

**CALIFORNIA BUILDING STANDARDS COMMISSION  
BUILDING CODE, and EXISTING BUILDING CODE WORKSHOP  
November 6, 2014 - Agenda Item 3b**

**DRAFT EXPRESS TERMS for the 2016  
CALIFORNIA BUILDING CODE, PART 2,  
CALIFORNIA BUILDING STANDARDS CODE, TITLE 24,  
CALIFORNIA CODE OF REGULATIONS**

**LEGEND FOR DRAFT EXPRESS TERMS**

1. Existing California amendments or code language being modified are in italics when they appear in the model code text: All such language appears in *italics*, modified language is underlined.
2. New California amendments: All such language appears underlined and in italics.
3. Repealed text: All such language appears in ~~strikeout~~.
4. *[Information for the reader: All such language is bracketed and in red italics]*

**WORKSHOP DRAFT EXPRESS TERMS**

**Statement of specific purpose, problem, rationale and benefits:**

The California Building Standards Commission (CBSC) currently adopts Chapter 19 Concrete with various California amendments. CBSC coordinates adoption and amendments with the Division of the State Architect- Structural Safety Division (DSA-SS) for application to State owned buildings, Colleges, Universities, and Community Colleges.

CBSC proposes to repeal the amendment to the 2013 CBC, Section 1905.1.9 American Concrete Institute (ACI), Section D.3.3 and adopt the 2015 IBC Section 1905.1.8, ACI 318, Section 17.2.3.

**Rationale:**

During the 2013 Intervening Code Adoption Cycle CBSC amended Section 1905.1.9 to correct the text in the 2012 IBC Chapter 19 which erroneously reflected modifications to ACI 318-08 rather than ACI 318-11. The proposed amendment was necessary to keep the 2013 CBC consistent with ACI 318-11. During the 2015 Triennial Code Adoption Cycle, CBSC is proposing to repeal Section 1905.1.9 and adopt the 2015 IBC model code language shown below. The 2015 International Building Code (IBC) was modified relevant to the concrete anchorage provisions in Section 1905.1.8 to maintain the intent regarding light-frame shear wall anchorage, while achieving consistency with Chapter 17 of the 2014 ACI 318. Anchorage to concrete is addressed in Chapter 17 of ACI 318. The 2014 edition of ACI 318 is the approved referenced standard for concrete design in the 2015 IBC. The 2015 IBC renumbered Section 1905.1.9 to 1905.1.8.

- CBSC noted one inconsistency. **ACI Section 17.2.3.5.2 Exception 3** cites “concrete anchors less than or equal to 1 inch” while the 2013 CBC cites “concrete anchors less than or equal to 5/8 inch”. This should be discussed and coordinated with DSA-SS, HCD as well at the workshop. *[Was this a change to the ACI prior to the published 2015 IBC; look at ACI]*

CHAPTER 19 – CONCRETE

SECTION 1905  
MODIFICATIONS TO ACI 318

- [Repeal the following California amendments.]

**1905.1.9 ACI 318, Section D.3.3.** Modify ACI 318, Sections D.3.3.4.2, D.3.3.4.3 (d) and D.3.3.5.2 to read as follows:

~~D.3.3.4.2 – 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 Section D.3.3.4.3. The anchor design tensile strength shall be determined in accordance with Section D.3.3.4.4.~~

~~**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 D.3.3.4.3 (d).~~

~~D.3.3.4.3 (d) – The anchor or group of anchors shall be designed for the maximum tension obtained from design load combinations that include  $E_e$ , with  $E_e$  increased by  $\Omega_0$ . The anchor design tensile strength shall be calculated from Section D.3.3.4.4.~~

~~D.3.3.5.2 – 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 Section D.3.3.5.3. The anchor design shear strength for resisting earthquake forces shall be determined in accordance with Section D.6.~~

~~**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 Sections D.6.2 and D.6.3 need not be computed and Section D.3.3.5.3 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 AF&PA 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 Sections D.6.2 and D.6.3 need not be computed and Section D.3.3.5.3 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 5/8 inch [16mm] in diameter of sill plate or track to foundation or foundation stem wall need not satisfy~~

~~Section D.3.3.5.3 (a) through (c) when the design strength of the anchors is determined in accordance with Section D.6.2.1(e).~~

- **CBSC proposes to adopt the 2015 IBC and amend [if necessary] Section 1905.1.8 ACI, Section 17.2.3**

**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 Section 17.2.3.4.3. The anchor design tensile strength shall be determined in accordance with Section 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 D.3.3.4.3 (d).

- **Coordinate the addition of Section 1604A.8.2 if appropriate.**

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  $\Omega_0$ . The anchor design tensile strength shall be calculated from Section 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 Section 17.2.3.5.3. The anchor design shear strength for resisting earthquake forces shall be determined in accordance with Section 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 Sections 17.5.2 and 17.5.3 need not be computed and Section 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 Sections 17.5.2 and 17.5.3 need not be computed and Section 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 **5/8 inch** [16mm] in diameter of sill plate or track to foundation or foundation stem wall need not satisfy Section 17.2.3.5.3(a) through (c) when the design strength of the anchors is determined in accordance with Section 17.5.2.1(c).

- **Coordinate the 5/8 inch dimension. In the 2013 CBC, HCD & BSC adopted language which read 1 inch, not 5/8 inch.**

Notation:

Authority: Health and Safety Code § 16600 18928 & 18934.5

References: Health and Safety Code §§18928, 18928.1, 18934.5 & 18938(b)

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