and shall be deemed by OSHPD to be free of adverse seismic interactions that could be caused by potential failure of overhead or adjacent components.

3416A.1.1.1.5 Buildings removed from acute-care hospital service.

Services/systems and utilities for conforming acute care hospital buildings shall be permitted to pass through or under a building that has been removed from acute care hospital service until January 1, 2030 if the building removed from service meets the performance requirements of Section 3416A.1.1.1.1. Services/systems and utilities for nonconforming non-acute care hospital buildings shall be permitted to pass through or under a building that has been removed from acute care hospital service only if the building removed from service meets the performance requirements of Section 3416A.1.1.1.2.

3416A.1.1.2 Services/systems and utilities for skilled nursing facilities, intermediate care facilities and correctional treatment centers.

~~3416A.1.1.2.1 New buildings and additions. Services/systems and utilities for new buildings and additions shall not originate in or pass through or under nonconforming structures.~~

~~**Exception:** As an alternate to this section, skilled nursing and intermediate care facilities and correctional treatment centers shall be permitted to meet the requirements in Section 3416A.1.1.1 for hospital buildings.~~

~~3416A.1.1.2.2 Alterations and remodels. Services/systems and utilities for alterations or remodels of existing buildings shall be permitted to pass through nonconforming structures, provided the new services/systems and utilities passing through the buildings are anchored and braced for seismic forces in accordance with these regulations for new buildings and are free of adverse seismic interactions caused by potential failure of overhead or adjacent components.~~

3416A.1.2 Jurisdiction. Services/systems and utilities for ~~Hospitals, skilled nursing facilities, and intermediate care facilities~~ shall originate in and only pass through or under buildings that are under the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD).

**SECTION 3417A
COMPLIANCE ALTERNATIVES
FOR MEANS OF EGRESS**

3417A.1 General. Means of egress through existing buildings shall be in accordance with Chapter 10 except as modified in this section.

3417A.1.1 Means of egress. ~~for hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers.~~ Means of egress for acute care hospitals, skilled nursing facilities, intermediate care facilities, and correctional treatment centers shall comply with the requirements of Sections 3417A.1.1.1 and 3417A.1.1.2.

Exception: The enforcing agency shall be permitted to exempt minor additions, minor alterations and minor remodel projects from these requirements.

3417A.1.1.1 Means of egress for hospital buildings. Means of egress for hospital buildings shall comply with the requirements of Sections 3417A.1.1.1.1 through 3417A.1.1.1.6.

3417A.1.1.1.1 New and existing conforming hospital buildings. Means of egress for new hospital buildings and additions to existing conforming hospital buildings shall only pass through buildings that are conforming or comply with the requirements of SPC-3 or higher, and NPC-4 or higher.

Exception: Existing means of egress that pass through hospital buildings that have approved nonstructural performance categories NPC-3, or NPC-2, if the building has an approved extension to the NPC-3 deadline, shall be permitted to remain for the duration of extension. The nonstructural components in the path of egress shall be braced in accordance with the new building provisions of this code.

3417A.1.1.1.2 Existing SPC-2 hospital buildings. Means of egress for additions to existing SPC-2 hospital buildings shall only pass through hospital buildings that have approved performance categories of SPC-2 or higher and NPC-4 or higher.

Exception: The means of egress shall be permitted to pass through hospital buildings that have approved nonstructural performance categories of NPC-3, or NPC-2 if the building has an approved extension to the NPC-3 deadline. Nonstructural components in the path of egress shall be braced in accordance with the new building provisions of this code.

3417A.1.1.1.3 Existing SPC-3 or higher hospital buildings. Means of egress for remodels of existing SPC-3 or higher hospital buildings shall only pass through hospital buildings that have approved performance categories of SPC-2 or higher and NPC-4 or higher.

Exception: The means of egress shall be permitted to pass through hospital buildings that have approved nonstructural performance categories of NPC-3, or NPC-2 if the building has an approved extension to the NPC-3 deadline. Nonstructural components in the path of egress shall be braced in accordance with the new building provisions of this code.

3417A.1.1.1.4 Existing SPC-1 hospital buildings. Means of egress for remodels of existing SPC-1 hospital buildings shall only pass through hospital buildings that have approved performance categories of SPC-1 or higher and NPC-2 or higher.

Exception: Means of egress for acute care service spaces for hospitals licensed pursuant to subdivision (a) of Section 1250 of the Health and Safety Code shall comply with the requirements of Section 3417A.1.1.1.2.

3417A.1.1.1.5 Other non-conforming hospital buildings. Hospital buildings that would not otherwise require evaluation for an SPC rating, which are used as a part of the means of egress for ~~acute care~~ hospital buildings, shall be evaluated in accordance with the requirements of Section 1.3, Chapter 6, of the California Administrative Code to determine the appropriate rating, or shall meet the structural requirements of these regulations for conforming hospital buildings. Means of egress shall be in accordance with the requirements of Sections 3417A.1.1.1.1 through 3417A.1.1.1.4.

3417A.1.1.1.6 Buildings removed from hospital service. The means of egress for acute care hospitals shall be permitted to pass through buildings that are removed from

hospital service only if the buildings remain under the jurisdiction of OSHPD, and only until January 1, 2030, subject to the following:

1. Egress for conforming hospital buildings shall be permitted to pass through buildings that have been removed from acute care hospital service that comply with the requirements of Section 3417A.1.1.1.1 or 3417A.1.1.1.3.
2. Egress for nonconforming hospital buildings shall be permitted to pass through buildings that have been removed from acute care hospital service that comply with the requirements of Section 3417A.1.1.1.2 or 3417A.1.1.1.4.

After January 1, 2030, the means of egress for acute care hospital buildings shall only pass through hospital buildings that have approved performance categories of SPC-3 or higher and NPC-5.

~~**3417A.1.1.2 Means of egress for skilled nursing facilities, intermediate care facilities and correctional treatment centers.** Means of egress for skilled nursing facilities, intermediate care facilities, and correctional treatment centers shall comply with the requirements of Sections 3417.1.1.2.1 and 3417.1.1.2.2.~~

~~**3417A.1.1.2.1 New facilities or additions to existing facilities.** Means of egress for new or additions to skilled nursing facilities, intermediate care facilities, or correctional treatment centers shall only pass through conforming buildings.~~

~~**Exception:** As an alternate, skilled nursing facilities, intermediate care facilities, and correctional treatment centers shall be permitted to meet the egress requirements in Sections 3417A.1.1.1.1 through 3417A.1.1.1.5 for hospital buildings.~~

~~**3417A.1.2 Jurisdiction.** Means of egress for Hospitals, skilled nursing facilities and intermediate care facilities, shall only pass through buildings that are under the jurisdiction of the Office of Statewide Health Planning and Development (OSHPD).~~

SECTION 3418A [OSHPD-4] REMOVAL OF HOSPITAL BUILDINGS FROM GENERAL ACUTE CARE SERVICES

3418A.1 General. The requirements of this section shall apply when general acute care services are completely removed from SPC buildings or when buildings are removed from OSHPD jurisdiction. All buildings that remain under the OSHPD jurisdiction, after one or more SPC buildings are removed, shall satisfy the requirements of the California Building Standards Code. Approval of construction documents and a building permit are required for removal of SPC Buildings from general acute care services or removal of buildings from OSHPD jurisdiction.

3418A.1.1 Buildings without approved extensions. A SPC 1 hospital building without an approved delay in compliance requirements in accordance with the California Administrative Code (CAC) Chapter 6 Section 1.5.2 or past the extension date granted in accordance with the CAC Chapter 6 Section 1.5.2 shall not be issued a building permit until a project to remove the subject SPC 1 building from general acute care services has been approved, permitted, and closed in compliance by the Office.

Exception: Building permits for seismic compliance, maintenance and repair shall be permitted to be issued.

3418A.2 Definitions. The following words and terms are applicable to this section only:

BUILDING. The area included within surrounding exterior walls or any combination of exterior walls and fire walls (as described in Sections 202 and 706) exclusive of vent shafts and courts. Areas of the building not provided with surrounding walls shall be included in the building area if such areas are included within the horizontal projection of the roof or floor above. A building may consist of one or more adjacent SPC Buildings.

GENERAL ACUTE CARE SERVICE. Means basic and supplemental services, as defined in Section 1224.3, provided in a general acute care hospital building, as defined in Section ~~202~~ 1224.3 and the California Administrative Code, Chapter 6, Section 1.2.

~~[Relocated to Section 3402A] SPC SEISMIC SEPARATION.~~ Means a building separation in accordance with the California Administrative Code, Chapter 6 Section 3.4.

STRUCTURAL SEPARATION. Means a building separation in accordance with this code.

3418A.3 Establishing eligibility for removal from general acute care service. In order to establish that one or more SPC buildings are eligible for removal from general acute care service, the hospital owner shall submit construction documents showing that after the SPC Buildings are removed from general acute care service:

1. All basic acute care services or supplemental services on the hospital's license are provided in SPC buildings satisfying the requirements for SPC-2, SPC-3, SPC-4, SPC-4D, or SPC-5.

Exception: If the hospital includes SPC-1 buildings that are not being removed from general acute care service, and these SPC-1 buildings have an approved extension to the SPC-2 deadline, basic acute care services or supplemental services on the hospital's license are permitted to remain in these SPC buildings for the duration of their extension or until these SPC-1 buildings are removed from general acute care service, whichever comes first.

2. All basic acute care services or supplemental services on the hospital's license are provided in SPC buildings satisfying the requirements for NPC-3, NPC-4, or NPC-5.

Exception: Services shall be permitted to be located in SPC buildings satisfying the requirements of NPC-2 if the SPC buildings have an approved extension to NPC-3 deadline.

3. The hospital complies with all egress requirements, including occupant load, number of required exits and travel distance to exits, and provides evidence that no egress from any acute care hospital building passes through the SPC buildings removed from general acute care service, SPC-1 buildings, or through buildings not under OSHPD jurisdiction.

Exceptions:

1. If the SPC building has an approved extension to the SPC-2 deadline, existing egress through the SPC-1 building shall be permitted for the duration of the extension or until the SPC-1 Building is removed from general acute care service, whichever comes first.
2. When permitted by Section 3417A.1.1.1.6.
4. No SPC building removed from general acute care service is used as a smoke compartment for any acute care hospital building. Buildings not under OSHPD jurisdiction shall not be used as a smoke compartment for any acute care hospital building.
5. Structural separation, fire barriers and fire walls shall satisfy the requirements of the California Building Standards Code.

Exception: An SPC seismic separation in accordance with the California Administrative Code Chapter 6 Section 3.4 shall be deemed to satisfy the building structural/seismic separation requirement in this section for SPC buildings that will remain under OSHPD jurisdiction.

6. If the SPC building removed from general acute care service shares a common fire alarm system with the acute care hospital, the main fire alarm control panel shall be located in an acute care hospital building. The SPC building removed from general acute care service shall be in a separate zone monitored by the main fire alarm control panel. Flexible connections shall be provided for conduits/conductors crossing structural or SPC seismic separation joints. If the intent is to place the SPC building under local jurisdiction, the building shall satisfy Section 3418A.5.1.

Exception: Flexible connections for fire alarm conduits/conductors crossing seismic separation joints ~~and fail safe shut-off valves, and disconnects for utilities~~ between an SPC building removed from general acute care service and adjacent SPC-1 or SPC-2 buildings may be omitted, provided the fire alarm ~~and utilities~~ in the adjacent SPC-1 and SPC-2 buildings have no connection to any SPC-3, SPC-4, SPC-4D, and SPC-5 buildings providing general acute care service.

7. If the SPC building removed from general acute care service shares the fire sprinkler system with the acute care hospital, an isolation valve with a tamper switch shall be provided to isolate the portion of the system serving the SPC building removed from acute care service. Flexible connections shall be provided in piping that crosses structural or SPC seismic separation joints. The fire sprinkler system shall not originate in the SPC building removed from general acute care service. If the intent is to place the building under local jurisdiction, the building shall satisfy Section 3418A.5.1.

Exception: Flexible connections for seismic separation joints and fail safe shut-off valves, and disconnects for utilities between an SPC building removed from general acute care service and adjacent SPC-1 or SPC-2 buildings may be omitted, provided utilities in the adjacent SPC-1 and SPC-2 buildings have no connection to any SPC-3, SPC-4, SPC-4D, and SPC-5 buildings providing general acute care service.

8. Patient access as required by Section 1224.4.7.5 does not pass through an SPC building removed from general acute care service or through buildings that are not under the jurisdiction of OSHPD.
9. The primary accessible entrance to the hospital is not through an SPC building removed from general acute care service or through buildings that are not under the jurisdiction of OSHPD.
10. No utilities servicing acute care hospital buildings originate in or pass through, over, or under, an SPC building removed from general acute care service, except as permitted by Section 3416A.1.1.1.5, or a building not under OSHPD jurisdiction.
11. If utilities originating in an acute care hospital building feed a SPC building removed from general acute care hospital service, fail safe shut-off valves and/or disconnects shall be provided that permit isolation of the SPC building removed from general acute care service from the hospital utilities. Flexible connections shall be provided for all utilities crossing structural or SPC seismic separation joints.

Exception: Flexible connections for ~~fire alarm conduits/conductors crossing~~ seismic separation joints and fail safe shut-off valves, and disconnects for utilities between an SPC building removed from general acute care service and adjacent SPC-1 or SPC-2 buildings may be omitted, provided ~~the fire alarm and~~ utilities in the adjacent SPC-1

and SPC-2 buildings have no connection to any SPC-3, SPC-4, SPC-4D, and SPC-5 buildings providing general acute care service.

3418A.4 Buildings intended to remain under OSHPD jurisdiction.

3418A.4.1 Qualifying non-acute care services. In order for a freestanding building to remain under OSHPD jurisdiction that is removed from general acute care service, it shall contain one or more qualifying services. Qualifying services include:

- a. Services considered "Outpatient Clinical Services" as defined in H&SC § 129730(a):
 - i. Administrative space
 - ii. Central sterile supply
 - iii. Storage
 - iv. Morgue and autopsy facilities
 - v. Employee dressing rooms and lockers
 - vi. Janitorial and housekeeping facilities
 - vii. Laundry
- b. Outpatient portions of the following services (with no more than 25 percent in-patient use), including but not limited to:
 - i. Surgical
 - ii. Chronic dialysis
 - iii. Psychiatry
 - iv. Rehabilitation, occupational therapy, or physical therapy
 - v. Maternity
 - vi. Dentistry
 - vii. Chemical dependency
- c. Services that duplicate Basic Services, as defined in H&SC §1250, or services that are provided as part of a Basic Service, but are not required for facility licensure (with no more than 25 percent in-patient use).

All hospital support services listed in Section 3418A.4.1 Item a that are located in an SPC building at the time general acute care services are removed may remain, provided the California Department of Public Health certifies to the Office that it has received and approved a plan that demonstrates how the health facility will continue to provide all basic services in the event of any emergency when the SPC building may no longer remain functional. This certification shall be submitted by hospital to the Office prior to approval of the application to remove the SPC building from general acute care service.

3418A.4.2 Maintaining existing non-acute care services under existing license. Existing approved non-acute care occupancies, or services, existing in the SPC building at the time it is removed from general acute care service shall be permitted to remain, and removal of the SPC building from general acute care service is not considered a change in occupancy. The enforcement agency shall be permitted to require evidence that the existing occupancies and services were in compliance at the time they were located in the SPC building. Any hospital support services located in the building removed from general acute care service, including administrative services, central sterile supply, storage, morgue and autopsy, employee dressing rooms and lockers, janitorial and housekeeping service, and laundry, shall be in excess of the minimum requirements for licensure and operation. Prior approval by the California Department of Public Health shall be obtained by hospital to maintain these services in the SPC building removed from acute care service.

3418A.4.3 Change of licensed services under existing license. A change of service or function for all, or a portion, of the SPC building removed from general acute care service requires compliance with the current requirements for that service, including accessibility requirements in accordance with Chapter 11B.

3418A.4.3.1 Skilled nursing or acute psychiatric services. When general acute care services are removed from an SPC building which is intended to be used for skilled nursing or acute psychiatric services, and the new services will be licensed under the existing license of

the general acute care hospital these new services shall comply with Section 3416A.1.1.1.5 for a nonconforming hospital building.

3418A.4.3.1 3418A.4.3.2 Outpatient clinical services. When general acute care services are removed from an SPC building which is intended to be used for outpatient clinical services under the existing acute care hospital license, the building is required to comply with the current OSHPD 3 code requirements for the new service.

3418A.4.4 SPC buildings removed from general acute care service with new license. When general acute care services are removed from an SPC building, and new services provided in the SPC building are issued an initial license, as determined by the California Department of Public Health, as a skilled nursing facility or acute psychiatric hospital, the SPC building shall comply with the new building code requirements or equivalent provisions of the California Building Standards code at the time of application.

3418A.4.5 Change of building occupancy or division. When an SPC building is removed from general acute care service with or without change of license, the new occupancy group and division of the building, and/or new service or function, shall be established. A new certificate of occupancy shall be required for the building removed from general acute care service.

3418A.5 Change in jurisdiction for buildings removed from general acute care service. Except as provided by Section 3418A.5.3, at the hospital's discretion, a building removed from general acute care service shall be permitted to be placed under the jurisdiction of the local enforcement agency. To be eligible for a change in jurisdiction, the building removed from general acute care service shall satisfy the requirements of Section 3418A.5.1.

3418A.5.1 Eligibility for change in jurisdiction. For a building removed from general acute care service to be eligible for a change in jurisdiction to the local enforcing agency, all the following criteria shall be satisfied:

- a. The building removed from general acute care service shall be freestanding, as defined in the California Administrative Code, Section 7-111.
- b. Any hospital support services located in the building removed from general acute care service, including administrative services, central sterile supply, storage, morgue and autopsy, employee dressing rooms and lockers, janitorial and housekeeping service, and laundry, shall be in excess of the minimum requirements for licensure and operation. Prior approval by the California Department of Public Health shall be obtained by hospital to locate these services in the building removed from general acute care service.
- c. Services/systems and utilities (e.g. power, emergency power, communication/data/nurse-call systems, space-heating systems, fire alarm system, fire-sprinkler system, medical gas & plumbing systems) shall be separate and independent from those serving any buildings under OSHPD jurisdiction.
- d. If the building being transferred to the jurisdiction of the local enforcing agency is adjacent to a building under OSHPD jurisdiction and fire resistive construction separations are required, they shall be located in the building under OSHPD jurisdiction.

3418A.5.2 Modification of buildings removed from OSHPD jurisdiction. The owner of the building shall be responsible for bringing the building into compliance with all requirements of the new authority having jurisdiction. If a building requires modification to become eligible for removal from OSHPD jurisdiction, the construction project shall be closed with compliance by OSHPD prior to the change in jurisdiction. All occupancy separation, set-back, and allowable area requirements shall be enforced.

3418A.5.3 Buildings not eligible for change in jurisdiction. The following freestanding buildings shall remain under OSHPD jurisdiction:

- a. Any building in which basic and/or supplementary services are provided for a general acute care hospital, acute psychiatric hospital, and general acute care hospital providing only acute medical rehabilitation center services.
- b. Any building which provides required patient access, egress, or smoke compartment for a Building under OSHPD's jurisdiction.
- c. Any building in which services under OSHPD jurisdiction are provided, including skilled nursing services, intermediate care services, acute psychiatric services, and distinct part skilled nursing or intermediate care services.
- d. Any building providing central plant or utility services to a building under OSHPD jurisdiction.
- e. Any building through which utilities pass through, over or under, to serve a building under OSHPD jurisdiction.

3418A.6 Vacant space. With the removal of general acute care services, the vacated space must be re-classified with an intended occupancy as required under Section 302. If the hospital determines that the building or space in the SPC building removed from general acute care service will be vacant, the hospital shall demonstrate that unsafe conditions as described in Section 116.1 are not created.

3418A.7 Demolition: Demolition of SPC buildings to be removed from general acute care services shall be permitted when buildings remaining under OSHPD's jurisdiction, after demolition, satisfy the requirements of the California Building Standards Code and demolition activity does not impair the operation and/or safety of any buildings that remain under the OSHPD's jurisdiction. Demolition shall be in accordance with Section 3303.

SECTION 3419A ~~[OSHPD-1]~~ HOSPITAL BUILDINGS REMOVED FROM GENERAL ACUTE CARE SERVICES

3419A.1 General. The requirements of this section and Section 3418A shall apply to buildings removed from general acute care services that remain under OSHPD jurisdiction.

3419A.2 Non-GAC buildings. Non-GAC buildings shall conform to the requirements of Section 1.10.1.

3419A.3 Freestanding buildings. Application and enforcement of freestanding buildings removed from general acute care services but remaining under OSHPD jurisdiction shall be in accordance with Section 1.10.

Freestanding hospital-owned clinics shall be permitted to be under the jurisdiction of OSHPD in accordance with the California Administrative Code Sections 7-2104, 7-2105, and 7-2106.

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

CHAPTER 35 REFERENCED STANDARDS

This chapter lists the standards that are referenced in various sections of this document. The standards are listed herein by the promulgating agency of the standard, the standard identification, the

effective date and title, and the section or sections of this document that reference the standard. The application of the referenced standards shall be as specified in Section 102.4.

[OSHPD 1 & 4] Reference to other chapters. In addition to the code sections referenced, the standards listed in this chapter are applicable to the respective code sections in Chapters 16A, 17A, 18A, 19A, 21A, and 22A. ~~and 34A.~~

...

AAMA	American Architectural Manufacturing Association 1827 Waldon Office Square, Suite 550 Schaumburg, IL 60173	
Standard reference number	Title	Referenced in code section number
...		
501.4-09	<i>Recommended Static Test Method for Evaluating Curtain Wall and Storefront Systems Subjected to Seismic and Wind Induced Interstory Drifts</i>	2410.1
501.6-09	<i>Recommended Dynamic Test Method For Determining The Seismic Drift Causing Glass Fallout From A Wall</i>	2410.1

ACI	American Concrete Institute 38800 Country Club Drive Farmington Hills, MI 48333-9094	
Standard reference number	Title	Referenced in code section number
...		
318-14	Building Code Requirements for Structural Concrete	<i>Table 1705A.2.1, Table 1705A.3, - 1705A.2.2.1.2, 1810A.3.10.4, 1901.3.4.4, 1903A, 1904A, 1905A, 1910A.5.4, 1913A.5, 1913A.7.2, 1913.2, 1913.3</i>
355.2-07	<i>Qualification of Post-Installed Mechanical Anchors in Concrete</i>	1616A.1.19
355.4-11	<i>Qualification of Post-Installed Adhesive Anchors in Concrete</i>	1616A.1.19
440.2R-08	<i>Guide for the Design and Construction of Externally Bonded FRP Systems for Strengthening Concrete Structures</i>	1911A.3 1914A.3
...		
503.7-07	<i>Specification for Crack Repair by Epoxy Injection.</i>	1911A.2 1914A.2
506-05	<i>Guide to Shotcrete</i>	1913.4.5, 1908A.1, 1910A.1, 1908A.3, 1910A.3, 1908A.12, 1910A.12, 1911A.2, 1914A.2
530-13	Building Code Requirements for Masonry Structures	2107A.5, 2107A.6

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...		
AISC	American Institute of Steel Construction Construction One East Wacker Drive, Suite 700 Chicago, IL 60601-2001	
Standard reference number	Title	Referenced in code section number
341-10	Seismic Provisions for Structural Steel Buildings	1705A.2.1, 2212.2, 2205A, 2206A
358- 10	<i>Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications including Supplements No. 1 & 2</i>	2212.3, 2205A, 2206A.2
360-10	Specifications for Structural Steel Buildings	1705A.2.1, Table 1705A.2.1, 2206A.2, 2212.1.1, 2204A.4, 2204A.2.2, 2212A.1.2, 2212A.2.1

AISI	American Iron and Steel Institute 1140 Connecticut Avenue, 705 Suite 705 Washington. DC 20036	
Standard reference number	Title	Referenced in code section number
S214-12	North American Standard for Cold-formed Steel Framing- Truss Design, 2012	2211A.3, 2212.5.1.2

ANSI	American National Standards Institute 25 West 43rd Street, Fourth Floor New York, NY 10036	
Standard reference number	Title	Referenced in code section number
A 190.1-12	Structural Glued Laminated Timber	<u>1705A.5.4</u>

...		
APA	APA - Engineered Wood Association 7011 South 19th Tacoma, WA 98466	
Standard reference number	Title	Referenced in code section number
A 190.1-12	Structural Glued Laminated Timber	<u>1705A.5.4</u>

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ASCE/SEI		American Society of Civil Engineers Structural Engineering Institute 1801 Alexander Bell Drive Reston, VA 20191-4400	
Standard reference number	Title		Referenced in code section number
5-13	Building Code Requirements for Masonry Structures		<u>2107A.5, 2107A.6</u>
...			
7-10	<i>Minimum Design Loads for Buildings and Other Structures including Supplement No. 1</i>		104.11, 202, 1616.9, 1616.10, 1603A.2 1613A, 1616A, 1803A.6, 1905A.1.21, 2114A.1, 2114.13, 2210A.2, 2212A.2.4, 2410.1.1, 2410.1.2,
...			
19- 10	Structural Application of Steel Cables for Buildings		<u>2208A.1, 2207.1, 2207.2</u>
...			
24 - 13 <u>14</u>	Flood Resistant Design and Construction		1203.4.2, 1612.4, 1612A.4, 1612.5, 1612A.5, 2702.1.7, 3001.2
...			
41- 06 <u>13</u>	<i>Seismic Evaluation and Retrofit Rehabilitation of Existing Buildings including Supplement No. 1</i>		1603A.2, 1616A.1.30, <u>3406A, 3412A, 3413A</u>
49- 12 <u>07</u>	Wind Tunnel Testing for Buildings and Other Structures		1609.1.1, <u>1609A.1.1</u>

...

ASTM		ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428-2959	
Standard reference number	Title		Referenced in code section number
...			
A 153/A 153M-09	Specification for Zinc Coating (Hot-dip) on Iron and Steel Hardware		<u>2304.10.1.1</u> 2304.9.1.1
A370 - 13 <u>40</u>	<i>Standard Test Methods and Definitions for Mechanical Testing of Steel Products</i>		3413A.1.3
...			
A 722/A722M-12	Specifications for Uncoated High-strength Steel Bar for Prestressing Concrete		<u>1812A.4.2</u> J106.2.4.2, 1811A.4
...			

<u>A1064-13</u>	<i>Standard Specification for Carbon steel wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete</i>	<u>1903A.8</u>
...		
B 695-04 (2009)	Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel Strip for Building Construction	<u>2304.10.1.1</u> 2304.9.1.1
...		
<u>C90-14</u>	<i>Standard Specification for Load Bearing Concrete Masonry Units</i>	<u>2105A.2</u>
C 94/C94M- <u>14a</u> <u>13</u>	Specifications for Ready Mix Concrete	<u>1705A.3.3.1</u> 1705A.3.3
...		
C 150-12	Specification for Portland Cement	1903A, 1910A 1913A, <u>1916.1.2</u>
...		
C 270- <u>14a</u> <u>12a</u>	Specifications for Mortar for Unit Masonry	<u>2114.2</u> <u>2105A.3</u>
C 289-07	Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates	1903A.3
...		
C 595-13	Specification for Blended Hydraulic Cement	1903A.6, <u>1910A.1</u> 1913A.1
...		
C 618 – <u>12a</u> 08a	<i>Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete</i>	1903A.3, <u>1910A.1</u> 1913A.1, <u>1913.2</u>
...		
C 635/C 635M- <u>13a</u>	Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel ceilings	<u>1616.10.16,</u> <u>1616A.1.21</u> 1616A.1.20
C 636/C 636M - <u>13</u> 08	Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels	<u>1616.10.16,</u> <u>1616A.1.21</u> 1616A.1.20
...		
C 989- <u>13</u> 09	<i>Standard Specification for Slag Cement for Use in Concrete and Mortars</i>	1903A.5, 1903A.6, <u>1910A.1</u> 1913A.1, 1913.2
...		
C 1019- <u>13</u> <u>14</u>	Test Method of Sampling and Testing Grout	<u>2105A.3</u> <u>2105A.2.2.1.4,</u> <u>2114.6.1</u> <u>2114.9.1</u>
...		
C 1157/C 1157M-11	ASTM Standard Performance Specification for Hydraulic Cement	<u>1910A.1</u> 1913A.1,
...		
C 1240-11	Standard Specification for Silica Fume Used in Cementitious Mixtures	1903A.6
C 1249- 06a(2010)	<i>Standard Guide for Secondary Seal for Sealed Insulated Glass Units for Structural Sealant Glazing Applications</i>	1903A.6, <u>2410.1.1</u>
...		
C 1260-07	Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)	1903A.6, 2410.1.1
...		
C 1293-08b	Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction	1903A.6, 1913.2.3
...		
C 1314-07	Test Method for Compressive Strength of Masonry	<u>2114.9.1</u>

	<i>Prisms</i>	
...		
<i>C 1392-00(2014 2009)</i>	<i>Standard Guide for Evaluating Failure of Structural Sealant Glazing</i>	<i>2410.1.3</i>
<i>C 1394-03 (2012 2008)</i>	<i>Standard Guide for In-Situ Structural Silicone Glazing Evaluation</i>	<i>2410.1.3</i>
...		
<i>C 1401-1409a</i>	<i>Standard Guide for Structural Sealant Glazing</i>	<i>2410.1</i>
...		
<i>C1567-08</i>	<i>Standard Test Method for Determining the Potential Alkali-Silica Reactivity of the Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)</i>	<i>1903A.6, 1913.2.3,</i>
<i>C1586-05 (2011)</i>	<i>Standard Guide for Quality Assurance of Mortars</i>	<i>2114.9.1, 2105A.3 2105A.2.2.1.4</i>
...		
<i>D 1586-11</i>	<i>Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils</i>	<i>J112.2 1813A</i>
...		
<i>D-3441-05</i>	<i>Standard Test Method for Mechanical Cone Penetration Tests of Soil</i>	<i>J112.2</i>
<i>D 5778-12</i>	<i>Standard Test Method for Electronic Friction Cone and Piezocone Penetration Testing of Soils</i>	<i>1813A</i>
...		
<i>D 3966-07 (2013)</i>	<i>Standard Test Method for Piles Under Lateral Loads</i>	<i>1810A.3.3.2</i>
...		
<i>E 580- 14 44b</i>	<i>Standard Practice for Installation of Ceiling Suspension Systems of Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions</i>	<i>1616A.1.21 4616A.1.20</i>
...		
<i>F 606-14</i>	<i>Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets</i>	<i>2213A.1</i>
...		

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AWC	American Wood Council 222 Catoclin SE, Suite 201 Leesburg, VA 20175	
Standard reference number	Title	Referenced in code section number
...		

ANSI/AWC NDS-2015	National Design Specifications (NDS) for Wood Construction with 2012 Supplement <i>and addendum</i>	<u>1905A.1.8</u> 1905A.1.24...
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AWPA	American Wood Products Association P.O. Box 361784 Birmingham, AL 35236-1784	
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U1-14	USE CATEGORY SYSTEM: User Specification for Treated Wood Except Section 6, Commodity Specification H	<u>1812A.2</u> ... J106.2.2
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AWS	American Welding Society 550 N.W. LeJeune Road Miami, FL 33126	
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Standard reference number	Title	Referenced in code section number
D1.1- 10	<i>Structural Welding Code-Steel</i>	<i>Table 1705A.2.1, 1705A.2.5</i> 1705A.2.2.5, 2212.6.2, 2213A.2
D1.3-08	Structural Welding Code-Sheet Steel	<i>Table 1705A.2.1, 1705A.2.5</i>
D1.4-11	Structural Welding Code – Reinforcing Steel	<i>Table 1705A.2.1, 1705.2.2.1.2, 2107A.3, 2107A.4</i>
D1.8-09	<i>Structural Welding Code – Seismic Supplement</i>	<u>1705A.2.5</u> 1705A.2.2.5
QC1- 07 06	<i>Standard for AWS Certification of Welding Inspectors</i>	<u>1705A.2.5</u> 1705A.2.2.5

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FM	Factory Mutual Global Research Standards Laboratories Department 1301 Atwood Avenue, P.O. Box 7500 Johnston, RI 02919	
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Standard reference number	Title	Referenced in code section number
<i>ANSI/FM 1950-15-40</i>	<i>Approval Standard for Seismic Sway Braces for Automatic Sprinkler Systems Pipe, Tubing and Conduit</i>	<u>1705A.13.2</u> 1705A.12.3
...		

...

ICC	International Code Council, Inc. 500 New Jersey Ave, NW 6 th Floor Washington, DC 20001	
Standard reference number	Title	Referenced in code section number
...		
<i>ICC-ES AC 01-42 15*</i>	<i>Acceptance criteria for expansion anchors in Masonry elements</i>	1616A.1.19
<i>ICC-ES AC 58-42 15*</i>	<i>Acceptance criteria for Adhesive anchors in Masonry elements</i>	1616A.1.19
<i>ICC-ES AC 70-42 15*</i>	<i>Acceptance criteria for fasteners power-driven into Concrete, Steel and Masonry elements</i>	<u>1616A.1.20</u> 1908A.1.1
<i>ICC-ES AC 106- 42 15*</i>	<i>Acceptance criteria for predrilled fasteners (screw anchors) in Masonry</i>	1616A.1.19
<i>ICC-ES AC 125- 42 15*</i>	<i>Acceptance criteria for Concrete, and Reinforced and Unreinforced Masonry strengthening using externally bonded Fiber-Reinforced Polymer (FRP) composite systems.</i>	<u>1911A.3</u> 1914.3
<i>ICC-ES AC 156-42 15*</i>	<i>Acceptance criteria for Seismic Certification by Shake-Table Testing of Nonstructural Components</i>	<u>1705A.13.3</u> 1705A.12.4
<i>ICC-ES AC 178- 42 15*</i>	<i>Acceptance criteria for inspection and verification of Concrete, and Reinforced and Unreinforced Masonry strengthening using Fiber-Reinforced Polymer (FRP) composite systems.</i>	<u>1911A.3</u> 1914A.3
<i>ICC-ES AC 193- 42 15*</i>	<i>Acceptance criteria for mechanical anchors in Concrete elements</i>	1616A.1.19, 1909A.11
<i>ICC-ES AC 232- 15*</i>	<i>Acceptance criteria for anchor channels in Concrete elements</i>	<u>1616A.1.19</u> , 1901.3.2
<i>ICC-ES AC 308- 42 15*</i>	<i>Acceptance criteria for post-installed adhesive anchors in Concrete elements</i>	1616A.1.19, 1901.3.3
<i>ICC-ES AC 358- 42</i>	<i>Acceptance criteria for Helical</i>	1810A.3.1.5.1

15*	<i>foundation systems and devices</i>	
ICC-ES AC 446- 15*	<i>Acceptance criteria for headed cast-in specialty inserts in Concrete</i>	<u>1616A.1.19, 1901.3.2</u>

* Refers to International Building Code, 2012 2015 as a reference standard.

...

ISO	International Organization for Standardization ISO Central Secretariat 1 ch, de la Voie-Creuse, Case Postale 56 CH-1211 Geneva 20, Switzerland	
Standard reference number	Title	Referenced in code section number
...		
<i>ISO 9001-08</i>	<i>Quality management systems - Requirements</i>	<u>1705A.13.3</u> <u>1705A.12.4</u>
<i>ISO 17020-12</i>	<i>Conformity assessment - Requirements for the operation of various types of bodies performing inspection</i>	<u>1704A.2</u>
<i>ISO 17025-05</i>	<i>General requirement for competence of testing and calibration laboratories</i>	<u>1703A.4</u> <u>1705A.12.4</u>

...

NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471	
Standard reference number	Title	Referenced in code section number
...		
13-16	Installation of Sprinkler Systems	1616.9.5, 1616.10.17

...

PCI	Precast Prestressed Concrete Institute 200 West Adams Street, Suite 2100 Chicago, IL 60606-5230	
Standard reference number	Title	Referenced in code section number
...		
<i>PCI 120-10</i>	<i>PCI Design Handbook, 7th Edition</i>	<u>1905A.1.1, 1905A.1.2</u> 1905A.1

PTI	Post-Tensioning Institute 8601 North Black Canyon Highway, Suite 103 Phoenix, AZ 85021	
Standard reference number	Title	Referenced in code section number
...		
<i>PTI-2004</i>	<i>Recommendations for Prestressed Rock and Soil Anchors (4th Edition)</i>	<u><i>1810A.3.10.4, 1811A.2, 1812A.4, 1812A.5, 1813A.2 J106.2.4, J106.2.5</i></u>
...		

...

TMS	The Masonry Society 3970 Broadway, Unit 201-D Boulder, CO 80304-1135	
Standard reference number	Title	Referenced in code section number
...		
402— 13	Building Code Requirements for Masonry Structures	<u><i>2107A.5, 2107A.6</i></u>
...		

...

UL	UL LLC 333 Pfingsten Road Northbrook, IL 60062-2096	
Standard reference number	Title	Referenced in code section number
...		
857— 13	Busways	<u><i>1705A.13.3.1</i></u>
...		

...

WCLIB	West Coast Lumber Inspection Bureau P. O. Box 23145 Portland, OR 97281	
Standard reference number	Title	Referenced in code section number
...		

AITC 111-05	Recommended Practice for Protection of Structural Glued Laminated Timber During Transit, Storage and Erection	2303.1.3.1
...		
AITC 117-10	Standard Specifications for Structural Glued Laminated Timber of Softwood Species	2303.1.3.1
...		
AITC 404-05	Standard for Radially Reinforcing Curved Glued Laminated Timber Members to Resist Radial Tension	2303.1.3.1

...

(All existing amendments that are not revised above shall continue without any change)

NOTATION:

Authority: Health and Safety Code Section 130005(g) & 130021

Reference: Health and Safety Code Section 1275, 129790, 129850 & 130005(g)

**APPENDIX J
GRADING**

(This Appendix is not adopted by OSHPD)

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**SECTION J104
PERMIT APPLICATION AND SUBMITTALS**

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J104.4 Liquefaction study. For sites with mapped maximum considered earthquake spectral response accelerations at short periods (S_s) greater than 0.5g as determined by Section 1613, a study of the liquefaction potential of the site shall be provided, and the recommendations incorporated in the plans.

Exception:

1. A liquefaction study is not required where the building official determines from established local data that the liquefaction potential is low.
2. ~~[OSHPD 1, 2, & 4] Exception 1 not permitted by OSHPD.~~

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**SECTION J106
EXCAVATIONS**

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(Relocated to Chapter 18A) J106.2 Earth retaining shoring. [OSHPD 1 & 4]

~~**J106.2.1 General.** The requirements of this section shall apply to temporary and permanent earth retaining shoring using soldier piles and lagging with or without tie-back anchors in soil or rock, only when existing or new OSHPD 1 or 4 facilities are affected. Shoring used as construction means and methods only, which does not affect existing or new OSHPD 1 or 4 facilities, are not regulated by OSHPD and shall satisfy the requirements of the authorities having jurisdiction. Design, construction, testing, and inspection shall satisfy the requirements of this code except as modified in Sections J106.2.2 through J106.2.8.~~

~~**J106.2.2 Duration.** Shoring shall be considered temporary when elements of the shoring will be exposed to site conditions for a period of less than one (1) year, and shall be considered permanent otherwise. Permanent shoring shall account for the increase in lateral soil pressure due to earthquake. At the end of the construction period, the existing and new structures shall not rely on the temporary shoring for support in anyway. Wood components shall not be used for permanent shoring lasting more than two (2) years. Wood components of the temporary shoring that may affect the performance of permanent structure shall be removed after the shoring is no longer required.~~

~~All components of the shoring shall have corrosion protection or preservative treatment for their expected duration. Wood components of the temporary shoring that will not be removed shall be treated in accordance with AWWA U1 (Commodity Specification A, Use Category 4B and Section 5.2), and shall be identified in accordance with Section 2303.1.8.1.~~

~~**J106.2.3 Surcharge:** Surcharge pressure due to footings, traffic, or other sources shall be considered in design. If the footing surcharge is located within the semi-circular distribution or bulb of earth pressure (when shoring is located close to a footings), lagging shall be designed for lateral earth pressure due to footing surcharge. Soil arching effects may be considered in the design of lagging. Underpinning of the footing may be used in lieu of designing the shoring and lagging for surcharge pressure. Alternatively, continuously contacting drilled pier shafts near the footings shall be permitted. The lateral surcharge design pressure shall be derived using Boussinesq equations modified for the distribution of stresses in an elastic medium due to a uniform, concentrated or line surface load as appropriate and soil arching effects.~~

~~**J106.2.4 Design and testing:** Except for the modifications as set forth in Sections J106.2.4.1 and J106.2.4.2 below, all Prestressed Rock and Soil Tie-back Anchors shall be designed and tested in accordance with PTI Recommendations for Prestressed Rock and Soil Anchors (PTI-2004).~~

~~**J106.2.4.1 Geotechnical requirements:** The geotechnical report for the earth retaining shoring shall address the following:~~

- ~~1. Minimum diameter and minimum spacing for the anchors including consideration of group effects.~~
- ~~2. Maximum unbonded length and minimum bonded length of the tie-back anchors.~~
- ~~3. Maximum recommended anchor tension capacity based upon the soil or rock strength / grout bond and anchor depth / spacing.~~
- ~~4. Allowable bond stress at the ground / grout interface and applicable factor of safety for ultimate bond stress for the anchor. For permanent anchors, a minimum factor of safety of 2.0 shall be applied to ground soil interface as required by PTI-2004 Section 6.6.~~
- ~~5. Minimum grout pressure for installation and post grout pressure for the anchor. The presumptive post grout pressure of 300 psi may be used for all soil type.~~
- ~~6. Class I Corrosion Protection is required for all permanent anchors. The geotechnical report shall specify the corrosion protection recommendations for temporary anchors.~~
- ~~7. Performance test for the anchors shall be at a minimum of two (2) times the design loads and shall not exceed 80% of the specified minimum tensile strength of the anchor rod. A creep test is required for all prestressed anchors that are performance tested. All production anchors shall be tested at 150% of design loads and shall not be greater than 70% of the specified minimum tensile strength of the anchor rod.~~
- ~~8. Earth pressure, surcharge pressure, and the seismic increment of earth pressure loading, when applicable.~~
- ~~9. Maximum recommended lateral deformation at the top of the soldier pile, at the tie-back anchor locations, and the drilled pier concrete shafts at the lowest grade level.~~
- ~~10. Allowable vertical soil-bearing pressure, friction resistance, and lateral passive soil resistance for the drilled pier concrete shafts and associated factors of safety for these allowable capacities.~~
- ~~11. Soil-pier shaft / pile interaction assumptions and lateral soil stiffness to be used in design for drilled pier concrete shaft or pile lateral loads.~~
- ~~12. Acceptable drilling methods.~~
- ~~13. Geotechnical observation and monitoring recommendations.~~

~~**J106.2.4.2 Structural requirements:**~~

- ~~1. Tendons shall be thread-bar anchors conforming to ASTM A 722.~~
- ~~2. Anchor design loads shall be based upon the load combinations in Section 1605A.3.1~~

and shall not exceed 60 percent of the specified minimum tensile strength of the tendons.

- 3. The anchor shall be designed to fail in grout bond to the soil or rock before pullout of the soil wedge.*
- 4. Design of shoring system shall account for as-built locations of soil anchors considering all specified construction tolerances in Section J106.2.8.*
- 5. Design of shoring system shall account for both short and long term deformation.*

J106.2.4.3 Testing of tie-back anchors:

- 1. The geotechnical engineer shall keep a record at job site of all test loads, total anchor movement, and report their accuracy.*
- 2. If a tie-back anchor initially fails the testing requirements, the anchor shall be permitted to be re-grouted and retested. If anchor continues to fail, the followings steps shall be taken:
 - a. The contractor shall determine the cause of failure — variations of the soil conditions, installation methods, materials, etc.*
 - b. Contractor shall propose a solution to remedy the problem. The proposed solution will need to be reviewed and approved by geotechnical engineer, shoring design engineer, and the building official.**
- 3. After a satisfactory test, each anchor shall be locked-off in accordance with Section 8.4 of PTI 2004.*
- 4. The shoring design engineer shall specify design loads for each anchor.*

J106.2.5 Construction: The construction procedure shall address the following:

- 1. Holes drilled for piles / tie-back anchors shall be done without detrimental loss of ground, sloughing or caving of materials and without endangering previously installed shoring members or existing foundations.*
- 2. Drilling of earth anchor shafts for tie-backs shall occur when the drill bench reaches two to three feet below the level of the tie-back pockets.*
- 3. Casing or other methods shall be used where necessary to prevent loss of ground and collapse of the hole.*
- 4. The drill cuttings from earth anchor shaft shall be removed prior to anchor installation.*
- 5. Unless tremie methods are used, all water and loose materials shall be removed from the holes prior to installing piles / tie-backs.*
- 6. Tie-back anchor rods with attached centralizing devices shall be installed into the shaft or through the drill casing. Centralizing device shall not restrict movement of the grout.*
- 7. After lagging installation, voids between lagging and soil shall be backfilled immediately to the full height of lagging.*
- 8. The soldier piles shall be placed within specified tolerances in the drilled hole and braced against displacement during grouting. Fill shafts with concrete up to top of footing elevation, rest of the shaft can generally be filled with lean concrete. Excavation for lagging shall not be started until concrete has achieved sufficient strength for all anticipated loads as determined by the shoring design engineer.*
- 9. Where boulders and / or cobbles have been identified in the geotechnical reports, contractor shall be prepared to address boulders and / or cobbles that may be encountered during the drilling of soldier piles and Tie-back anchors.*
- 10. The grouting equipment shall produce grout free of lumps and indispensed cement. The grouting equipment shall be sized to enable the grout to be pumped in continuous operation. The mixer shall be capable of continuously agitating the grout.*
- 11. The quantity of grout and grout pressure shall be recorded. The grout pressure shall be controlled to prevent excessive heave in soils or fracturing rock formations.*
- 12. If post-grouting is required, post grouting operation shall be performed after initial grout has set for 24 hours in the bond length only. Tie-backs shall be grouted over a sufficient length (anchor bond length) to transfer the maximum anchor force to the anchor grout.*
- 13. Testing of anchors may be performed after post-grouting operations provided grout has reached strength of 3,000 psi as required by PTI-2004 Section 6.11.*
- 14. Anchor rods shall be tensioned straight and true. Excavation directly below the anchors shall not continue before those anchors are tested.*

J106.2.6 Inspection, survey monitoring, and observation

- ~~1. The shoring design engineer or his designee shall make periodic inspections of the job site for the purpose of observing the installation of shoring system, testing of tie-back anchors, and monitoring of survey.~~
- ~~2. Testing, inspection, and observation shall be in accordance with testing, inspection and observation requirements approved by the building official. The following activities and materials shall be tested, inspected, or observed by the special inspector and geotechnical engineer:

 - ~~a. Sampling and testing of concrete in soldier pile and tie-back anchor shafts.~~
 - ~~b. Fabrication of tie-back anchor pockets on soldier beams~~
 - ~~c. Installation and testing of tie-back anchors.~~
 - ~~d. Survey monitoring of soldier pile and tie-back load cells.~~
 - ~~e. Survey Monitoring of existing buildings.~~~~
- ~~3. A complete and accurate record of all soldier pile locations, depths, concrete strengths, tie-back locations and lengths, tie-back grout strength, quantity of concrete per pile, quantity of grout per tie-back and applied tie-back loads shall be maintained by the special inspector and geotechnical engineer. The shoring design engineer shall be notified of any unusual conditions encountered during installation.~~
- ~~4. Calibration data for each test jack, pressure gauge, and master pressure gauge shall be verified by the special inspector and geotechnical engineer. The calibration tests shall be performed by an independent testing laboratory and within 120 calendar days of the data submitted.~~
- ~~5. Monitoring points shall be established at the top and at the anchor heads of selected soldier piles and at intermediate intervals as considered appropriate by the geotechnical engineer.~~
- ~~6. Control points shall be established outside the area of influence of the shoring system to ensure the accuracy of the monitoring readings.~~
- ~~7. The periodic basis of shoring monitoring, as a minimum, shall be as follows:

 - ~~a. Initial monitoring shall be performed prior to any excavation.~~
 - ~~b. Once excavation has begun, the periodic readings shall be taken weekly until excavation reaches the estimated subgrade elevation and the permanent foundation is complete.~~
 - ~~c. If performance of the shoring is within established guidelines, shoring design engineer may permit the periodic readings to be bi-weekly. Once initiated, bi-weekly readings shall continue until the building slab at ground floor level is completed and capable of transmitting lateral loads to the permanent structure. Thereafter, readings can be monthly.~~
 - ~~d. Where the building has been designed to resist lateral earth pressures, the periodic monitoring of the soldier piles and adjacent structure can be discontinued once the ground floor diaphragm and subterranean portion of the structure is capable of resisting lateral soil loads and approved by the shoring design engineer, geotechnical engineer, and the building official.~~
 - ~~e. Additional readings shall be taken when requested by special inspector, shoring design engineer, geotechnical engineer, or the building official.~~~~
- ~~8. Monitoring reading shall be submitted to shoring design engineer, engineer in responsible charge, and the building official within 3 working days after they are conducted. Monitoring readings shall be accurate to within 0.01 feet. Results are to be submitted in tabular form showing at least the initial date of monitoring and reading, current monitoring date and reading and difference between the two readings.~~
- ~~9. If the total cumulative horizontal or vertical movement (from start of construction) of the existing buildings reaches 1/2" or soldier piles reaches 1" all excavation activities shall be suspended. The geotechnical and shoring design engineer shall determine the cause of movement, if any, and recommend corrective measures, if necessary, before excavation continues.~~
- ~~10. If the total cumulative horizontal or vertical movement (from start of construction) of the existing buildings reaches 3/4" or soldier piles reaches 1 1/2" all excavation activities shall be suspended until the causes, if any, can be determined. Supplemental shoring shall be devised to eliminate further movement and the building official shall review and~~

- ~~approve the supplemental shoring before excavation continues.~~
- ~~11. Monitoring of Tie-back Anchor Loads:~~
- ~~a. Load cells shall be installed at the tie-back heads adjacent to buildings at maximum interval of 50', with a minimum of one load cells per wall.~~
 - ~~b. Load cell readings shall be taken once a day during excavation and once a week during the remainder of construction.~~
 - ~~c. Load cell readings shall be submitted to the geotechnical engineer, shoring design engineer, engineer in responsible charge, and the building official.~~
 - ~~d. Load cell readings can be terminated once the temporary shoring no longer provides support for the buildings.~~

J106.2.7 Monitoring of existing OSHPD 1 and 4 structures

- ~~1. The contractor shall complete a written and photographic log of all existing OSHPD 1 & 4 structures within 100 ft or three times depth of shoring, prior to construction. A licensed surveyor shall document all existing substantial cracks in adjacent existing structures.~~
- ~~2. Contractor shall document existing condition of wall cracks adjacent to shoring walls prior to start of construction.~~
- ~~3. Contractor shall monitor existing walls for movement or cracking that may result from adjacent shoring.~~
- ~~4. If excessive movement or visible cracking occurs, contractor shall stop work and shore/reinforce excavation and contact shoring design engineer and the building official.~~
- ~~5. Monitoring of the existing structure shall be at reasonable intervals as required by the registered design professional subject to approval of the building official. Monitoring shall be performed by a licensed surveyor and shall consist of vertical and lateral movement of the existing structures. Prior to starting shoring installation a pre-construction meeting shall take place between the contractor, shoring design engineer, surveyor, geotechnical engineer, and the building official to identify monitoring locations on existing buildings.~~
- ~~6. If in the opinion of the building official or shoring design engineer, monitoring data indicate excessive movement or other distress, all excavation shall cease until the geotechnical engineer and shoring design engineer investigates the situation and makes recommendations for remediation or continuing.~~
- ~~7. All reading and measurements shall be submitted to the building official and shoring design engineer.~~

J106.2.8 Tolerances. ~~Following tolerances shall be specified on the construction documents.~~

- ~~1. Soldier Piles:
 - ~~i. Horizontal and vertical construction tolerances for the soldier pile locations.~~
 - ~~ii. Soldier pile plumbness requirements (angle with vertical line).~~~~
- ~~2. Tie back Anchors:
 - ~~i. Allowable deviation of anchor projected angle from specified vertical and horizontal design projected angle.~~
 - ~~ii. Anchor clearance to the existing/new utilities and structures.~~~~

**SECTION J107
FILLS**

J107.1 General. Unless otherwise recommended in the soils report, fills shall conform to provisions of this section.

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J107.5 Compaction. All fill material shall be compacted to 90 percent of maximum density as determined by ASTM D 1557, Modified Proctor, in lifts not exceeding 12 inches (305 mm) in depth.

~~[OSHPD 1, 2, & 4] This section establishes minimum requirements only.~~

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(Relocated to Chapter 18A) Section J112
~~Vibro Stone Columns for Ground Improvement~~

~~**J112.1 General. [OSHPD 1, 2, & 4]** This section shall apply to Vibro Stone Columns (VSCs) for ground improvement using unbounded aggregate materials. Vibro stone column provisions in this section are intended to increase bearing capacity, reduce settlements, and mitigate liquefaction for shallow foundations. These requirements shall not be used for grouted or bonded stone columns, ground improvement for deep foundation elements, or changing site class. VSCs shall not be considered as a deep foundation element.~~

~~Ground improvement shall be installed under the entire building/structure footprint and not under isolated foundation elements only.~~

~~Design, construction, testing, and inspection shall satisfy the requirements of this code except as modified in Sections J112.2 through J112.5.~~

~~**J112.2 Geotechnical Report.** Geotechnical report shall specify vibro stone column requirements to ensure uniformity in total and differential immediate settlement, long term settlement, and earthquake induced settlement.~~

- ~~1. Soil compaction shall be sufficient to mitigate potential for liquefaction as described in California Geological Survey (CGS) Special Publication 117A (SP-117A): Guidelines for Evaluating and Mitigating Seismic Hazard in California.~~
- ~~2. Area replacement ratio for the compaction elements and the basis of its determination shall be explained. Minimum factor of safety for soil compaction shall be in accordance with SP-117A.~~
- ~~3. Depth of soil compaction elements and extent beyond the footprint of structures/foundation shall be defined. Extent beyond the foundation shall be half the depth of the VSCs with a minimum of 10' or an approved alternative.~~
- ~~4. Minimum diameter and maximum spacing of soil compaction elements shall be specified. VSC's shall not be less than 2 feet in diameter and center to center spacing shall not exceed 8 feet.~~
- ~~5. The modulus of subgrade reactions for shallow foundations shall account for the presence of compaction elements.~~
- ~~6. The modulus of subgrade reactions, long term settlement, and post earthquake settlement shall be specified along with expected total and differential settlements for design.~~
- ~~7. The acceptance criteria for Cone Penetration Test (CPT) in accordance with ASTM D 3441 complemented by Standard Penetration Test (SPT) in accordance with ASTM D 1586, if necessary, to verify soil improvement shall be specified~~
- ~~8. The requirements for special inspection and observation by the Geotechnical engineer shall be specified.~~
- ~~9. A Final Verified Report (FVR) documenting the installation of the ground improvement system and confirming that the ground improvement acceptance criteria have been met shall be prepared by the Geotechnical Engineer and submitted to the enforcement agency for review and approval.~~

~~**J112.3 Shallow Foundations.** VSCs under the shallow foundation shall be located symmetrically around the centroid of the footing or load.~~

- ~~1. There shall be a minimum of four stone columns under each isolated or continuous/combined footing or approved equivalent.~~
- ~~2. The VSCs or deep foundation elements shall not be used to resist tension or overturning uplift from the shallow foundations.~~
- ~~3. The foundation design for the shallow foundation shall consider the increased vertical stiffness of the VSCs as point supports for analysis, unless it is substantiated that the installation of the VSCs result in improvement of the surrounding soils such that the modulus of subgrade reaction, long term settlement, and post earthquake settlement can be considered uniform throughout.~~

~~**J112.4 Installation.** VSCs shall be installed with vibratory probes. Vertical columns of compacted unbounded aggregate shall be formed through the soils to be improved by adding gravel near the tip of the vibrator and progressively raising and re-penetrating the vibrator which will results in the gravel being pushed into the surrounding soil.~~

~~Gravel aggregate for VSCs shall be well graded with a maximum size of 6" and not more than 10% smaller than 3/8" after compaction.~~

~~**J112.5 Construction Documents.** Construction documents for VSCs, as a minimum, shall include the following:~~

- ~~1. Size, depth, and location of VSCs.~~
- ~~2. Extent of soil improvements along with building/structure foundation outlines.~~
- ~~3. Field verification requirements and acceptance criteria using CPT/SPT.~~
- ~~4. The locations where CPT/SPT shall be performed.~~
- ~~5. The Testing, Inspection and Observation (TIO) program shall indicate the inspection and observation required for the VSCs.~~

(OSHPD is not adopting Appendix J, since requirements are now covered in Chapter 18A)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790

APPENDIX L EARTHQUAKE RECORDING INSTRUMENTATION

SECTION L101 GENERAL

L101.1 General. Every structure located where the 1-second spectral response acceleration, S_1 , in accordance with Section 1613.3 is greater than 0.40 that either 1 exceeds six stories in height with an aggregate floor area of 60,000 square feet (5574 m²) or more, or 2 exceeds 10 stories in height regardless of floor area, shall be equipped with not less than three approved recording accelerographs. The accelerographs shall be interconnected for common start and common timing.

[OSHPD 1, 3, & 4] There shall be a sufficient number of instruments to characterize the response of the building during an earthquake and shall include at least one tri-axial free field instrument or equivalent.

L101.2 Location. As a minimum, instruments shall be located at the lowest level, mid-height, and near the top of the structure. Each instrument shall be located so that access is maintained at all times and is unobstructed by room contents. A sign stating "MAINTAIN CLEAR ACCESS TO THIS INSTRUMENT" in 1-inch block letters shall be posted in a conspicuous location.

[OSHPD 1, 3, & 4] A proposal for instrumentation and equipment specifications shall be forwarded to the enforcement agency for review and approval.

L101.3 Maintenance. Maintenance and service of the instrumentation shall be provided by the owner of the structure. Data produced by the instrument shall be made available to the building official on request.

Maintenance and service of the instruments shall be performed annually by an approved testing agency. The owner shall file with the building official a written report from an approved testing agency certifying that each instrument has been serviced and is in proper working condition. This report shall be submitted when the instruments are installed and annually thereafter. Each instrument shall have affixed to it an externally visible tag specifying the date of the last maintenance or service and the printed name and address of the testing agency.

[OSHDP 1] The Owner of the building shall be responsible for the implementation of the instrumentation program. Maintenance of the instrumentation and removal/processing of the records shall be the responsibility of the enforcement agency.

(All existing amendments are continued without any change)

NOTATION:

Authority: Health and Safety Code Section 129850

Reference: Health and Safety Code Sections 1275, 129850 and 129790