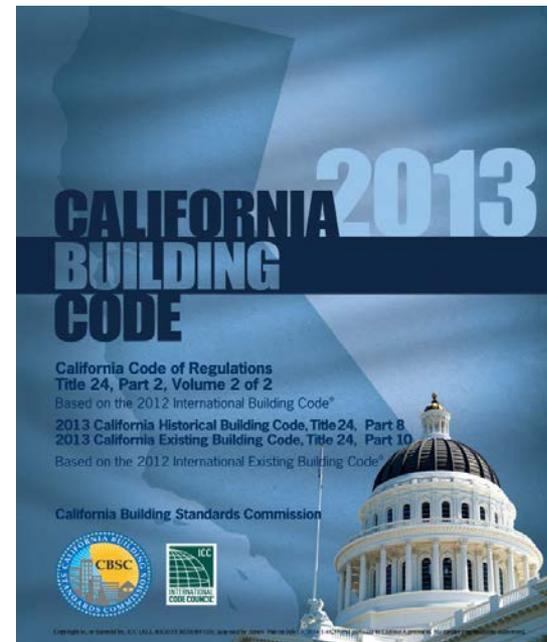
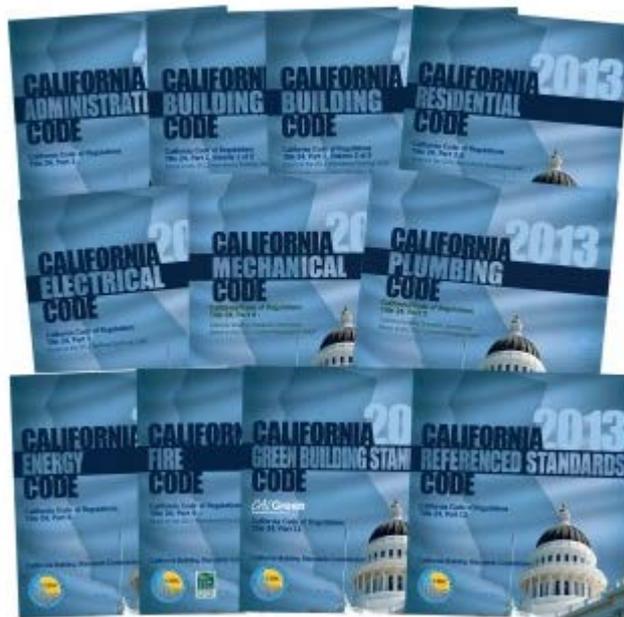




Office of Statewide Health Planning and Development Facilities Development Division

Jeffrey Enzler, S.E. / James C. Pan, S.E.
District Structural Engineer
Inspection Services Unit



Hospital Inspector Recertification Seminar 2013 CBSC

2013 CBC Structural Highlights Including 1-1-2014 errata



Nonstructural Components

- Chapter 16A several provisions have been clarified.
- Some requirements have been incorporated into ASCE 7, so they are no longer in Chapter 16A.
- Some provisions are covered in Model Code (IBC) or other standards (e.g. ASTM E 580 for ceilings), so they are no longer in Chapter 16A.



Screw Anchors for Concrete or Masonry

- Screw anchors shall not be used in exterior or wet locations (CBC 2013 Section 1616A.1.19).
- Screw anchors shall be tension tested, torque tests not permitted (CBC 2013 Section 1913A.7.5).
- Screw anchors or holes shall not be reused (CBC 2013 Section 1616A.1.19); so a screw anchor may not be removed or loosened to allow the installation of test apparatus.

Post-Installed Anchors in Concrete or Masonry

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

13.4.2.3 Post-installed anchors in concrete and masonry.

Post-installed anchors in concrete used for component anchorage shall be pre-qualified for seismic applications in accordance with ACI 355.2, ICC-ES AC193 or ICC-ES AC308. 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. Re-use of screw anchors or screw anchor holes shall not be permitted.



Post-Installed Anchor Testing

1913A.7.5 Testing procedure. Test procedure shall be as permitted by an 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 an approved test report using criteria adopted in this code.

Masonry Inspection & Test

1705A.4 Masonry construction. Masonry construction shall be inspected and verified in accordance with TMS 402 and TMS 602 quality assurance program, *as set forth in Table 1.19.3, Level C* requirements.

Inspection and testing of post-installed anchors in masonry shall be required in accordance with requirements for concrete in Chapters 17A and 19A.



Masonry Inspection & Test

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

CBC Chapter 17A

1703A.4 Performance. Changed to say “appropriate referenced standards” rather than “standards referenced in Chapter 35.” This clarifies that the ASTM standards for testing are not all listed in Chapter 35.

1703A.5.4 Method of labeling. Information required to be permanently identified on the product shall be acid etched, sand blasted, ceramic fired, laser etched, embossed or of a type that, once applied, cannot be removed without being destroyed.



1704A.2.2 Access for Special Inspection

1704A.2.2 Access for special inspection. The construction or work for which special inspection is required shall remain accessible and exposed for special inspection purposes until completion of the required special inspections.



1705A.2 – Steel Construction

Exception to Section 1705A.2: Requires fabricator to submit, “... a detailed procedure for material control...” when special inspection of steel fabrication (shop welding) is not required because the fabricator performs no welding, thermal cutting or heating operation of any kind.

1705A.2 – Steel Construction

1705A.2 Steel construction. The special inspections for steel elements of buildings and structures shall be as required in this section.

Exception: Special inspection of the steel fabrication process shall not be required where the fabricator does not perform any welding, thermal cutting or heating operation of any kind as part of the fabrication process. In such cases, the fabricator shall be required to submit a detailed procedure for material control that demonstrates the fabricator's ability to maintain suitable records and procedures such that, at any time during the fabrication process, the material specification, and grade for the main stress-carrying elements are capable of being determined. Mill test reports shall be identifiable to the main stress-carrying elements when required by the approved construction documents.

1705A.2.1 Required Verification...

Steel

The fabricator and erector quality control provisions of AISC 360-10 Chapter N and AISC 341-10 Chapter J are adopted per 1705A.2.1. The contractor must provide Quality Control inspections.

The owner must still provide for Quality Assurance (independent testing and special inspection) per Chapter 17A. The Quality Assurance provisions of AISC are augmented by additional requirements in Chapter 17A.



1705A.2.1 Requirements

1705A.2.1 Structural steel. Special inspections *and tests* of structural steel shall be in accordance with the quality assurance requirements *of this section and Chapter 22A.*

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:

- N4., Item 2. (Quality Assurance Inspector Qualifications)*
- 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)*

1705A.2.1 Requirements (Continued)

In addition to the quality assurance inspection requirements contained in AISC 360, Section N5, Item 6 (Inspection of High Strength Bolting), 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.



1705A.3 Concrete Construction

- Table 1705A.3 item 3 - The special inspection requirement for cast in anchors has been changed from “continuous” to “periodic.”
- Special Inspectors shall verify mix design.

1705A.3 Concrete Construction

TABLE 1705A.3
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

| VERIFICATION AND INSPECTION | CONTINUOUS | PERIODIC | REFERENCED STANDARD ^a | IBC REFERENCE |
|---|------------|----------|----------------------------------|------------------------|
| 1. Inspection of reinforcing steel, including prestressing tendons, and placement. | — | X | ACI 318: 3.5, 7.1-7.7 | 1910.4 |
| 2. Inspection of reinforcing steel welding in accordance with Table 1705.2.2, Item 2b. | — | — | AWS D1.4 ACI 318: 3.5.2 | — |
| 3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used. | — | X | ACI 318: 8.1.3, 21.2.8 | 1908.5, 1909.1 |
| 4. Inspection of anchors post-installed in hardened concrete members ^b . | — | X | ACI 318: 3.8.6, 8.1.3, 21.2.8 | 1909.1 |
| 5. Verifying use of required design mix. | — | X | ACI 318: Ch. 4, 5.2-5.4 | 1904.2, 1910.2, 1910.3 |



1705A.3 Concrete Construction

Table 1705A.3 item 4 – Footnote b added saying:

“b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with ACI 355.2 or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.”

(Note that tension or torque test loads and acceptance criteria shall also be shown on the construction documents per 1913A.7.1.)



1705A.3 Concrete Construction

Table 1705A.3 item 13 (new item) – Inspection of adhesive anchors in horizontal and upwardly inclined positions. Periodic special inspection required.

Also, footnote c added saying, “c. Installation of all adhesive anchors in horizontal and upwardly inclined positions shall be performed by an ACI/CRSI certified adhesive anchor installer.”

Note that this provision applies to the **installer** in accordance with ACI 318 Section D.9.2.2.



CBC 2013 Table 1705A.3

**TABLE 1705A.3
REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION**

| | | | | |
|--|---|---|------------------|---|
| <i>13. Inspection of adhesive anchors in horizontal and upwardly inclined positions.^c</i> | — | X | ACI 318: D.9.2.2 | — |
|--|---|---|------------------|---|

For SI: 1 inch = 25.4 mm.

- a. Where applicable, see also Section 1705.11, Special inspections for seismic resistance.
- b. Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with ACI 355.2 or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.
- c. *Installation of all adhesive anchors in horizontal and upwardly inclined positions shall be performed by an ACI/CRSI certified adhesive anchor installer.*



1705A.4 Masonry Construction

- The masonry special inspection table (Table 1704A.5.3) has been deleted; reference is made to TMS 402 Table 1.19.3 and TMS 602.
- Most provisions are unchanged; the following slides clarify some of the provisions that may be confusing:

TMS 402 & TMS 602

Unnumbered rows (Tests) at the top of Table 1.19.3:

- Verification of $f'm$ is recognized as a test and reference is made to Article 1.4 B of TMS 602 however, Article 1.4 B is superseded by CBC 2105A.
- Verification of proportions of materials for mortar and grout; similar to current requirements except that the definition of “periodic and continuous” special inspection don’t apply to “tests”



TMS 402 & TMS 602

Third un-numbered row (tests) at the top of Table 1.19.3:

- “Slump flow” and “VSI” (visual stability index) are only applicable to “self-consolidating grout.” These tests are not applicable to ordinary grout.

TMS 402 & TMS 602

Numbered rows (Special Inspections) of Table 1.19.3:

1. The term, “approved submittals” shall be interpreted as the “approved construction documents.” Submittals that are not reviewed or approved by OSHPD **never** take precedence over the approved construction documents

- 2d. Special inspection for placement of reinforcement, connectors, and prestressing tendons and anchorages” changed from periodic to continuous, (see old 2010 CBC Table 1704A.5.3, Row 5c)



TMS 402 & TMS 602

Numbered rows (Special Inspections) of Table 1.19.3 (continued):

3. The special inspector shall observe the preparation of grout specimens, mortar specimens and/or prisms - continuous.

ASTM C 780 and C 1019 require test specimens to be prepared by the testing laboratory for mortar and grout.



1705A.6.1 – Soil Fills

- Changed reference from “approved geotechnical report” to “approved construction documents.”
- Changed “observation” to “inspection” for cleared areas and benches prepared to receive soils.
- Changed “observation” to “inspection” for removal of all unsuitable soils and other materials.
- Clarified that the GEOR verified report covers both tested materials and/or inspected work.



1705A.11 – Special Inspection for Seismic Resistance

1705A.11 Special Inspections for seismic resistance.

Special inspections itemized in Sections 1705A.11.1 through 1705A.11.8, unless exempted by the exceptions of Section 1704A.2, are required for the following:

- 1. The seismic force-resisting systems in structures assigned to Seismic Design Category D, E or F in accordance with Sections 1705A.11.1 through 1705A.11.3, as applicable.
- 2. *Equipment/components requiring special seismic certification* assigned to Seismic Design Category D, E or F in accordance with Section 1705A.11.4.



1705A.11 – Special Inspection for Seismic Resistance

1705A.11 Special Inspections for seismic resistance (cont.)

- 3. Architectural, mechanical and electrical components in accordance with Sections 1705A.11.5 and 1705A.11.6.
- 4. Storage racks in structures assigned to Seismic Design Category D, E or F in accordance with Section 1705A.11.7.
- 5. Seismic isolation *and damping* systems in accordance with Section 1705A.11.8.



1705A.11.4 – Special Insp. for Special Seismic Certification

New Section:

1705A.11.4 Special inspection for special seismic certification. The special inspector shall examine *equipment and components* requiring *special seismic certification* in accordance with Section *1705A.12.4* and verify that the label, anchorage ~~or~~ and mounting conforms to the certificate of compliance.

(note the word “or” shown in strikeout should be “and.” It will be corrected in an errata.)

1705A.11.6 – Mechanical and Electrical Components

Three changes made as follows:

- All sub-items changed to reference Seismic design categories D, E or F; this requires *all* electrical equipment to receive periodic special inspection rather than just emergency or stand-by power in category D structures.
- Item 3; removed “Flammable, combustible or highly toxic” and included “hazardous.”
- Item 4; removed the word “HVAC”; *all* ductwork for hazardous materials is included.

1705A.12.4 Special Seismic Certification

Special Seismic Certification for active or energized equipment and components shall be based on test.

“...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.”



1705A.12.4.1

The list of systems, equipment and components requiring seismic certification has been modified. Many items are clarifications.

Also, three new items have been added:

- 18. Power isolation and correction systems.
- 19. Motorized surgical lighting systems.
- 20. Motorized operating table systems.



1705A.12.4.1 (continued)

The exceptions to the list have been modified:

- Equipment and components installed in nonconforming buildings have been **removed from the exceptions**; they will require special seismic certification unless they have a component importance factor (I_p) of 1.0.
- Conduits and cable trays have been added to exception 3.
- ...

1705A.12.4.1 (continued)

The exceptions to the list have been modified (continued):

2. “Movable (mobile) and temporary equipment/components that 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.” has been added to the exceptions.
5. “Electrical motors and pumps 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” has been added to the exceptions.

18A Soils and Foundations

- **1810A.3.3.1.2 Load tests.** was revised to clarify that “Procedure G: Cyclic Loading Testing” shall be included when testing in accordance with ASTM D 1143.
- **1810A.3.3.1.5 Uplift capacity of a single deep foundation element.** Revised to require inclusion of the cyclic loading procedure of ASTM D 3689.
- **1810A.3.3.2 Allowable lateral load.** Revised to require that lateral load tests, when used as an alternative to analysis, must conform to ASTM D 3966 including the cyclic loading procedure.

19A Concrete

Referenced standard updated to ACI 318-11

Note that reference standard ACI 318 was changed: Section 21.5.3.2; maximum spacing of hoops in SMRF plastic hinge region is reduced. Hoops spacing shall not exceed the smallest of:

- $d/4$,
- Six times the diameter of the smallest primary reinforcing bars... (used to be eight times), or
- 6 inches (used to be 12")



1903A.6 Aggregates

Changed reference from “ASTM C 289” to “ASTM C 1260 or ASTM C 1293” for aggregate reactivity testing.

- Added two new recognized means of mitigation (items 5 and 6).
- Requires ASTM C 1567 tests to be performed separately on fine and coarse aggregates.
- Requires tests to have been performed in the last three years.



1909A Anchorage to Concrete

ACI 318-11, Appendix D, Section D2.2 changed to *require that adhesive anchors be installed in concrete with an age of at least 21 days.*

1913A Conc., Reinforcement & Anchor Testing

1913A.7.5 Testing procedure. Test procedure shall be as permitted by an 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 an approved test report using criteria adopted in this code.



19A Concrete

Referenced standard updated to ACI 318-11

Old Section 1905A.12 – Cold Weather Requirements deleted. ACI 318 Section 5.12 contains general requirements for placement in cold weather.

Old Section 1906A.2 – Removal of Shores, Forms and Reshores deleted. No 12 hour minimum time limit for form removal. See ACI 318 Section 6.2

Old Section 1906A.3.2 – Adequate Support [for pipes and conduits] deleted. See ACI 318 Section 6

19A Concrete

Old Section 1906A.4 - Construction joints deleted. See ACI 318 Section 6.4

Old Section 1906A.4.1 – Surface Preparation deleted. See ACI 318 Section 6.4.1 and 6.4.2

Old Section 1907A.5.1 Prestressing Tendons deleted. See ACI 318 Section 7.5

21A Masonry

Reference standards updated to:

- Building Code Requirements for Masonry Structures (TMS 402-11/ACI 530-11/ASCE 5-11)
- Specifications for Masonry Structures (TMS 602-11/ACI 530.1-11/ASCE 6-11)



21A Masonry

2101A.3 Construction documents. Revised item 8 to require that, “Size and permitted locations of conduits, pipes and sleeves” be shown on the construction documents.

2104A.5.1.2.1.2 High-lift Grouted Construction

- Changed to say that “access to...” every reinforced cell is required rather than requiring a cleanout in every reinforced cell.
- Deleted, “...The foundation or other horizontal construction joints shall be cleaned of all loose material and mortar droppings before each pour.”
- See TMS 602 Section 3.2

2105A.2.2.1.4 Mortar and Grout Tests

When the prism test method of Section 2105A.2.2.2 is used during construction, the tests in this section are not required.

2105A. 4 Masonry Core Testing

Clarified that the architect or engineer in responsible charge or his or her representative or the inspector of record may select areas for sampling, and the visual examination of cores is to be made by the laboratory acceptable to the building official.

2010 Section 2107A.6 Deleted

Old section 2107A.6 deleted; changes relevant to the IOR:

- Anchor bolts are addressed in TMS 402/TMS 602
- Relocated maximum anchor bolt sizes to 2106A.1.1 Item 4.

2115A Masonry Screen Walls

- **Item 2:** Revised to require the joint reinforcement to be spaced at a maximum of 16 inches on center.
- **Item 4:** Added, “The specified thickness of the units for exterior applications shall not be less than 3-7/8 inches.”

22A Steel

Reference standards updated to:

- AISC 341-10,
- AISC 358-10 and
- AISC 360-10

2213A.1 Tests of High-Strength Bolts, Nuts and Washers

Added: [OSHPD 1 and 4] A minimum of three samples per lot, as defined in the ASTM standards for bolts [and not nuts and washers], shall be tested for tensile properties, but need not exceed three samples per 400 bolts

23A Wood

Reference standards updated to:

- National Design Specifications (NDS)-12 and
- Special Design Provisions for Wind and Seismic (SDPWS)-08 (**NOT** SDPWS-13)



2303.1.1 Sawn Lumber

Added: “End-jointed lumber used in an assembly required to have a fire-resistance rating shall have the designation "Heat Resistant Adhesive" or "HRA" included in its grade mark.”

2304.9.5 Fasteners and Connectors...

2304.9.5 Fasteners and connectors in contact with preservative-treated and fire-retardant-treated wood.

- **Revised to clarify that nuts and washers are included:** “Fasteners, including nuts and washers, and connectors in contact with preservative-treated and fire-retardant-treated wood shall be in accordance with Sections 2304.9.5.1 through 2304.9.5.4. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A 153.”



2305.1.2 Additional Requirements

Relocated Items 6 and 7:

- 6. Any wood structural panel sheathing used for 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.



Chapters 1 through 15 and 24-35

Chapters 1 through 15 and 24 through 35 and the appendices are not included in this presentation. Inspectors should familiarize themselves with the changes in these chapters.

This presentation only covers “some highlights” of the structural changes in Chapters 16A through 23.



01-01-2014 Errata

Chapters 24 and 25 are shown as adopted on the matrix adoption tables in the January 1, 2014 errata:

CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE CHAPTER 24 – GLASS AND GLAZING

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.

See Chapter 1 for state agency authority and building applications.)

| Adopting agency | BSC | SFM | HCD | | | DSA | | | OSHPD | | | | BSCC | DPH | AGR | DWR | CEC | CA | SL | SLC |
|--|-----|-----|-----|---|------|-----|----|-------|-------|---|---|---|------|-----|-----|-----|-----|----|----|-----|
| | | | 1 | 2 | 1/AC | AC | SS | SS/CC | 1 | 2 | 3 | 4 | | | | | | | | |
| Adopt entire chapter | X | | X | X | | | | | | X | | | | | | | | | | |
| Adopt entire chapter as amendeded (amended sections listed below) | | | | | | | X | X | X | | | X | | | | | | | | |
| Adopt only those sections that are listed below | | | | | | | | | | | | | | | | | | | | |
| Chapter / Section | | | | | | | | | | | | | | | | | | | | |
| 2403.2.1 | | | | | | | X | X | X | | | X | | | | | | | | |
| Table 2403.2.1 | | | | | | | X | X | X | | | X | | | | | | | | |
| 2410 & Subsections | | | | | | | X | X | X | | | X | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |

11



01-01-2014 Errata

CALIFORNIA BUILDING CODE – MATRIX ADOPTION TABLE CHAPTER 25 – GYPSUM BOARD AND PLASTER

(Matrix Adoption Tables are non-regulatory, intended only as an aid to the user.

See Chapter 1 for state agency authority and building applications.)

| Adopting agency | BSC | SFM | HCD | | | DSA | | | OSHPD | | | | BSCC | DPH | AGR | DWR | GEC | CA | SL | SLC | | |
|--|-----|-----|-----|---|------|-----|----|-------|-------|---|---|---|------|-----|-----|-----|-----|----|----|-----|--|--|
| | | | 1 | 2 | 1/AC | AC | SS | SS/CC | 1 | 2 | 3 | 4 | | | | | | | | | | |
| Adopt entire chapter | X | | X | X | | | | | | | X | | | | | | | | | | | |
| Adopt entire chapter as amendeded (amended sections listed below) | | | | | | | | | | X | | | | | | | | | | | | |
| Adopt only those sections that are listed below | | | | | | | | | | | | | | | | | | | | | | |
| Chapter / Section | | | | | | | | | | | | | | | | | | | | | | |
| 2501.2 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2503.2 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2504.2 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2504.2.1 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2505.3 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2507.3 | | | | | | | X | X | X | | | | | | | | | | | | | |
| 2508.5.6 | | | | | | | X | X | X | | | | | | | | | | | | | |

The Office of the State Fire Marshal's adoption of this chapter or individual sections is applicable to structures regulated by other state agencies pursuant to Section 1.11.



01-01-2014 Errata

J106.2 Earth retaining shoring [OSHPD 1 & 4, DSA-SS & DSA-SS/CC]

J106.2.1 General. The requirements of this section shall apply to temporary and permanent earth retaining shoring

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, DSA-SS & DSA-SS/CC] This section establishes minimum requirements only.*

SECTION J112

VIBRO STONE COLUMNS FOR GROUND IMPROVEMENT

|| *[OSHPD 1, 2 & 4, DSA-SS & DSA-SS/CC]*



Thank You

