

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

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2022 Triennial Code – HCAI CBSC Webinar Series

Session 1:

- Introduction
- Part 2V2 – Structural
- Part 3 – Electrical
- Part 4 – Mechanical
- Part 5 – Plumbing
- Part 10 – Existing Building

October 5, 2022

Session 2:

- Triennial Fire Code
- Part 2 – Building Code
 - Part 9 – Fire Code

October 27, 2022

Session 3:

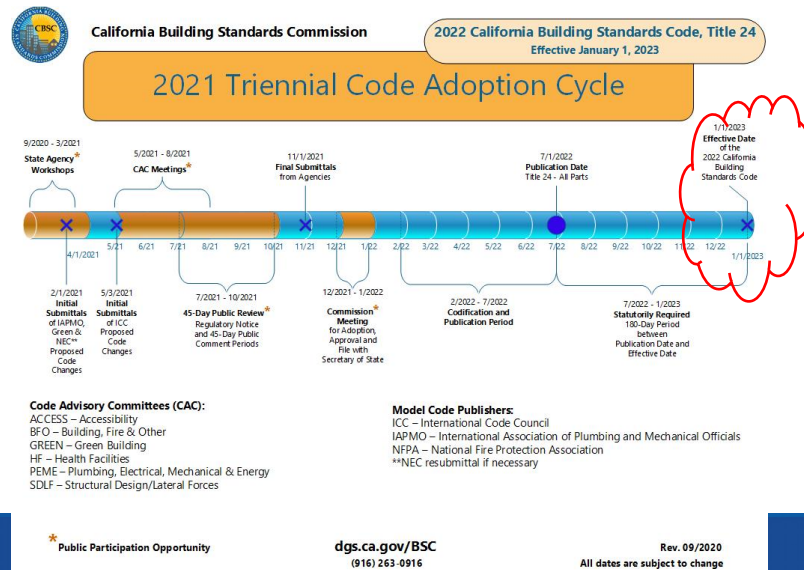
- Part 1 – California Administrative
- Part 2V1 – Architectural
- What's Coming Up –
Bring Your Questions

December 1, 2022



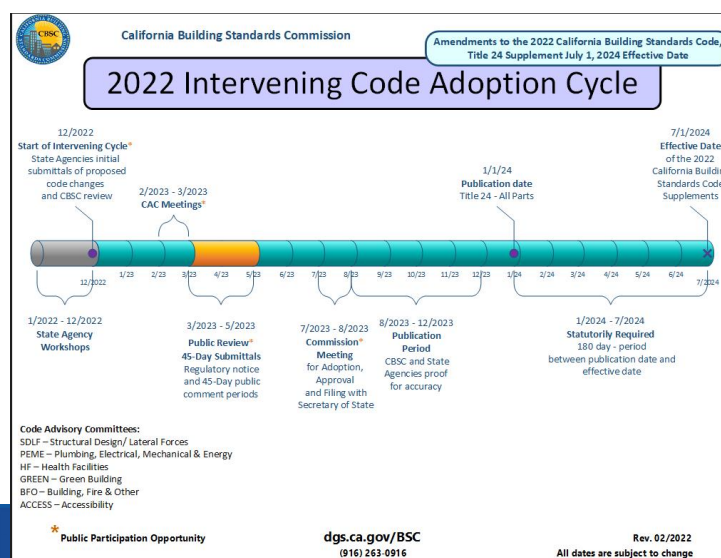
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2022 CBSC Timeline



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2022 CBSC Timeline



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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

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LEGEND

Bold black text or regular black text = Existing text – no change

Underlined blue text = new text

Underlined red text = new text with emphasis

~~Strikethrough gray text~~ = text to be deleted

Purple text = references

6

Questions

After Each Part



7



2022 California Electrical Code Part 3

8

Amend OSHPD Definition For Electrical Coordination

Coordination, Selective (Selective Coordination). Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings for the full range of available overcurrents, from overload to the available fault current, and for the full range of overcurrent protective device opening times associated with those overcurrents. (CMP-10)

Coordination. [OSHPD 1, 2, 3, 4 & 5] Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the selection and installation of overcurrent protective devices and their ratings or settings utilizing the 0.10 second level of the overcurrent protective device from the time current curve as the basis for the lower limit of the calculation method.



9

Add OSHPD Requirements for Acceptable Equipment

110.2 Approval. The conductors and equipment required or permitted by this Code shall be acceptable only if approved.

[OSHPD 1, 1R, 2, 3, 4 & 5] Equipment shall be approvable if the equipment meets the following requirements:

- Equipment is approved, listed, labeled or certified for its use by a Nationally Recognized Testing Laboratory (NRTL) as recognized by the U.S. department of Labor, Occupational Safety and Health Administration*
- When field evaluated, equipment is evaluated and labeled by a Field Evaluation Body (FEB) that is accredited by International Accreditation Services (IAS) in accordance with NFPA 790*
- Equipment has special seismic certifications when required by Sections 1705.13.3 and 1705A.13.3 of California Building Code*



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Add Pointer to CBC Similar CBC Requirement

110.26 Spaces About Electrical Equipment.

...

(C) Entrance to and Egress from Working Space.

...

(3) Personnel Doors. Where equipment rated 800 amperes or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with listed panic hardware or listed fire exit hardware.

[\[OSHPD 1, 1R, 2, 3, 4, & 5\] See California Building Code, Section 1010.1.10 for additional exit door requirements for electrical room with equipment rated 800-amperes or more.](#)

Informational Note: For information on panic hardware, see UL 305, Standard For Safety For Panic Hardware. For fire exit hardware, see UL 305, Standard For Panic Hardware, and UL 10C, Standard for Safety for Positive Pressure Fire Tests of Door Assemblies.



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Change “Emergency System” to “Essential Electrical System”

220.42 General Lighting. The demand factors specified in Table 220.42 shall apply to that portion of the total branch-circuit load calculated for general illumination. They shall not be applied in determining the number of branch circuits for general illumination.

[OSHPD 1] The factors of Table 220.42 shall not be applied in the following areas: surgery suite, including recovery; emergency department, kitchen, food service, dining, critical care areas as defined in Article 517, elevator lobbies, corridors, inpatient nurse stations, and loads connected to the life safety branch or the critical branch of the ~~emergency~~ essential electrical system. Administrative areas shall be included in “All others” Type of Occupancy



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Switches Located Near Bathtubs and Showers

404.4 Damp or Wet Locations.

...

(C) Switches in Tub or Shower Spaces. Switches shall not be installed within tub or shower spaces unless installed as part of a listed tub or shower assembly.

[OSHPD 1, 2, 4 & 5] Switches that are not part of a listed tub or shower assembly shall not be installed within shower rooms or stalls, or be accessible from within those areas. Switches shall not be installed within 900mm (3 ft) 5 feet (1.52m) of the perimeter of bathtubs or shower stalls.

Exception 1: Bath station devices for Call Systems meeting the requirements of 517.123(C)(4) shall be permitted to be installed outside the perimeter of bathtubs or shower stalls.

Exception 2: Bath station devices for Call Systems meeting the requirements of 517.123(C)(3) shall be permitted to be installed within the tub or shower spaces.



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Receptacles Located Near Bathtubs and Showers

406.9 Receptacles in Damp or Wet Locations.

...

(C) Bathtub and Shower Space. Receptacles shall not be installed within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. The identified zone is all-encompassing and shall include the space directly over the tub or shower stall.

Exception: In bathrooms with less than the required zone the receptacle(s) shall be permitted to be installed opposite the bathtub rim or shower stall threshold on the farthest wall within the room.

[OSHPD 1, 2, 4 & 5] Exception not adopted.

(1) [OSHPD 1, 2, 4 & 5] Receptacles shall not be installed within shower rooms or stalls or be accessible from within these areas. Receptacles shall not be installed within 5 feet (1.52 m) of the perimeter of bathtubs or shower stalls.



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Update ANSI/IES References

517.22 [OSHPD 1, 2, 3, 4 & 5] Artificial Lighting.

...

(B) Illumination.

(1) [OSHPD 1, 3, 4 & 5] Illumination intensity. Illumination intensity values in each area shall meet the recommended values in the latest edition of ~~the Illuminating Engineering Society of North America (IESNA) Lighting Handbook~~ ANSI/IES RP-29, Recommended Practice: Lighting Hospital and Healthcare Facilities.

(2) [OSHPD 2] Minimum illuminance. Minimum maintained average illuminance in each area shall meet the recommended values in the latest edition of ~~ANSI/IESNA RP-28, Recommended Practice for~~ Recommended Practice: Lighting and the Visual Environment for Senior Living Older Adults and the Visually Impaired.

15

Revise Type 1 Essential Electrical System Requirements for OSHPD 4 and OSHPD 5

517.29 Source of Power

...

(A.1) [OSHPD 1, 2, 3, 4 & 5] Applicability. The requirements of Part III, 517.29 through 517.35, shall apply to hospitals, facilities subject to the requirements of CEC 517.40(B), clinics subject to the requirements of CEC 517.45(B) or (C), correctional treatment centers and acute psychiatric hospitals providing critical care (Category 1) ~~and/or general care (Category 2)~~ services.

16

Allow Battery Systems for Essential Electrical System

517.30 Source of Power

...

(B) Types of Power Sources.

...

(1.1) [OSHPD 1, 3, 4 and 5] Generating Units. The alternate source of power shall be at least one of the following:

(A) Generator(s) driven by some form of prime mover(s) and located on the premises.

(B) Another generating unit(s) where the normal source consists of a generating unit(s) located on the premises.

(C) As provided in paragraph (B)(2) below.

(D) As provided in paragraph (B)(3) below.

All on-premises sources of power shall meet the on-premises fuel or battery stored energy requirements specified in Article 700.12.

[OSHPD 1, 2, & 5]: For facilities subject to Centers for Medicare and Medicaid Services (CMS) regulations, see 42 CFR 482.15(e) and 42 CFR 483.73(e) for emergency generator requirements.

(2) Fuel Cell Systems.

...

(3) Battery Systems.

Battery systems shall be permitted to serve as the alternate source for all or part of an essential electrical system. [OSHPD 1, 3, 4 and 5] Where life safety and critical portions of the distribution system are present, a connection shall be provided for a portable diesel generator.



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42 CFR 482.15(e) and 42 CFR 483.73(e)

§482.15(e) Condition for Participation:

- Emergency and standby power systems. The hospital must implement emergency and standby power systems based on the emergency plan set forth in paragraph (a) of this section and in the policies and procedures plan set forth in paragraphs (b)(1)(i) and (ii) of this section.

§483.73(e)

- (e) Emergency and standby power systems. LTC facility must implement emergency and standby power systems based on the emergency plan set forth in paragraph (a) of this section.



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Delete OSHPD 5 from OSHPD Banner and Relocate OSHPD Amendment

517.30 Sources of Power.

...

(C) Location of Essential Electrical System Components.

Essential electrical system components shall be located to minimize interruptions caused by natural forces common to the area (e.g., storms, floods, earthquakes, or hazards created by adjoining structures or activities).
[99.6.2.4.1] *[OSHPD 1, & 4 & ~~5~~] Refer to California Building Code, Section 1617A.1.40.*

(1) Services....

(2) Feeders....



19

Allow Option for Receptacles and Light Switches to be Identified on Device or Cover Plate

517.31 Requirements for the Essential Electrical System.

...

(E) Receptacle [OSHPD 1, 2, 3, 4 & 5] and Switch Identification. The cover plates for the electrical receptacles *[For OSHPD 1, 2, 3, 4 & 5] and light switches ~~[For OSHPD 1, 2, 3, 4 & 5]~~ or the electrical receptacles and light switches* supplied from the life safety and critical branches shall have a distinctive color or marking so as to be readily identifiable.
[99:6.7.2.3.5(B)]



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Restore 10 Second Restoration Time for Type 1 Life Safety and Critical Branches

517.32 Branches Requiring Automatic Connection.

(A) Life Safety and Critical Branch Used in a Type 1 EES.

Those functions of patient care depending on lighting or appliances that are connected to the essential electrical system shall be divided into the life safety branch and the critical branch, as described in 517.33 and 517.34.

[OSHPD 1, 2, 3, 4, & 5] The life safety and critical branches shall be installed and connected to the alternate power source specified in 517.30(A) and (B) so that all functions specified herein for the life safety and critical branches are automatically restored to operation within 10 seconds after interruption of the normal source.



21

Amend OSHPD Amendment to Add Requirement for Imaging Equipment to be Powered by Essential Electrical System

517.34 Critical Branch.

(A) Task Illumination, Fixed Equipment, and Selected Receptacles. The critical branch shall supply power for task illumination, fixed equipment, select receptacles, and select power circuits serving the following spaces and functions related to patient care:

...

(7) Task illumination, select receptacles, and select power circuits for the following areas:

- a. Category 1 (critical care) or 2 (general care) spaces with at least one duplex receptacle per patient bed location, and task illumination as required by the governing body of the health care facility.

...

1. [OSHPD 1] Imaging room containing imaging equipment approved by Licensing Agency for diagnostic services of emergency/trauma patients found in California Building Code Section 1705A.13.3.1 7. Imaging equipment shall be connected to critical branch or equipment branch.

...

~~(4011)~~ *[OSHPD 1, 2, 3, & 4 & 5] The following equipment: ...*



22

Repeal Requirement for UPS Systems for Telecommunications and Data Technology Equipment to be Powered by Equipment Branch

517.35 Equipment Branch Connection to Alternate Power Source.

(A) Equipment for Delayed Automatic Connection.

...

~~(10) [OSHPD 1, 2, 3, 4 & 5] Where provided, UPS systems serving telephone, data, technology and telecommunications equipment rooms and closets.~~

23

Add OSHPD Amendment to Correct Error for Type 2 Essential Electrical System Equipment Branch

517.44 Connection to Equipment Branch. The equipment branch shall be installed and connected to the alternate power source such that equipment described in 517.35(A)(6) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety and critical branches. [99:6.7.5.1.4.2(A)]

[OSHPD 2, 4 & 5] The equipment branch shall be installed and connected to the alternate power source such that equipment described in 517.44(A) is automatically restored to operation at appropriate time-lag intervals following the energizing of the life safety. [99:6.7.5.1.4.2(A)]

The equipment branch arrangement shall also provide for the additional connection of equipment listed in 517.44(B).

Exception: For essential electrical systems under 150 kVA, deletion of the time-lag intervals feature for delayed automatic connection to the equipment branch shall be permitted.

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Change “Critical Branch” to “Equipment Branch”

517.44 Connection to Equipment Branch. ...

(B) Delayed Automatic or Manual Connection to the Equipment Branch. ...

...

(3) Optional Connections to the Equipment Branch. Additional illumination, receptacles, and equipment shall be permitted to be connected only to the critical branch.

[\(3.1\) \[OSHPD 2, 4, & 5\] Optional Connections to the Equipment Branch. Additional illumination, receptacles, and equipment shall be permitted to be connected only to the equipment branch.](#)



25

Add Power over Ethernet (PoE) Wiring to 517.80

517.80 Patient Care Spaces. Equivalent insulation and isolation to that required for the electrical distribution systems in patient care areas shall be provided for communications, signaling systems, data system circuits, fire alarm systems, and systems less than 120 volts, nominal.

Class 2 and Class 3 signaling and communications systems, [\[OSHPD 1, 2, 3, 4, & 5\] Class 2 circuits that transmit power and data to a power device](#), and power-limited fire alarm systems shall not be required to comply with the grounding requirements of 517.13, to comply with the mechanical protection requirements of 517.31(C)(3)(5), or to be enclosed in raceways, unless otherwise specified by Chapter 7 or 8.

Secondary circuits of transformer-powered communications or signaling systems shall not be required to be enclosed in raceways unless otherwise specified by Chapters 7 or 8. [99:6.7.2.3.7]

[\[OSHPD 1, 2, 3, 4, 5\] See ANSI/NEMA C137.3-2017, American National Standard for Lighting Systems — Minimum Requirements for Installation of Energy Efficient Power over Ethernet \(PoE\) Lighting Systems, for information on installation of cables for PoE lighting systems.](#)



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Changes to Nurse Call Systems Requirements

517.123 [OSHPD 1, 2, 3, 4 & 5] Call Systems

(A) General.

(1) Nurse call devices shall be installed in the locations ~~shown required~~ in Table 1224.4.6.5 and as described in Sections 1224, 1225, 1226, 1227, and 1228 of the California Building Code. One device shall be permitted to accommodate any combination of patient station, staff emergency, and code call, provided the individual functions and requirements listed below are met.

...

(C) Bath Stations. Bath stations shall meet the following requirements:

...

(4) At toilets, the call station shall be located to the side, within 12 inches (304.8 mm) of the front of the toilet bowl and shall maintain a clearance of 12 inches (304.8 mm) above the horizontal grab bar ~~between 3 and 4 feet (914 mm to 1219 mm) above the floor.~~

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Restrict Raceways and Cables Not Related to Technology and Telecommunication Rooms from Being Installed or Passing Through these Rooms

517.124 [OSHPD 1, 4 & 5] Technology and Telecommunications

Rooms. Where technology or telecommunications rooms are provided in accordance with Section 1224.5 of the California Building Code, the following requirements shall apply:

(A) General. Electrical equipment, raceways, and cables that ~~is~~ are not directly related to the support of the room shall not be installed in or pass through the room. Non-lighting circuits serving each room shall be dedicated to that room.

28

Remove OSHPD 1R and Add OSHPD 5 to Periodically
Emergency System Testing

700.3 Tests and Maintenance.

...

(B) Tested Periodically. Systems shall be tested periodically on a schedule approved by the authority having jurisdiction to ensure the systems are maintained in proper operating condition. *[OSHPD 1, ~~1R~~, and, 2, & 5] The authority having jurisdiction is Department of Public Health, Licensing and Certification.*



29

Repeal ATS Listing Amendment Due to Addition of ATS Listing
and Marking Requirements in Model Code 700.5(A)

700.5 Transfer Equipment.

...

(C) Automatic Transfer Switches. Automatic transfer switches shall be electrically operated and mechanically held. Automatic transfer switches shall not be permitted to be reconditioned. *~~[OSHPD 1, 1R, 2, 3, 4 & 5] Automatic transfer switches rated above 1000 VAC shall be listed for emergency system use or approved by an alternative testing and approval program acceptable to the authority having jurisdiction.~~*



30

Add Minimum Energy Storage Requirements for Battery System

700.12(C) Storage Battery. Storage batteries shall be of suitable rating and capacity to supply and maintain the total load for a minimum period of 11 1/2 hours, without the voltage applied to the load falling below 87 1/2 percent of normal. Automotive-type batteries shall not be used.

An automatic battery charging means shall be provided.

Exception: [OSHPD 1, 2, 3, 4 & 5] Battery system used as an alternate power source for Type 1 essential electrical system shall be of suitable rating and capacity to supply and maintain the full-demand load for the time durations specified in 700.12(D)(2)(a).



31

Relocate Existing OSHPD Amendment and Add Reference to CMS Regulations

700.12 General Requirements. ...

(D) Generator Set. ...

(2) Internal Combustion Engines as Prime Movers.

(a) On-Site Fuel Supply. Where internal combustion engines are used as the prime mover, an on-site fuel supply shall be provided with an on-premises fuel supply sufficient for not less than 2 hours' operation of the system.

Exceptions [SFM, OSHPD 1, 2, 3, 4 & 5]

Exception No.1: [SFM, OSHPD 1, 2, 3, 4 & 5] The on-premises fuel supply shall be sufficient for not less than 24 hours full-demand operation in acute general care hospitals and correctional treatment centers that provide optional services. For acute care hospital facilities required to meet NPC-5, the on-premise fuel supply shall be sufficient for no less than 72 hours full-demand operations.

...

[OSHPD 1, 2, & 5]: For facilities subject to CMS regulations, see 42 CFR 482.15(e)(3) and 42 CFR 483.73(e)(3) for emergency generator fuel requirements.



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42 CFR 482.15(e)(3) and 42 CFR 483.73(e)(3)

Emergency generator fuel. [Hospitals, CAHs and LTC facilities] that maintain an onsite fuel source to power emergency generators must have a plan for how it will keep emergency power systems operational during the emergency, unless it evacuates.

Update Existing OSHPD Amendment for Fuel Cell

(G) Fuel Cell System. Fuel cell systems used as a source of power for emergency systems shall be of suitable rating and capacity to supply and maintain the total load for not less than 2 hours of full-demand operation.

Exception: [OSHPD 1, 2, 3, 4 & 5] Fuel cell system shall meet on-premises fuel requirements specified in Article 700.12 ~~(B)~~(D)(2)(a)

Questions Part 3



35



2022 California Mechanical Code Part 4

36

Definition for Zone

Section: Section 228.0 -Z-

228.0

...

[ASHRAE 34:3]

Zone. [For OSHPD 1, 2, 3, 4 & 5] A space or group of spaces within a building for which the heating, or cooling requirements are sufficiently similar that desired conditions can be maintained throughout by a single controlling device.



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Variable Air Volume

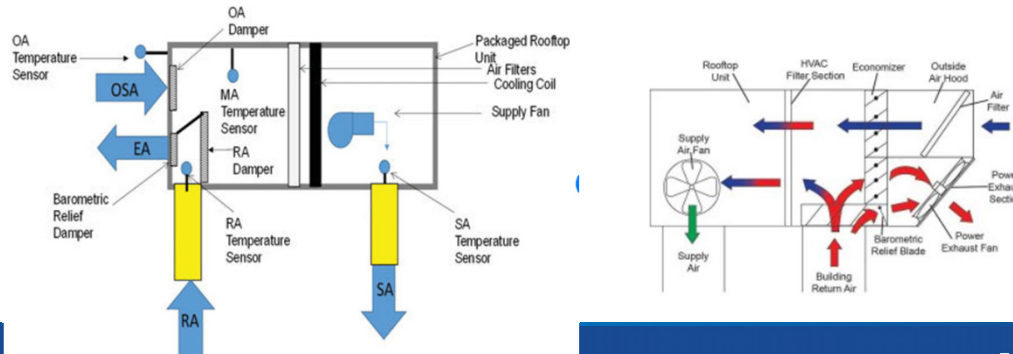
407.5.1.3 Spaces with pressure requirements per Table 4-A shall utilize
~~Variable air volume for return or exhaust air shall be accomplished by~~
~~utilizing~~ an automatic modulating damper in the return or exhaust air
for each ~~zone~~space. The damper will modulate from full open to
minimum position in conjunction with the supply air VAV terminal
~~boxes~~equipment.



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Economizers

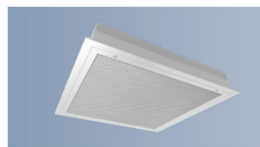
407.6 Economizers. *Systems with economizers shall include modulating relief and/or return fans to ensure compliance with the pressure requirements of spaces listed in Table 4-A.*



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Diffusers

420.0 Air Distribution Devices. *[For OSHPD 1, 2, 3, 4 & 5] All air distribution devices and supply air outlets shall meet the requirements of ASHRAE 170-2013, Section 6.7.2 and Table 6.7.2.*



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Remove a Redundancy on Gamma Camera

TABLE 4-A (continued)
PRESSURE RELATIONSHIP AND VENTILATION REQUIREMENTS FOR GENERAL ACUTE CARE HOSPITALS, SKILLED NURSING FACILITIES, INTERMEDIATE CARE FACILITIES, CORRECTIONAL TREATMENT CENTERS, OUTPATIENT FACILITIES, AND LICENSED CLINICS

Function or Space	Pressure Relationship to Adjacent Areas (f) (n)	Minimum Outdoor ach	Minimum Total ach	All Room Air Exhausted Directly to Outdoors (j)	Air Recirculated by Means of Room Units (a)	Design Relative Humidity (k), %	Design Temperature (l), oF/oC
...	...	...	...	...	...	...	...
Gamma Camera	NR	2	6	NR	No	NR	NR
Nuclear medicine (Gamma, PET, SPECT)	Negative	2	6	Yes	No	NR	NR

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Questions Part 4

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2022 California Plumbing Code Part 5

43

Identify Applicable Standard

- **1304.1.1 [OSHPD 1, 1R, 2, 3, 4 & 5]** *Medical gas systems for health care facilities that are regulated by OSHPD (hospitals, skilled nursing facilities, and intermediate care facilities, licensed clinics, and correctional treatment centers) shall be in accordance with NFPA 99, Standard for Health Care Facilities. [See California Fire Code Referenced Standards \(Chapter 80\) for applicable version of the Standard.](#) See California Building Code Table 1224.4.6.1 for location and number of station outlets for oxygen, vacuum, and medical air.*



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Replace Missing Exception

1304.1.2 [OSHPD 1, 1R, 2, 3, 4 & 5] A medical gas source system shall not be located in an OSHPD 1R or OSHPD 3 building. OSHPD 1R buildings shall be served by an individual main supply line separate from other OSHPD buildings, with a main line valve as per NFPA 99. [NFPA 99:5.1.4.2.1, 5.1.4.2.2, 5.1.4.3.1, 5.1.4.3.2] Valves shall be readily accessible and clearly labeled.

Exception: A medical gas source system serving only an OSHPD 1R or 3 building may be located within it.

Added Reference Standard for Dialysis

**TABLE 1701.1
REFERENCED STANDARDS**

STANDARD NUMBER	STANDARD TITLE	APPLICATION	REFERENCED SECTIONS
ANSI/AAMI RD62	Water Treatment Equipment for Hemodialysis Applications	Miscellaneous	Section 614.7
ASME A112.1.2-2012	Air Gaps in Plumbing Systems (For Plumbing Fixtures and Water-Connected Receptors)	Fittings	Table 603.2...

Questions Part 5



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2022 California Building Code Part 2, Volume 2

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Part 2, Volume 2 – Overview of Changes

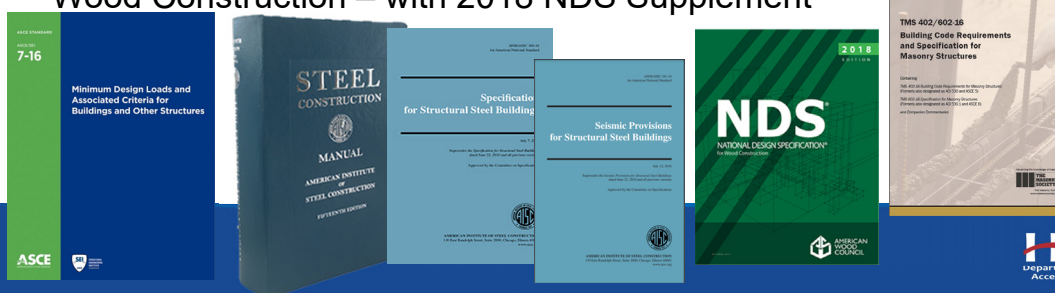
- Adopt the 2021 IBC and associated reference standards
- Carried forward existing amendments
- Added new amendments where existing language was revised in model code



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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



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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
- **D1.4/D1.4M – 2018** Structural Welding Code – **Steel Reinforcing bars**



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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

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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.

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Chapter 16 & 16A STRUCTURAL DESIGN

SECTION 1613 EARTHQUAKE LOADS

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

SITE CLASS	MAPPED RISK TARGETED MAXIMUM CONSIDERED EARTHQUAKE (MCE) _s SPECTRAL RESPONSE ACCELERATION PARAMETER AT SHORT PERIOD					
	$S \leq 0.25$	$S_s = 0.50$	$S_s = 0.75$	$S_s = 1.00$	$S_s = 1.25$	$S_s \geq 1.5$
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

- Use straight-line interpolation for intermediate values of mapped spectral response acceleration at short period, S_s .
- Values shall be determined in accordance with Section 11.4.8 of ASCE 7.
- 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_{s1} , 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.

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Chapter 16/16A STRUCTURAL DESIGN

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} .



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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



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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.



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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.



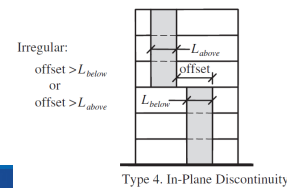
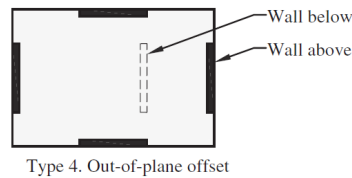
58

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.



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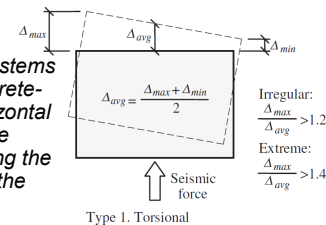
Chapter 16A STRUCTURAL DESIGN

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.

Exceptions:

- 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.
- 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.



Irregular:
 $\frac{\Delta_{max}}{\Delta_{avg}} > 1.2$
Extreme:
 $\frac{\Delta_{max}}{\Delta_{avg}} > 1.4$

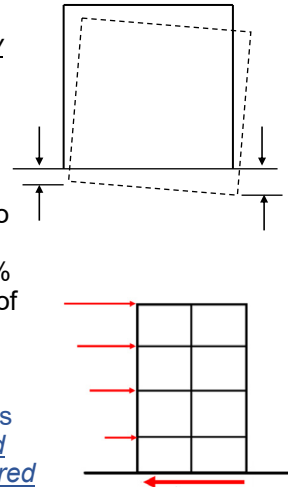
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Chapter 16A STRUCTURAL DESIGN

- **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:*

- ...
- 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.*



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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.*



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GUIDE RAIL BRACKET

COUNTERW.

RETAINER PL. ON TOP & BOTTOM OF CNT.

ROLLER ASSEMBLY (NOT SHOWN IN PLAN VIEW)

GUIDE RAIL

GUIDE RAIL BRACKET

PLAN

COUNTERT.

ELEVATION

SECTION PROPERTIES OF STEEL GUIDE RAIL

Wt. per ft.	I_x	I_y	S_x	S_y	r_x	r_y	Z_x	Z_y
1	2.02	0.81	1.03	0.46	1.70	1.28	1.79	1.14
2	8.05	3.23	4.12	1.92	2.02	1.57	1.97	1.50
3	13.5	5.48	6.49	3.15	2.13	1.51	2.61	1.95
4	20.0	8.29	9.78	4.58	2.16	1.51	3.43	2.72
5	26.5	11.08	12.67	6.03	2.18	1.51	4.16	3.12
6	33.0	13.88	15.67	7.53	2.18	1.51	4.76	3.51
7	39.5	16.68	18.67	9.03	2.18	1.51	5.26	3.81
8	46.0	19.48	21.67	10.53	2.18	1.51	5.76	4.11

TRACTION TYPE ELEVATOR

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.

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Chapter 18 & 18A SOILS AND FOUNDATIONS

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.



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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.

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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.

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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.

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

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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 and extended temporary anchors in service more than 2 years. A minimum of Class II ~~Corrosion~~ protection is required for temporary anchors in service less than or equal to 2 years.*

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Amendments - Chapter 18A – Soils and Foundations

SECTION 1807A 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.

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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.

...

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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

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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, the~~
testing apparatus support locations 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.

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.



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Amendments - Chapter 19 & 19A - Concrete

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

&

• 1905A.1.7 ACI 318, Section 14.1.4 [OSHDP 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 ...~~



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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.

...

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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.

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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	
$\epsilon_t \leq \epsilon_{ty}$	Compression-controlled	0.75	(a)	0.65	(b)
$\epsilon_{ty} < \epsilon_t < \epsilon_{ty} + 0.003$	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)
$\epsilon_t \geq \epsilon_{ty} + 0.003$	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 $0.005 \epsilon_{ty} + 0.003$.

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

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Amendments - Chapter 19A - Concrete

(Min flexural reinforcement 9.6.1.3 If A_s provided at every section is at least one-third greater than A_s 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.~~

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

...

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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.

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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.*
 - ...

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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.*

...

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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.*

...

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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.*

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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.

...

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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 ~~6,000-4,500 psi (41.37 31.03 MPa)~~ for clay masonry.

...

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Chapter 22A - STEEL

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

SECTION 2211A COLD-FORMED STEEL LIGHT-FRAME CONSTRUCTION

...

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

...

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Questions

Part 2, Volume 2



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2022 California Existing Building Code Part 10

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International Code Council renumbered much of Part 10 which affected a lot of HCAI code. Much renumbering occurred along with pointer corrections. We are not going to include that as part of this presentation but do want you to be aware of it.

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SECTION 304A STRUCTURAL DESIGN LOADS AND EVALUATION AND DESIGN PROCEDURES

304A.3.4.5.1 Replace-Exception: ASCE 41-13 § 7.2.13.2-Separation Exemptions: Add the following exemption with the following:

3. Seismic separation is deemed to comply with SPC 4D requirements and a pounding analysis is not required where either A) or B) apply:

A. ~~The~~ Where the adjacent building was constructed using the 1989 or later edition of the California Building Code and built under OSHPD jurisdiction, the minimum building separation distance specified in Section 7.2.13.1 need not be evaluated for Structural Performance Level Damage Control or lower.

B. ~~The~~ Where adjacent building-structure or building evaluated meets the SPC building separation requirements in accordance with the California Administrative Code (CAC), Chapter 6, Section 3.4 and all the following are met is not less than half as tall and adjacent structure has floors/levels that match those of the building being evaluated, the following exceptions apply:

1) ~~Where the structural resisting system of the adjacent building is different, the mass of the more flexible building is no greater than 50 percent of the mass of the stiffer building~~ For Structural Performance Level of Life Safety or lower, the seismic separation between the adjacent structure and the building being evaluated need not be evaluated.

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SECTION 304A

2) For Structural Performance Level of Damage Control, buildings need not meet the minimum separation distance specified in Section 7.2.13.1. where either a) or b) applies:

a) Adjacent structure is more than 2 inches times the number of stories below that level away from the building being evaluated at all floor levels that align.

b) The adjacent building does not have any of the following structural deficiencies as defined in the California Administrative Code, Chapter 6, Article 3:

- 1) Load path (3.1)
- 2) Weak story (3.3.1)
- 3) Soft story (3.3.2)
- 4) Vertical discontinuity (3.3.5) or
- 5) Torsion (3.3.6)

C. Where an approved pounding analysis procedure that accounts for the change in dynamic response of the structures caused by impact is used, the evaluated and retrofitted buildings need not meet the minimum separation distance specified in Section 7.2.13.1. Such analysis shall demonstrate that:

- 1) The structures are capable of transferring forces resulting from impact for diaphragms located at the same elevation; or
- 2) The structures are capable of resisting all required vertical and lateral forces considering the loss of any elements or components damaged by impact of the structures.

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	GAP > 2" TIMES # OF STORIES	GAP < 2" TIMES # OF STORIES	GAP > 2" TIMES # OF STORIES	GAP < 2" TIMES # OF STORIES
Height Check?	OK	OK	NG	NG
Floors Match?	Yes	Yes	NG	Yes
Exception allowed?	Not required	Yes	No	No
CP gap check?	Not required	Not required	Required	Required
DC gap Check	Not Required	Check if OK	N/A	N/A
Deficiency check	Not Required	If DC check not OK → Required	N/A	N/A

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SECTION 304A

304A.3.5.9 ASCE 41 Section 8.5.1-8.4.2.3.2.1 Modify ASCE 41 Section 8.5.1-8.4.2.3.2.1 with the following as follows:

8.4.2.3.2.1 Foundation Modeled as a Fixed Base If the base of the structure is assumed to be completely rigid, the foundation soil shall be classified as deformation controlled. Component actions shall be determined by Eq. (7-34). Acceptance criteria shall be based on Eq. (7-36), m-factors for foundation soil shall be 1.5 for Immediate Occupancy, 3.0 for Life Safety, and 4.0 for Collapse Prevention, and the use of upper-bound component capacities shall be permitted. Where overturning results in an axial uplift force demand from linear analysis, this uplift shall be considered deformation controlled, and an m-factor of 1.5 for Immediate Occupancy, 3.0 for Life Safety, and 4.0 for Collapse Prevention applied to the expected restoring dead load shall be used.

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304A.3.5.9 ASCE 41 Section 8.5.1-8.4.2.3.2.1 Modify ASCE 41 Section 8.5.1-8.4.2.3.2.1 and 8.4.2.3.2.2 with the following as follows:

8.4.2.3.2.1 Foundation Modeled as a Fixed Base ...

Alternatively, when seismic evaluation is performed for foundation after global analysis of the superstructure is complete, both overturning and axial seismic pseudo force demands are permitted to be divided by the m-factors above, provided the foundation is analyzed as a beam on Winkler springs (soil does not resist tension). The vertical spring stiffness values may be determined either from Figure 8-2 or Equation 8-11, or as provided by the geotechnical engineer. Acceptance criteria for soil bearing shall be considered met, based on one of the following methods either A or B:

A) Soil spring reactions are limited by the ultimate soil bearing capacity and the foundation system is stable under the applied loads.

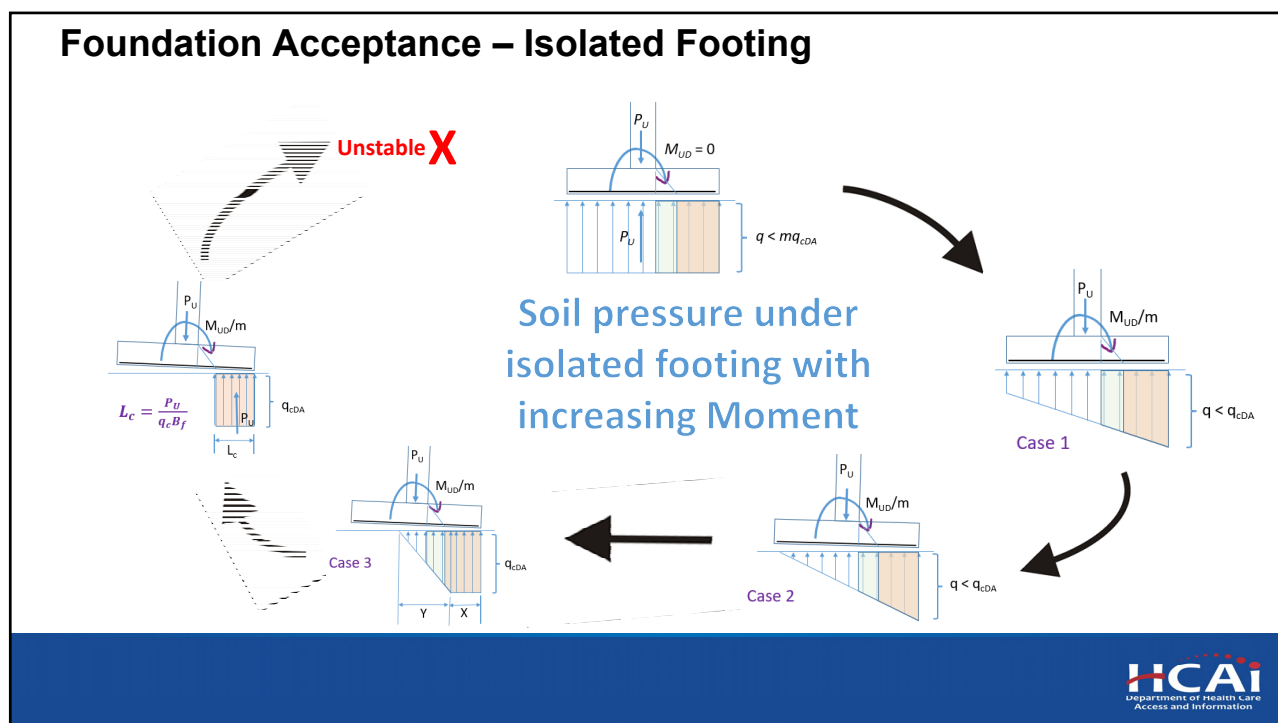
B) The resisting soil pressure distribution under the footing is triangular such that the maximum soil bearing pressure at any point of the footing is less than the ultimate soil bearing capacity.

Subject to the approval of the authority having jurisdiction, higher soil pressures may be permitted when appropriately justified.

The evaluation of the foundation structural element shall be considered as force controlled in accordance with the material chapters using the bearing pressure distribution under the footing from the same method used for the soil bearing acceptance criteria.

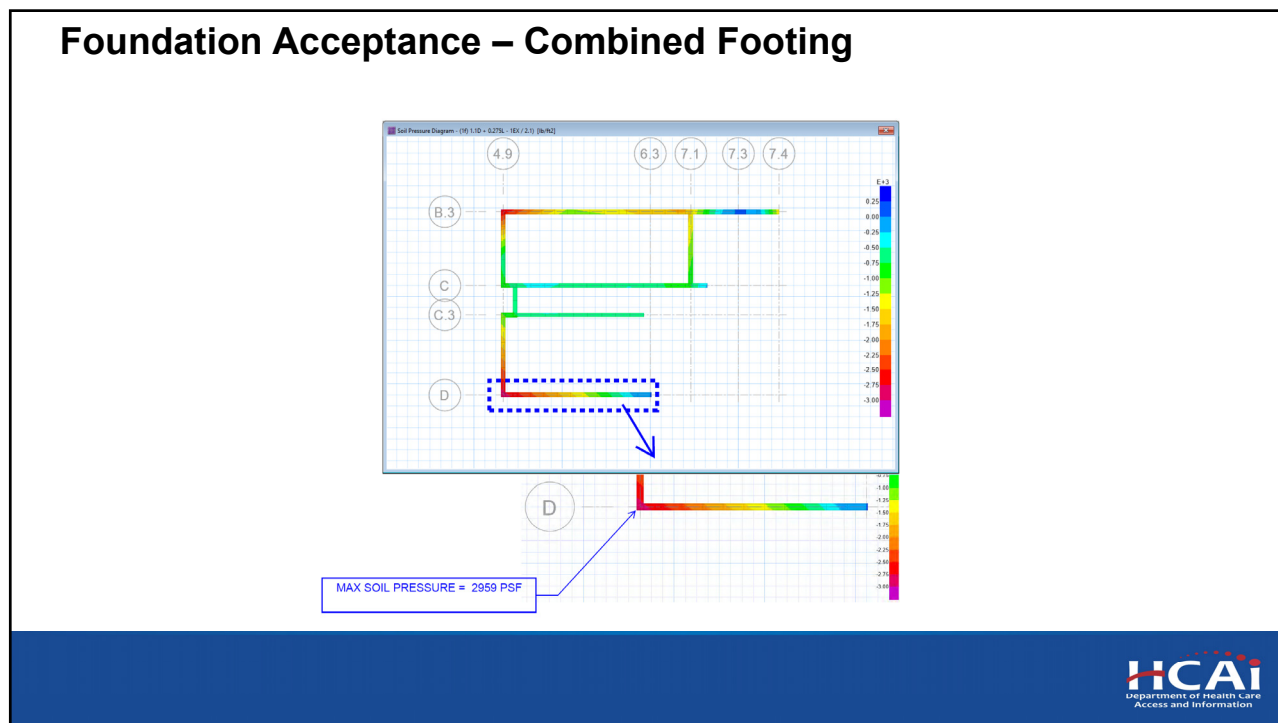
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Foundation Acceptance – Isolated Footing



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Foundation Acceptance – Combined Footing



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8.4.2.3.2.2 Foundation Interface Modeled as a Flexible Base Where the foundation flexibility is included in the mathematical model and is modeled using linear elastic foundation soil representation, the foundation soil shall be classified as deformation-controlled. Component actions shall be determined by Eq. (7-34). For rectangular or I-shaped footings, acceptability of foundation overturning shall be based on the m-factors in Table 8-3. Where global overturning results in an uplift force on the foundation, the expected dead load action on that portion of the foundation being uplifted shall be multiplied by the appropriate m-factor from Table 8-3 and shall be greater than the absolute axial tension demand on the foundation.

The m-factors in Table 8-3 depend on A_c/A_f , b/L_c , and the missing area ratio $(A_{rect} - A_f)/A_{rect}$, where A_c is defined in Section 8.4.2.3.1. The idealized footing configurations and corresponding parameters are defined in Fig. 8-3. The parameter b is defined as the width of rectangular footings and the flange width of I-shaped footings. The parameter L_c is defined as the length of the contact area and equal to A_c/b . The extent of the I-shape shall be quantified by the missing area ratio. For I-shaped footings, the parameter A_{rect} is equal to the area of the smallest rectangle that covers the footing footprint, and A_f is the actual footing area.



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8.4.2.3.2.2 Foundation Interface Modeled as a Flexible Base ...

Alternatively, superstructure pseudo force overturning demands to the foundation are permitted to be divided by the appropriate m-factors above and applied to the mathematical model representing the foundation system only, re-analyzed as a beam on Winkler springs (soil does not resist tension). Acceptance criteria for soil bearing shall be considered met, based on one of the following methods either A or B:

A) Soil spring reactions are limited by the ultimate soil bearing capacity and the foundation system is stable under the applied loads.

B) The resisting soil pressure distribution under the footing is triangular and the maximum soil bearing pressure at any point of the footing is less than the ultimate soil bearing capacity.

Subject to the approval of the authority having jurisdiction, higher soil pressures may be permitted when appropriately justified.

The evaluation of the foundation structural element shall be considered as force controlled in accordance with the material chapters using the bearing pressure distribution under the footing from the same method used for the soil bearing acceptance criteria.



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SECTION 304A

304A.3.5.112 ASCE 41 Section 10.7.1.1. Modify ASCE 41 Section 10.7.1.1 with the following:

...

304A.3.5.13 ASCE 41 Section 10.12.3 Modify ASCE 41 Section 10.12.3 as follows:

10.12.3 Evaluation of Existing Condition Allowable soil capacities (subgrade modulus, bearing pressure, and passive pressure) and foundation displacements for the selected performance level shall be as prescribed in Chapter 8 or as established with project specific data. All components of existing foundation systems and all new material, components, or components required for retrofit shall be evaluated as force-controlled actions. However, the capacity of the foundation components need not exceed 1.25 times the capacity of the supported vertical structural component or element (column or wall).

Exception: Component actions that are deformation controlled are permitted to use their expected strengths for the acceptance criteria.

Questions Part 10



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