2022 TITLE 24

California Code Changes

Introduction to

2022 California Building Standards

as applied to

Buildings Regulated by OSHPD/HCAI

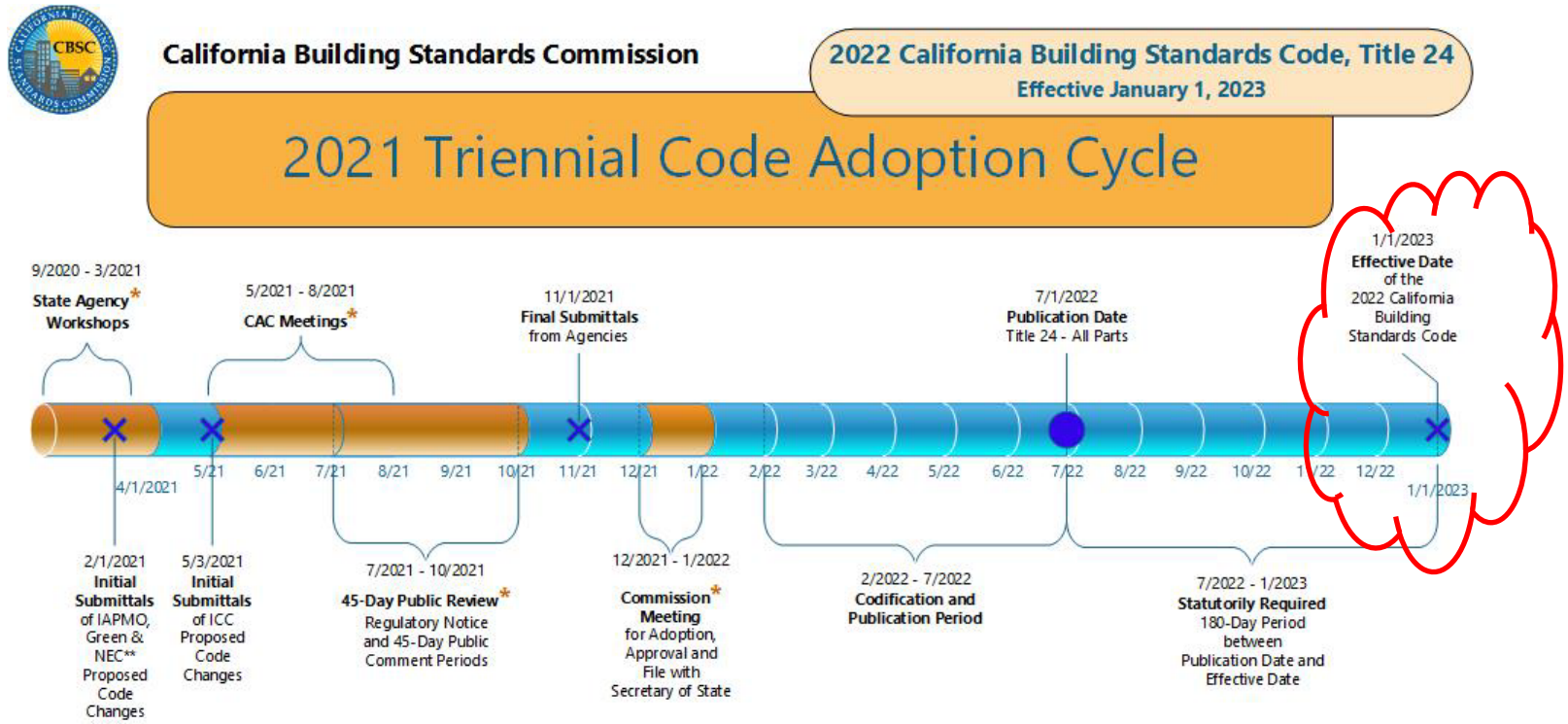
July 2022

1st Edition

CALIFORNIA BUILDING STANDARDS COMMISSION

HCAi Department of Health Care Access and Information

2022 CBSC Timeline



Code Advisory Committees (CAC):
ACCESS – Accessibility
BFO – Building, Fire & Other
GREEN – Green Building
HF – Health Facilities
PEME – Plumbing, Electrical, Mechanical & Energy
SDLF – Structural Design/Lateral Forces

Model Code Publishers:
ICC – International Code Council
IAPMO – International Association of Plumbing and Mechanical Officials
NFPA – National Fire Protection Association
**NEC resubmittal if necessary

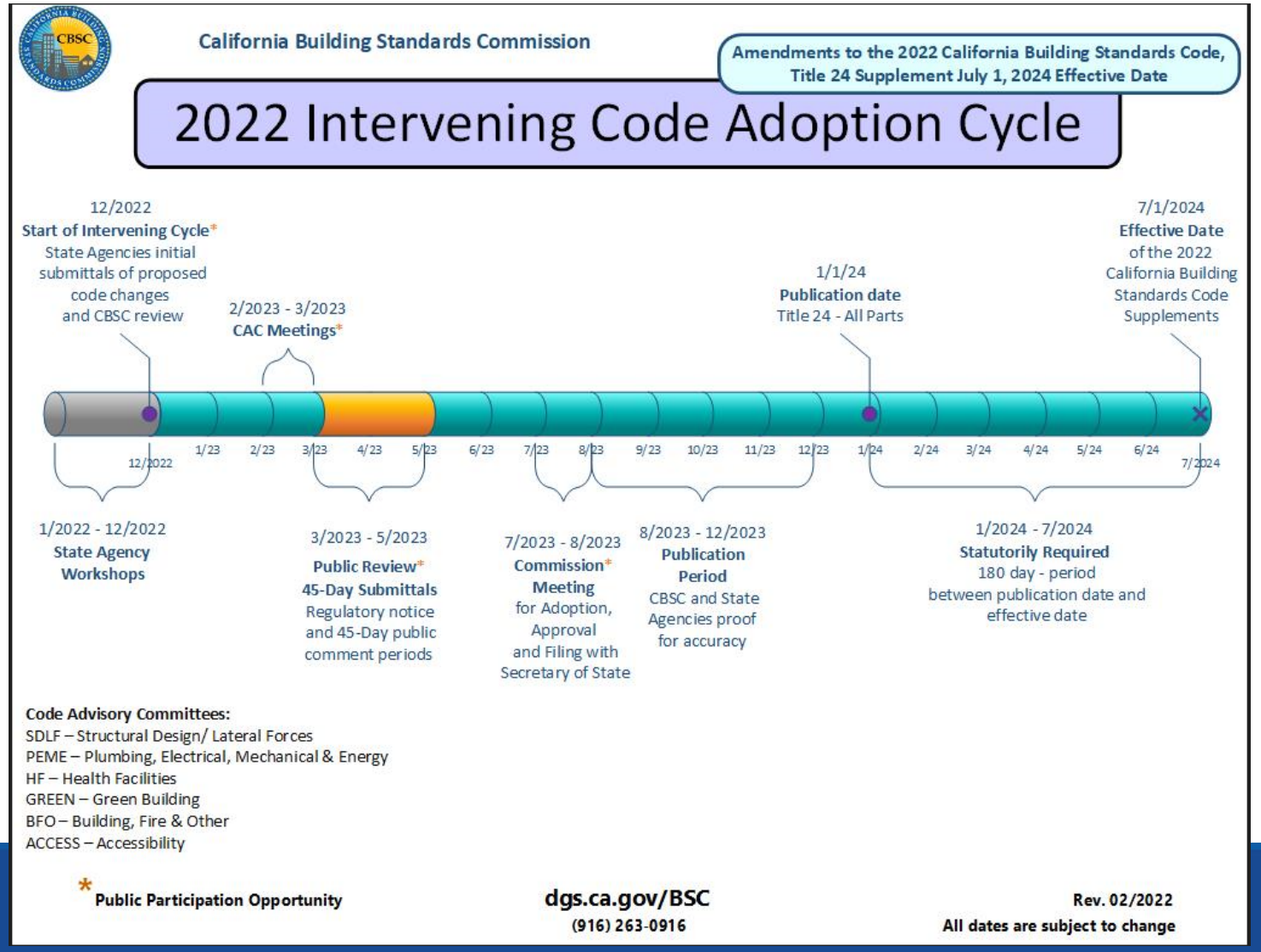
* Public Participation Opportunity

dgs.ca.gov/BSC
(916) 263-0916

Rev. 09/2020
All dates are subject to change

HCAI
Department of Health Care Access and Information

2022 CBSC Timeline



Department of Health Care Access and Information

2022 California Building Standards Code Changes

- ❑ Part 1 – Administrative Code
- ❑ Part 2 – Volume 1 (Non-structural) Building Code
- ❑ **Part 2 – Volume 2 (Structural) Building Code – Major Changes**
- ❑ Part 3 – Electrical Code – Housekeeping Items and Alignment with CBC and 2020 NEC
- ❑ Part 4 – Mechanical Code – More Alignment with ASHRAE 170
- ❑ Part 5 – Plumbing Code – Housekeeping Items
- ❑ Part 10 – Existing Building Code – SPC-4D

2022 California Building Code Part 2, Volume 2

Part 2, Volume 2 – Overview of Changes

- Adopt the 2021 IBC and associated reference standards
- Carried forward existing amendments
- Added new amendments where existing language was revised in model code

Major Reference Standards not Updated

- **ASCE 7-16** but included Supplement 3.
- **ANSI/AISC 360-16** Specifications for Structural Steel Buildings
- **ANSI/AISC 341-16** Seismic Provisions for Structural Steel Buildings
- **TMS 402/602 – 16** Building Code for Masonry Structures
- **ANSI/AWC NDS-2018** National Design Specification (NDS) for Wood Construction – with 2018 NDS Supplement

Major Reference Standards Updated

- ***ACI 318-19*** Building Code Requirements for Structural Concrete
- **ANSI/AISC 358-16/s1-18** Prequalification for Special and Intermediate Steel Moment Frames for Seismic Applications, Including Supplement 1
- **AISI** Code of Standard Practice cold form steel
  - **S100-16 s/S1-18 & w/S2-20 (2020), S202-20, S220-20, S240-20, S400-20**
- **ANSI/AWC SDPWS -2021** Seismic Design Provisions for Wind and Seismic
- **AWS D1.4/D1.4M – 2018** Structural Welding Code – Steel Reinforcing bars

Part 2 – Volume 2 – HCAI Amendments

Major Changes to Part 2 Volume 2

- Chapter 16/16A Structural Design
- Chapter 17/17A Special Inspections and Tests
- Chapter 18/18A Soils and Foundations
- Chapter 19/19A Concrete
- Chapter 21/21A Masonry
- Chapter 22A Steel
- Chapter 35 Reference Standards

Chapter 16 & 16 A STRUCTURAL DESIGN

SECTION 1605 LOAD COMBINATIONS

…

1605.2 (Formerly 1605.3.2) **Alternative allowable stress design load combinations.** In lieu of the load combinations in ASCE 7, Section 2.4, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following combinations.

…

[OSHPD 1R, 2B & 5] *Each load combination shall be investigated with one or more of the variable loads set to zero.*

Requirements in IBC 2018

SECTION 1605
LOAD COMBINATIONS

1605.1 General. Buildings and other structures and portions thereof shall be designed to resist all of the following:

1. The load combinations specified in Section 1605.2, 1605.3.1 or 1605.3.2.
2. The load combinations specified in Chapters 18 through 23.
3. The seismic load effects including overstrength factor in accordance with Sections 2.3.6 and 2.4.5 of ASCE 7 where required by Chapters 12, 13, and 15 of ASCE 7. With the simplified procedure of ASCE 7, Section 12.14, the seismic load effects including overstrength factor in accordance with Section 12.14.3.2 and Chapter 2 of ASCE 7 shall be used.

Applicable loads shall be considered, including both earthquake and wind, in accordance with the specified load combinations. Each load combination shall also be investigated with one or more of the variable loads set to zero.

Requirements in IBC 2021

SECTION 1605
LOAD COMBINATIONS

1605.1 General.

Buildings and *other structures* and portions thereof shall be designed to resist the strength load combinations specified in { ASCE 7 }, Section 2.3, the a*llowable stress design* load combinations specified in { ASCE 7 }, Section 2.4, or the alternative a*llowable stress design* load combinations of { Section 1605.2 }.

~~Buildings and other structures and portions thereof shall be designed to resist all of the following:~~

~~1. The load combinations specified in Section 1605.2, 1605.3.1 or 1605.3.2.~~

~~2. The load combinations specified in Chapters 18 through 23.~~

~~3. The seismic *load* effects including overstrength factor in accordance with Sections 2.3.6 and 2.4.5 of ASCE 7 where required by Chapters 12, 13, and 15 of ASCE 7. With the simplified procedure of ASCE 7, Section 12.14, the seismic load effects including overstrength factor in accordance with Section 12.14.3.2 and Chapter 2 of ASCE 7 shall be used.~~

~~Applicable *loads* shall be considered, including both earthquake and wind, in accordance with the specified *load* combinations. Each load combination shall also be investigated with one or more of the variable *loads* set to zero.~~

~~Where the load combinations with overstrength factor in Sections 2.3.6 and 2.4.5 of ASCE 7 apply, they shall be used as follows:~~

~~1. The basic combinations for strength design with overstrength factor in lieu of Equations 16-5 and 16-7 in Section 1605.2.~~

~~2. The basic combinations for *allowable stress design* with overstrength factor in lieu of Equations 16-12, 16-14 and 16-16 in Section 1605.3.1.~~

~~3. The basic combinations for *allowable stress design* with overstrength factor in lieu of Equations 16-21 and 16-22 in Section 1605.3.2.~~

Requirements in ASCE 7-16 (ASD)

2.4 LOAD COMBINATIONS FOR ALLOWABLE STRESS DESIGN

2.4.1 Basic Combinations. Loads listed herein shall be considered to act in the following combinations; whichever produces the most unfavorable effect in the building, foundation, or structural member shall be considered. Effects of one or more loads not acting shall be considered. Seismic load effects shall be

Chapter 16 & 16A STRUCTURAL DESIGN

SECTION 1613 EARTHQUAKE LOADS

TABLE 1613.2.3(1) *[OSHPD 1R, 2 & 5]*
VALUES OF SITE COEFFICIENT F_a[a]

SITE CLASS	MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE_R) SPECTRAL RESPONSE ACCELERATION PARAMETER AT SHORT PERIOD					
	$S_s \leq 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s = 1.25$	$S_s \geq 1.5$
A	0.8	0.8	0.8	0.8	0.8	0.8
B	0.9	0.9	0.9	0.9	0.9	0.9
C	1.3	1.3	1.2	1.2	1.2	1.2
D	1.6	1.4	1.2	1.1	1.0	1.0
E	2.4	1.7	1.3	~~Note b~~ *1.2[c]*	~~Note b~~ *1.2[c]*	~~Note b~~ *1.2[c]*
F	Note b	Note b	Note b	Note b	Note b	Note b

a. Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, *Ss*.
b. Values shall be determined in accordance with Section 11.4.8 of ASCE 7.
c. See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7. These values of F_a shall only be used for calculation of T_s, determination of Seismic Design Category, linear interpolation for intermediate values of S_s, and when taking the exception under Item 2 within Section 11.4.8 of ASCE 7.

SECTION 1613 EARTHQUAKE LOADS

TABLE 1613.2.3(2)
VALUES OF SITE COEFFICIENT F_v[a]

...

c. See requirements for site-specific ground motions in Section 11.4.8 of ASCE 7. ***[OSHPD 1R, 2 & 5]***
These values of F_v shall only be used for calculation of T_S, determination of Seismic Design Category, linear interpolation for intermediate values of S_1, and when taking the exceptions under Items 1 and 2 of Section 11.4.8 for the calculation of S_{D1}.

Chapter 16A STRUCTURAL DESIGN

1617A.1.3 ~~Reserved~~ ASCE 7, Section 11.4. Modify ASCE 7, Section 11.4 to include the following:

Seismic ground motion values shall include updated subsections in Supplement 3. ***[OSHPD 1 & 4]*** *Use of the 2020 NEHRP Provisions for multi-period spectra shall be permitted, where all of the following are included.*

1. *A detailed seismic design criterion shall be submitted to and approved by the AHJ.*
2. *Seismic Ground Motion values shall be determined using the 2020 NEHRP Provisions, Section 11.4.*
3. *Geologic Hazard and Geotechnical Investigation shall be performed using the 2020 NEHRP Provisions, Section 11.8.*
4. *Vertical Ground Motions, where required, shall be determined using the 2020 NEHRP Provisions, Section 11.9.*
5. *Site Classification shall be determined using the 2020 NEHRP Provisions, Chapter 20.*
6. *Site Specific Ground Motion Procedures shall be determined using the 2020 NEHRP Provisions, Chapter 21.*
7. *Seismic Ground Motion and Long-period Transition Maps shall be used from Chapter 22 of the 2020 NEHRP Provisions.*
8. *S_{DS} and S_{D1} obtained from the multi-period spectra determined using the 2020 NEHRP Provisions shall be used, where required in Chapter 12, 13 and 15 of ASCE 7-16.*

NEHRP Recommended Seismic Provisions for New Buildings and Other Structures

Volume I: Part 1 Provisions, Part 2 Commentary

FEMA P-2082-1 / September 2020

FEMA

nehrp

Chapter 16A STRUCTURAL DESIGN

1617A.1.5 ASCE 7, Section 12.2.3, 12.2.3.1, and 12.2.3.2. *Modify ASCE 7, Sections 12.2.3, 12.2.3.1, and 12.2.3.2 as follows:*

1617A.1.5.1 ASCE 7, Section 12.2.3. *Replace ASCE 7, Section 12.2.3 with the following:*

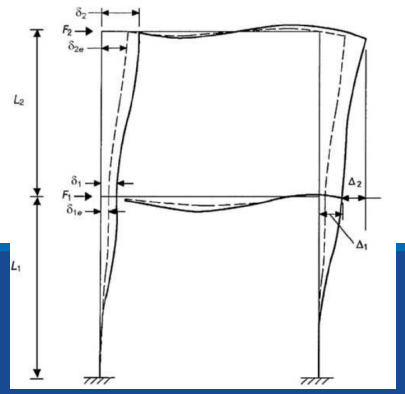
Where different seismic force-resisting systems are used in combinations to resist seismic forces in the same direction, other than those combinations considered as dual systems the design shall comply with the requirements of this section. The most stringent applicable structural system limitations contained in Table 12.2-1 shall apply, except as otherwise permitted by this section.

Chapter 16A STRUCTURAL DESIGN

1617A.1.5.3 ASCE 7, Section 12.2.3.2. *Modify ASCE 7, Section 12.2.3.2 by modifying Item a and adding Items f, g, and h, as follows:*

12.2.3.2 Two-Stage Analysis Procedure. A two-stage equivalent lateral force procedure is permitted to be used for structures that have a flexible upper portion above a rigid lower portion, provided that the design of the structure complies with all of the following:

a. The stiffness of the lower portion shall be at least 10 times the stiffness of the upper portion. *For purposes of determining this ratio, the base shear shall be computed and distributed vertically according to Section 12.8. Using these forces, the stiffness for each portion shall be computed as the ratio of the base shear for that portion to the elastic displacement, δ_{xe}, computed at the top of that portion, considering the portion fixed at its base. For the lower portion, the applied forces shall include the reactions from the upper portion, modified as required in Item d.*



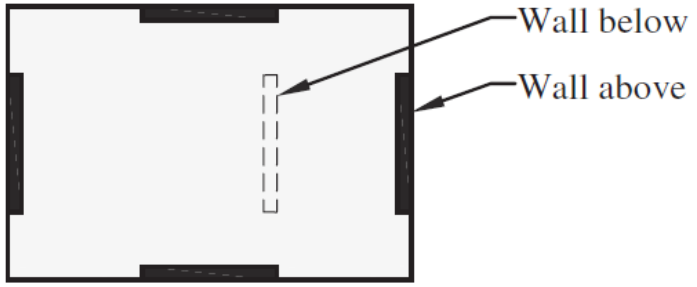
Chapter 16A STRUCTURAL DESIGN

12.2.3.2 Two-Stage Analysis Procedure.

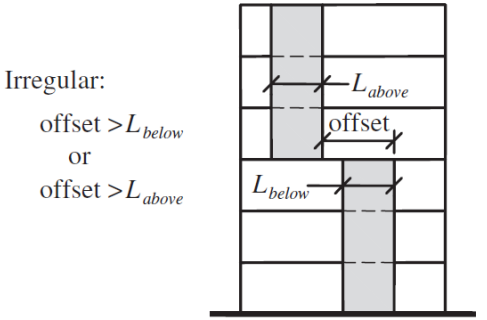
…

f. The structural height of the upper portion shall not exceed the height limits of Table 12.2-1 for the seismic force-resisting system used, where the height is measured from the base of the upper portion. ***[OSHPD 1 & 4]*** *Not permitted by OSHPD.*

g. Where Horizontal Irregularity Type 4 or Vertical Irregularity Type 4 exists at the transition from the upper to the lower portion, the reactions from the upper portion shall be amplified in accordance with Sections 12.3.3.3, 12.10.1.1, and 12.10.3.3 as applicable, in addition to amplification required by Item d.



Type 4. Out-of-plane offset

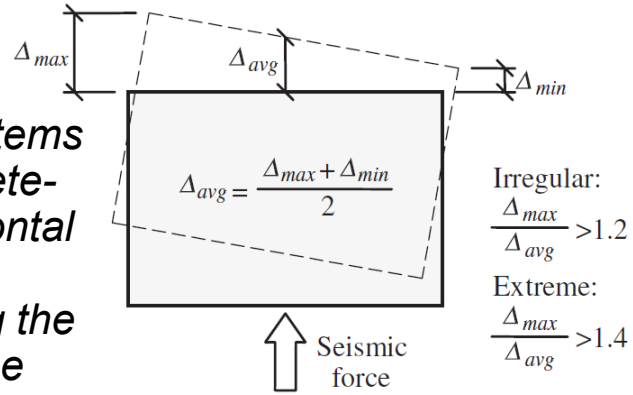


Type 4. In-Plane Discontinuity

Chapter 16A STRUCTURAL DESIGN

1617A.1.10 ASCE 7, Section 12.3.3.1. *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.*



Type 1. Torsional

Exceptions:

1. *Structures with reinforced concrete or reinforced masonry shear wall systems and rigid or semi-rigid diaphragms, consisting of concrete slabs or concrete-filled metal deck having a span-to-depth ratio of 3 or less, having a horizontal structural irregularity Type 1b of Table 12.3-1 are permitted, provided the maximum story drift in the direction of the irregularity, computed including the torsional amplification factor from Section 12.8.4.3, is less than 10% of the allowable story drift in ASCE 7 Table 12.12-1.*

2. *Structures having a horizontal structural irregularity Type 1b of Table 12.3-1 are permitted, provided a redundancy factor, ρ, of 1.3 as defined in ASCE 7 12.3.4 is assigned to the seismic force-resisting system in both orthogonal directions and the structure is designed for one of the orthogonal procedures as defined in ASCE 7 12.5.3.1.*

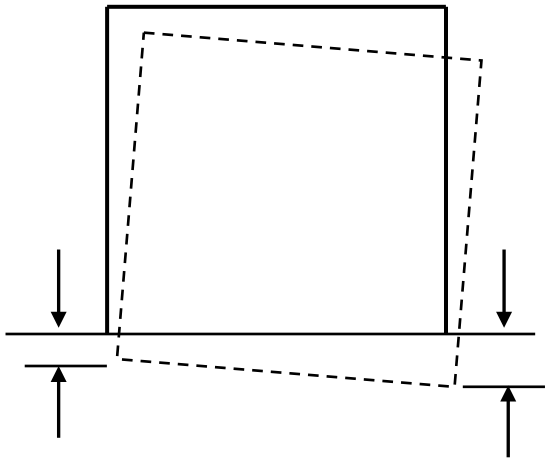
Chapter 16A STRUCTURAL DESIGN

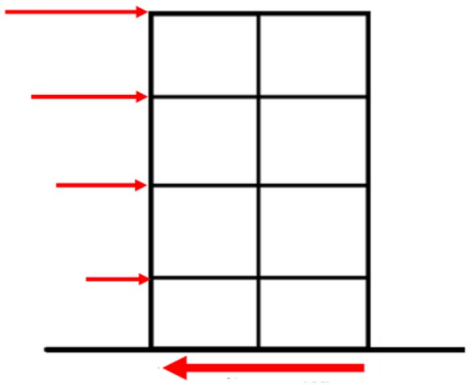
- ***1617A.1.16 ASCE 7, Section 12.13.9.2.*** *Modify ASCE 7 section 12.13.9.2 by the following sentence added to the end of item b as follows:*

12.13.9.2 Shallow Foundations

a. …

b. The foundation and superstructure are designed to accommodate differential settlements caused by liquefaction without loss of the ability to support gravity loads. For structures assigned to Risk Category II or III, residual strength of members and connections shall not be less than 67% of the undamaged nominal strength, considering the nonlinear behavior of the structure or, alternatively, demands on all members and connections shall not exceed the element's nominal strength when subjected to differential settlements. For structures assigned to Risk Category IV, demands on all members and connections shall not exceed the element's nominal strength when subjected to differential settlements. *Seismic load effects determined in accordance with Section 12.4 need not be considered in this check.*





- …

Chapter 16A STRUCTURAL DESIGN

1617A.1.18 ASCE 7, Section 13.1.4. *Replace ASCE 7, Section 13.1.4, with the following:*

…

13.1.4.a [OSHPD 1, ~~1R,~~ 2, 4 & 5]. *The following nonstructural components and equipment shall be anchored in accordance with this section. Design and detailing shall be in accordance with Chapter 13 except as modified by this section.*

…

10. Wall, Roof or Floor Hung Equipment: Seismic design and seismic details shall be provided for wall, roof or floor hung nonstructural components and equipment when the component weighs more than 20 lb. or, in the case of a distributed system, more than 5 lb./ft.

…

Chapter 16A STRUCTURAL DESIGN

1617A.1.27 ASCE 7, Section 13.6.11.1*. Modify ASCE 7, Section 13.6.11.1, by adding Section 13.6.11.1.1 as follows:*

13.6.11.1.1 Elevators guide rail support.

…

In addition to the requirements of ASCE 7, Section 13.6.11.1, the minimum seismic forces shall be 0.5g allowable stress design load acting in any horizontal direction.

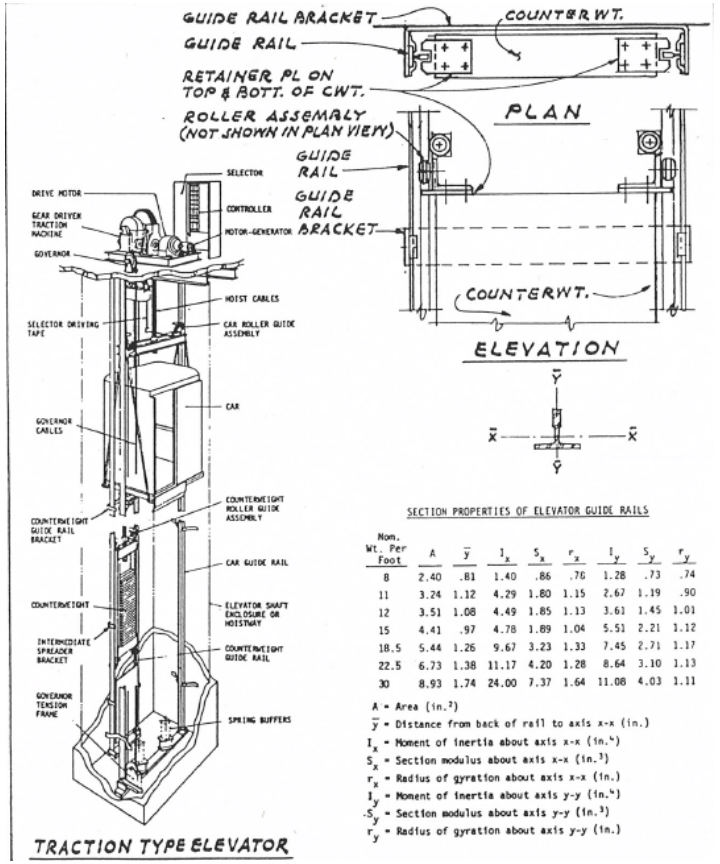
1617A.1.28 ASCE 7, Section 13.6.11.4. *Replace ASCE 7, Section 13.6.11.4, as follows:*

13.6.11.4 Retainer plates. *Retainer plates are required at the top and bottom...*

1. *The seismic force shall be computed per the requirements of ASCE 7 Section 13.6.11.1. The minimum horizontal acceleration shall be 0.5g allowable stress design load for all buildings.*

   ...

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



Nom. Wt. Per Foot	A	ȳ	I_x	S_x	r_x	I_y	S_y	r_y
8	2.40	.81	1.40	.86	.76	1.28	.73	.74
11	3.24	1.12	4.29	1.80	1.15	2.67	1.19	.90
12	3.51	1.08	4.49	1.85	1.13	3.61	1.45	1.01
15	4.41	.97	4.78	1.89	1.04	5.51	2.21	1.12
18.5	5.44	1.26	9.67	3.23	1.33	7.45	2.71	1.17
22.5	6.73	1.38	11.17	4.20	1.28	8.64	3.10	1.13
30	8.93	1.74	24.00	7.37	1.64	11.08	4.03	1.11

1705.3.9.2 Preconstruction tests

Requirements for shotcrete were deleted from model code as they are now incorporated in ACI 318-19 which is adopted by the IBC. Similar language in ACI 506R is not written in as mandatory language. Existing amendments are carried forward.

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

1705A.3.9.2 Preconstruction tests

1705A.3.9.2 Preconstruction tests. *A shotcrete mockup panel shall be shot, cured, cored or sawn, examined and tested prior to commencement of the project. The mockup panel shall be representative of the project and simulate job conditions as closely as possible. The mockup 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. Adequate encasement of bars larger than No. 5 shall be demonstrated by the mockup panel. 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. Approval from the enforcement agency must be obtained prior to performing shotcrete mockup panels.*

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

1705.5.45 Structural glued laminated and cross-laminated timber. [OSHPD 1R, 2B & 5]
Manufacture of all structural glued laminated and cross-laminated timber shall be continuously inspected by an approved agency.

The approved agency 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 with an identification mark.

Exception: *Special Inspection is not required for non-custom prismatic glued laminated members identified on drawings and sourced from stock or general inventory of 5 1/2-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 13.1 for non-custom members.*

1810.3.3.1.9 Helical piles.

The allowable axial design load, P_a, of helical piles shall be determined as follows:

$$P_a = 0.5\ P_u$$

where P_u is the least value of:

…

Ultimate capacity determined from well-documented correlations with installation torque.

Ultimate capacity determined from load tests where required by { Section 1810.3.3.1.2 }. ***[OSHPD 1R, 2 & 5]*** *Load tests are required to determine the ultimate capacity.*

Chapter 18 & 18A SOILS AND FOUNDATIONS

1810.3.8 Precast concrete Piles.

Precast concrete piles shall be designed and detailed in accordance with {ACI 318}.

- Exceptions:

  …

- For precast prestressed piles in Seismic Design Categories D through F, the minimum volumetric ratio of spirals or circular hoops required by Section 18.13.5.10.5(c) of { ACI 318 } shall not apply in cases where the design includes full consideration of load combinations specified in { ASCE 7 }, Section 2.3.6 or Section 2.4.5 and the applicable overstrength factor, Ω_0. In such cases, minimum transverse reinforcement shall be as specified in Section 13.4.5.6 of { ACI 318 }.***[OSHPD 1R, 2 & 5]*** *not permitted by OSHPD.*

- (Relocated from 1810.3.8.3.4) ***[OSHPD 1R, 2 & 5]*** ***Exception:*** *Where the axial load from seismic forces is amplified by the applicable overstrength factor, Ω_0 the axial load limits in Section 18.13.5.10.6 of ACI 318 may be increased by two times.*

(a) $0.2f_c'A_g$ for square piles
(b) $0.4f_c'A_g$ for circular or octagonal piles

Amendments - Chapter 18 & 18A

1810.3.11.2 Seismic Design Categories D through F.

- For structures assigned to Seismic Design Category D, E or F, deep foundation element resistance to uplift forces or rotational restraint shall be provided by anchorage into the pile cap, designed considering the combined effect of axial forces due to uplift and bending moments due to fixity to the pile cap. Anchorage shall develop not less than 25 percent of the strength of the element in tension. Anchorage into the pile cap shall comply with the following:

…

- **Exceptions**:
  - Connection tensile capacity need not exceed the strength required to resist seismic load effects including overstrength of { ASCE 7 } Section 12.4.3 or 12.14.3.2.
  - Connections need not be provided where the foundation or supported structure does not rely on the tensile capacity of the piles for stability under the design seismic force. ***[OSHPD 1R, 2 & 5]*** *not permitted by OSHPD.*

Amendments - Chapter 18 & 18A

1810.3.12 Grade beams.

- Grade beams shall comply with the provisions of { ACI 318 }.

- **Exception**: Grade beams designed to resist the seismic load effects including overstrength factor in accordance with Section 2.3.6 or 2.4.5 of { ASCE 7} ***[OSHPD 1R, 2 & 5]*** *need not comply with Section 18.13.3 of ACI 318*.

Amendments - Chapter 18 & 18A

SECTION 1811 PRESTRESSED ROCK AND SOIL FOUNDATION ANCHORS [OSHPD 1R, 2 & 5]

…

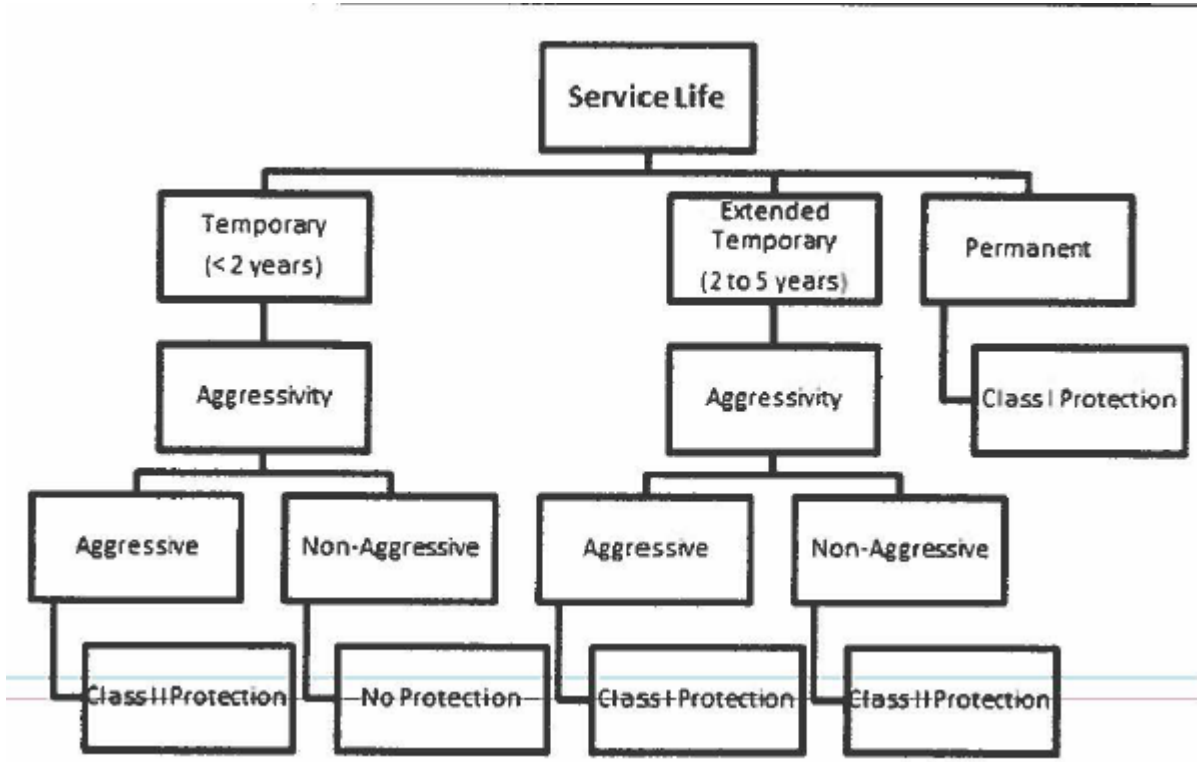
- ***1811.3 Geotechnical requirements.*** *Geotechnical report for the prestressed rock and soil foundation anchors shall address the following:*

…

- *7. Class I ~~C~~corrosion ~~P~~protection is required for all permanent and extended temporary anchors in service more than 2 years. A minimum of Class II ~~C~~corrosion ~~P~~protection is required for temporary anchors in service less than or equal to 2 years.*

Amendments - Chapter 18 & 18A

SECTION 1811 PRESTRESSED ROCK AND SOIL FOUNDATION ANCHORS [OSHPD 1R, 2 & 5]



Amendments - Chapter 18 & 18A

SECTION 1812 EARTH RETAINING SHORING [OSHPD 1R, 2 & 5]

…

- ***1812.4.1 Geotechnical requirements:*** *The geotechnical report for the earth retaining shoring shall address the following:*

…

  - *Class I corrosion protection is required for all permanent <u>and extended temporary</u> anchors <u>in service more than 2 years</u>. A minimum of Class II ~~C~~<u>c</u>orrosion ~~P~~<u>p</u>rotection is required for temporary anchors in service less than or equal to 2 years.*

Amendments - Chapter 18A – Soils and Foundations

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

…

1807A.2.45 Freestanding cantilever walls. *Freestanding cantilever walls shall comply with Section 15.6.8 of ASCE 7.* ***[OSHPD 1 & 4]*** *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.*

Table 15.4-2 Seismic Coefficients for Nonbuilding Structures Not Similar to Buildings

Nonbuilding Structure Type	Detailing Requirements[c]	R	Ω_0	C_d	Structural System and Structural Height, h_n, Limits (ft)[a,b] — Seismic Design Category B	C	D	E	F
Amusement structures and monuments	Sec. 15.6.3	2	2	2	NL	NL	NL	NL	NL
Inverted pendulum type structures (except elevated tanks, vessels, bins, and hoppers)	Sec. 12.2.5.3	2	2	2	NL	NL	NL	NL	NL
Ground-supported cantilever walls or fences	Sec. 15.6.8	1.25	2	2.5	NL	NL	NL	NL	NL
Signs and billboards		3.0	1.75	3	NL	NL	NL	NL	NL
All other self-supporting structures, tanks, or vessels not covered above or by reference standards that are not similar to buildings		1.25	2	2.5	NL	NL	50	50	50

[a]NL = no limit and NP = not permitted.

HCAi Department of Health Care Access and Information

Amendments - Chapter 18A – Soils and Foundations

SECTION 1813A VIBRO STONE COLUMNS FOR GROUND IMPROVEMENT

…

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

…

6. *A note indicating foundation construction shall not commence until the final verified report specified in Section 1813A.2 item 9 has been submitted to and approved by the enforcement agency.*

…

CHAPTER 19 - CONCRETE

1901.3.4 Tests for Post-Installed Anchors in Concrete [OSHPD 1R, 2 & 5].

…

1901.3.4.3 Test frequency. …

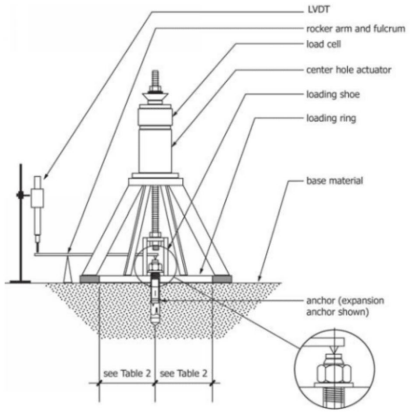
…

Exceptions:

…

6. [OSHPD 2] In State detention and correctional facilities, tension testing is not required for post-installed anchors used for attaching nonstructural components to concrete walls if the components do not contribute to security/detainment, life safety and the continuous operation of the institution following an event of extreme environmental loading from flood, wind, snow or earthquakes, such as grab bars and shower seats, as determined by the Enforcing Agency

Amendments - Chapter 19 & 19A - Concrete



1901.3.4.5 Test acceptance criteria. *…*

1. Hydraulic ram method:

Anchors tested with a hydraulic jack or spring-loaded devices

…

~~*For adhesive anchors, where other than bond is being tested,*~~ *t*<u>*T*</u>*he testing apparatus support* <u>*locations*</u> *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.*

> <u>***Exception:*** *When denoted accordingly on the approved construction documents, adhesive anchors complying with ACI 318 Equation 17.8.2a and for which concrete breakout does not control the design tensile strength may be tested with apparatus support locations closer than 1.5 times the anchor embedment depth.*</u>

Amendments - Chapter 19 & 19A - Concrete

1905.1.7 ACI 318, Section 14.1.4 *[OSHPD 1R, 2 & 5]*

&

- **1905*A*.1.7 ACI 318, Section 14.1.4 *[OSHPD 1 & 4]***

~~**Delete**~~ ***Modify*** **{ ACI 318 }, Section 14.1.4 ~~and replace~~ with the following:**

14.1.4 *Plain concrete shall not be permitted for a structure assigned to Seismic Design Category (SDC) D, E and F~~, only in cases (a) and (b)~~.*

~~*(a) Footings supporting …*~~

Amendments - Chapter 19 & 19A - Concrete

SECTION 1908 SHOTCRETE

…

1908.1 General. Shotcrete shall be in accordance with the requirements of ACI 318 ***[OSHPD 1R, 2 & 5]*** *and the provisions of ACI 506R.* ~~*The specified compressive strength of shotcrete shall not be less than 4,000 psi (27.6 MPa).*~~ *The evaluation of the shotcrete mockup panel to qualify bar clearance dimensions in accordance with ACI 318 Section 25.2.7 or contact lap splices in accordance with ACI 318 Section 25.5.1.7 shall be in accordance with the requirements of 506.4R with a core quality category of Very Good given in ACI 506.6T.*

…

Amendments - Chapter 19 & 19A - Concrete

SECTION 1908 SHOTCRETE

…

1908.1.

Table 1—Core evaluation category

	Criteria	Very good	Good	Satisfactory	Poor
a	Encapsulation of reinforcing steel as a percentage of the circumference of the reinforcement (any individual reinforcement cross section or total of all reinforcements in the core)*	Greater than 90 percent	Greater than 80 percent	Greater than 70 percent	Less than or equal to 70 percent
b	Maximum size† of any void touching the reinforcement, as a percentage of the cross section of that reinforcement	Less than 25 percent	Less than 30 percent	Less than 35 percent	Greater or equal to 35 percent

*When reinforcements are not centered in the core, an attempt should be made to determine the approximate length of the reinforcement's edge contact with shotcrete.

†Measured as approximate area of any voids touching the reinforcing steel on the cylindrical surface of the core.

Notes: Sand lenses should be measured as voids. Occasional scattered voids up to 1/4 in. (6.4 mm) diameter should be ignored.

Amendments - Chapter 19 & 19A - Concrete

SECTION 1908 SHOTCRETE

. . .

1908A.1

Visual representation of Core evaluation Criteria

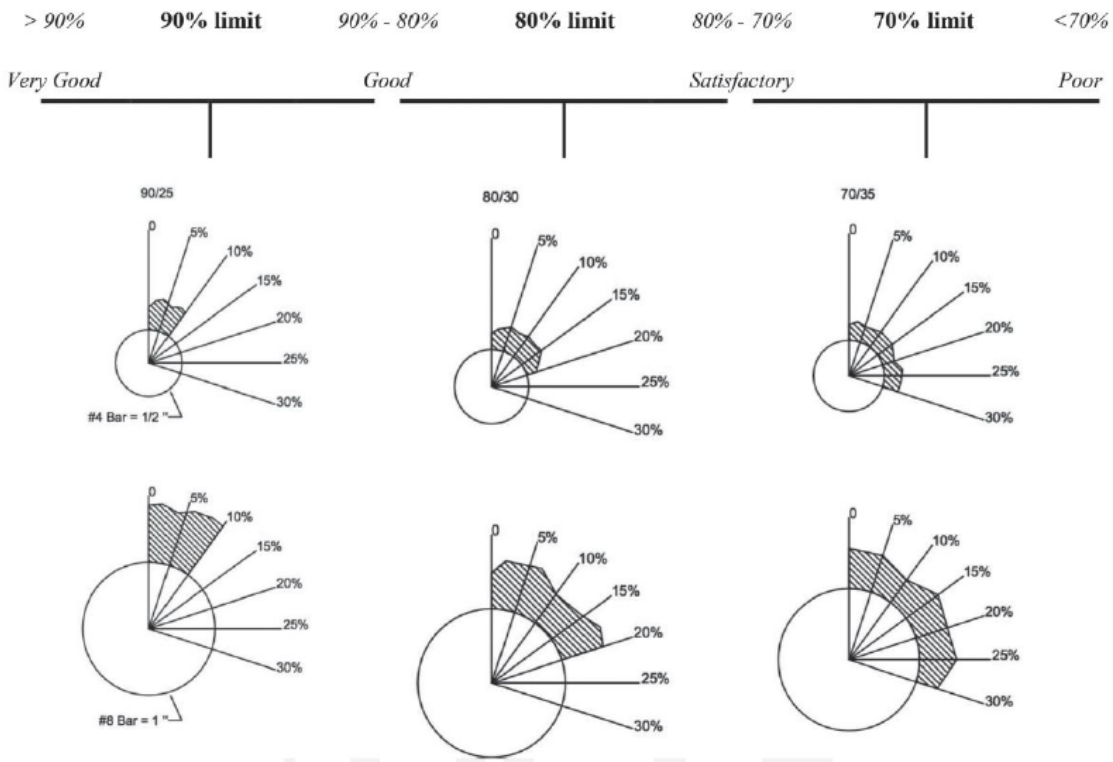


Fig. 1—Visual representation of Criteria (a and b) of Table 1. (Note: 1 in. = 25.4 mm)

Amendments - Chapter 19 & 19A - Concrete

- ***1908.2 Tests and Inspections. [OSHPD 1R, 2 & 5]*** *Preconstruction tests of one or more shotcrete mockup panels prepared in accordance with Section 1705A.3.9.2 are required. In addition to testing requirements in ACI 318, special inspection and testing shall be in accordance with Section 1705A.3.9.*

Amendments - Chapter 19 & 19A - Concrete

1910.3.4 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			
		Types of transverse reinforcement			
		Spirals conforming to 25.7.3		Other	
$\varepsilon_t \leq \varepsilon_{ty}$	Compression-controlled	0.75	(a)	0.65	(b)
$\varepsilon_{ty} < \varepsilon_t < \varepsilon_{ty}+0.003$	Transition[1,2]	$0.75 + 0.15\frac{\varepsilon_t-\varepsilon_{ty}}{\varepsilon_t^*-\varepsilon_{ty}}$	(c)	$0.65 + 0.25\frac{\varepsilon_t-\varepsilon_{ty}}{\varepsilon_t^*-\varepsilon_{ty}}$	(d)
$\varepsilon_t \geq \varepsilon_{ty}+0.003$	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 $P = 0.1A_g f'_c$ and ~~0.005~~ε_{ty} + 0.003.*

3. *For sections with factored axial compression force $P_u \geq 0.1A_g f'_c$, f shall be calculated using equation (c) or (d) for sections classified as transition, as applicable.*

Amendments - Chapter 19*A* - Concrete

(Min flexural reinforcement 9.6.1.3 If ***As*** provided at every section is at least one-third greater than ***As*** required by analysis, 9.6.1.1 and 9.6.1.2 need not be satisfied.)

1905A.1.3 ACI 318, Section 9.6.1.3. *Modify ACI 318, Section 9.6.1.3 by adding the following:*

This section shall not be used for members that resist seismic loads, except for either of the following conditions: ~~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~~.

1. *Foundation ~~elements~~ members for one-story wood-frame or one-story light steel buildings.*
2. *Foundation members designed for seismic load combinations including the overstrength factor.* ***[OSHPD 1 & 4]*** *The A_s provided shall not be less than that required by 1.2 times the cracking load based upon f_r defined in 19.2.3.*

…

Revisions to Masonry Chapters 21 & 21A

- Revisions made were initiated by public comments received from the Masonry Institute and consensus achieved in a collaborative effort with OSHPD, DSA and the Masonry Institute.

- Restructured and revised existing amendments rewritten as Modifications to TMS 402/602 and duplicate language has been deleted. Minimal net change in regulatory effect.

Chapter 21 & 21A - MASONRY

- **2103.4 Metal reinforcement and accessories.** Metal reinforcement and accessories shall conform to Article 2.4 of TMS 602. Where unidentified reinforcement ***[OSHPD 1R, 2 & 5]****, or bar reinforcement without mill certification,* is approved for use, not less than three tension and three bending tests shall be made on representative specimens of the reinforcement from each shipment and grade of reinforcing steel proposed for use in the work. ***[OSHPD 1R, 2 & 5]*** *Alternatively, the frequency of sampling for unidentifiable reinforcing bars specified in Section 1910.2 can be used.*

Amendments - Chapter 21

- ***2104.2.1 ~~General conditions.~~*** *…* ***TMS 602, Article 3.3 B Placing Mortar and Units.*** *Modify TMS 602 Article 3.3 B.2.c as follows:*

- c. Remove masonry protrusions extending (Relocated from Section 2104.2.1) *greater than ¼* ~~½~~ in. (~~12.7~~ *6.4* mm) ~~or more~~ into cells or cavities to be grouted.

Amendments - Chapter 21

- ***2104.2.2 TMS 602, Article 3.4 B Reinforcement.*** *Modify TMS 602 Article 3.4 B.1 and Article 3.4 B.3 as follows:*

- 1. Support reinforcement to prevent displacement caused by construction loads or by placement of grout or mortar, beyond the allowable tolerances. (Relocated from Section 2104.2.1) *Reinforcement and embedded items shall be clean, properly positioned and securely anchored against movement prior to grouting.*

…

- 3. Maintain a clear distance between reinforcing bars and the interior of masonry unit or formed surface of at least 1/4 in. (6.4 mm) for fine grout and 1/2 in. (12.7 mm) for coarse grout, *and the space between masonry unit surfaces and reinforcement shall be a minimum of one bar diameter,* except where cross webs of hollow units are used as supports for horizontal reinforcement. (Relocated from Section 2104.2.1) *Reinforcement and embedded items shall be solidly embedded in grout.*

…

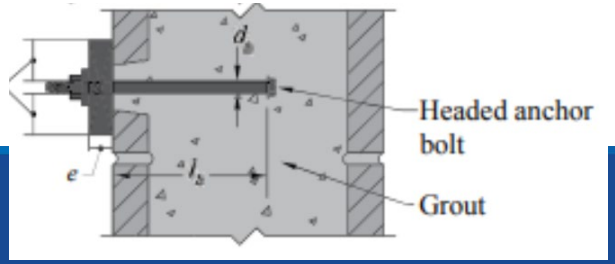
Amendments - Chapter 21

- ***2104.2.3 TMS 602, Article 3.4 D Anchor Bolts.*** *Replace TMS 602 Article 3.4 D.3 and add Articles 3.4 D.5 and 3.4D.6 as follows:*

…

- *3. (*Relocated from Section 2104.2.1) *Anchor bolts in the wythe or face shells of hollow masonry units shall be positioned to maintain a minimum of ½ in. of grout between the bolt circumference, the wythe or ~~and~~ the face shell.* For the portion of the bolt that is within the grouted cell, maintain a clear distance between the bolt and the face of masonry unit and between the head of the bolt and the formed surface of grout of at least 1/4 in. (6.4 mm) when using fine grout and at least 1/2 in. (12.7 mm) when using coarse grout. (Relocated from Section 2104.2.1) *Bolts shall be solidly embedded in grout.*

…



Amendments - Chapter 21 & 21A

2105.3 Mortar and grout tests. [OSHPD 1R, 2 & 5] ~~*These tests are to establish whether the masonry components meet the specified component strengths.*~~ ***TMS 602, Article 1.4 B Compressive Strength Determination.***
Modify TMS 602 Article 1.4 B as follows by adding:

- *5. Additional testing requirements:*

  a. At the beginning of all masonry work, at least one test sample of the mortar shall be taken on three successive working days and at least at one-week intervals thereafter. Where mortar is based on a proportion specification, mortar shall be sampled and tested during construction in accordance with ASTM C780, including Annex 4, to verify the proportions specified in ASTM C270, Table 2. Where mortar is based on a property specification, mortar shall be laboratory prepared and tested prior to construction in accordance with ASTM C780 to verify the properties specified in ASTM C270, Table 1 and field sampled and tested during construction in accordance with ASTM C780 to verify the proportions with the laboratory tests.

…

Amendments - Chapter 21 & 21A

- ~~*2105.5 Masonry prism method testing. [OSHPD 1R, 2 & 5] Prism test method performed prior to the start or during construction shall be in accordance with TMS 602 Section 1.4 B.3. Prism test method performed on constructed walls shall be in accordance with TMS 602 Section 1.4 B.4.*~~

- ~~*2105.6 Unit strength method testing. [OSHPD 1R, 2 & 5] Unit strength method testing shall be performed in accordance with TMS 602 Section 1.4 B.2.*~~

Amendments - Chapter 21 & 21A

- ***2107.7 Masonry Compressive Strength. [OSHPD 1R, 2 & 5]*** *The specified compressive strength of structural masonry, f'_m, shall be equal to or exceed 1,500 psi (10.34 MPa). The value of f'_m used to determine nominal strength value in this chapter shall not* (Relocated from Section 2105.2) *exceed 3,000 psi (20.7 MPa) for concrete masonry and shall not exceed 4,500 psi (31.03 MPa) for clay masonry.*

…

Amendments - Chapter 21 & 21A

2108.4 [OSHPD 1R, 2 & 5] TMS 402, Section 9.1.9.1.1. *Modify TMS 402, Section 9.1.9.1.1 as follows:*

- **9.1.9.1.1** Masonry Compressive Strength. The specified compressive strength of *structural* masonry, f'_m, shall be equal to or exceed 1,500 psi (10.34 MPa). The value of f'_m used to determine nominal strength values in this chapter shall not exceed ~~4,000 (41.37 MPa)~~ (Relocated from Section 2105.2) *3,000* psi *(20.7 MPa)* for concrete masonry and shall not exceed ~~6000~~ *4,500* psi (~~41.37~~ *31.03* MPa) for clay masonry.

…

Chapter 22A - STEEL

Adopt 2021 International Building Code (IBC) Chapter 22A for OSHPD 1 and 4 with the following modifications:

SECTION 2211*A* COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION

…

2211*A*.1.3 Truss design. Cold-formed steel trusses shall comply with the additional provisions of Sections 2211*A*.1.3.1 through 2211*A*.1.3.3.

(The following item is an existing amendment that was missed in the printed version of the 2019 CBC and should be added back into the 2022 CBC.) *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.*

…