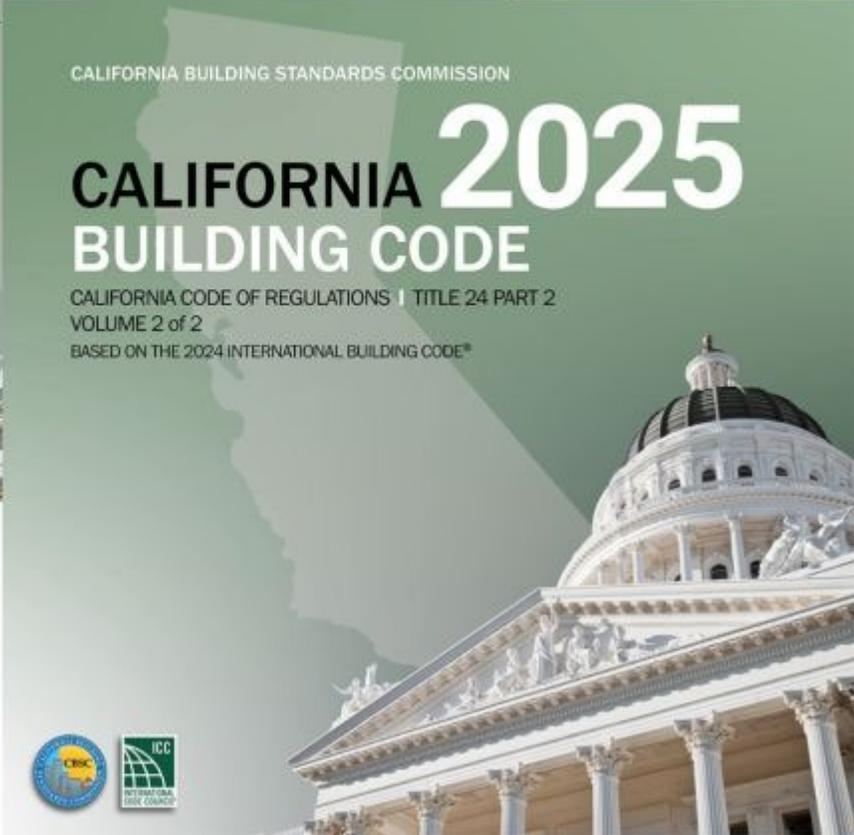


2022 California Building Standards Code

- Part 1 – Administrative Code
- Part 2 – Volume 1 (Non-structural) Building Code
- Part 2 – Volume 2 (Structural) Building Code – major changes/IOR related items**
- 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

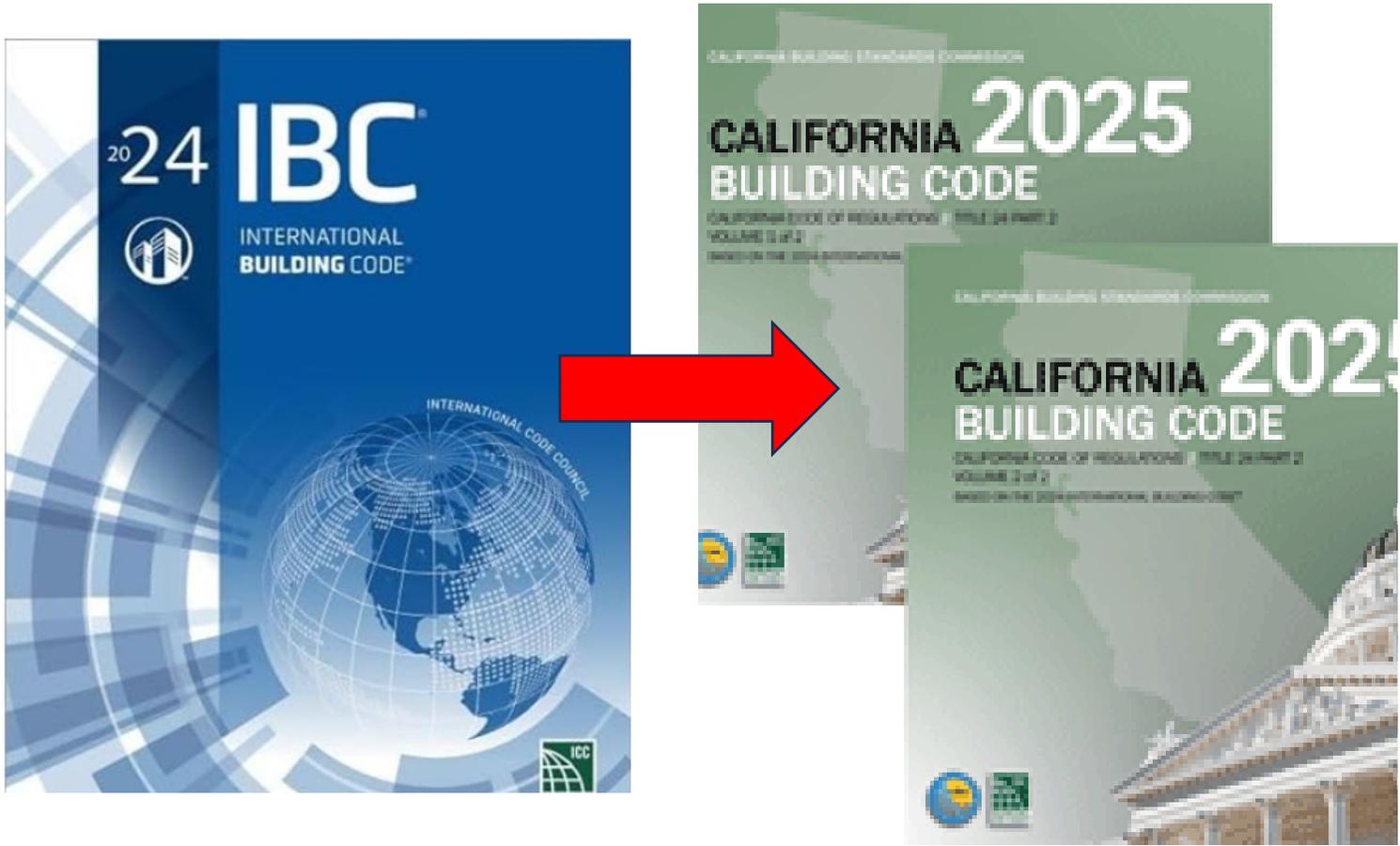
HCAI/OSHPD Major Amendments to the 2025 California Building Code Part 2



2025 California Building Code, Title 24 Part 2

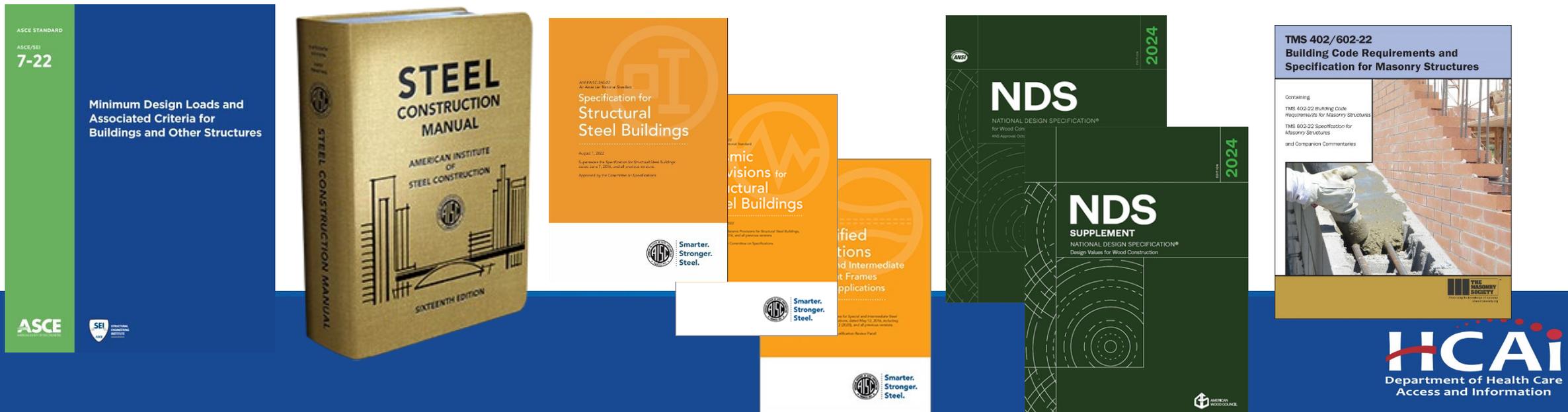
OVERVIEW OF CHANGES

- Repeal adoption of the 2021 International Building Code (IBC)
- Adopt 2024 IBC. Carry forward or repeal existing amendments.
- Amend as necessary to create the 2025 California Building Code, Part 2, Title 24.



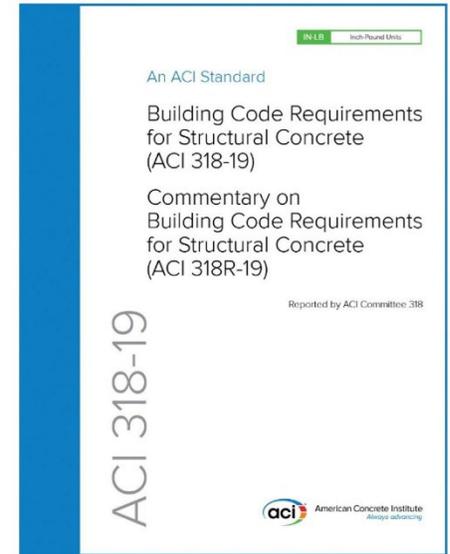
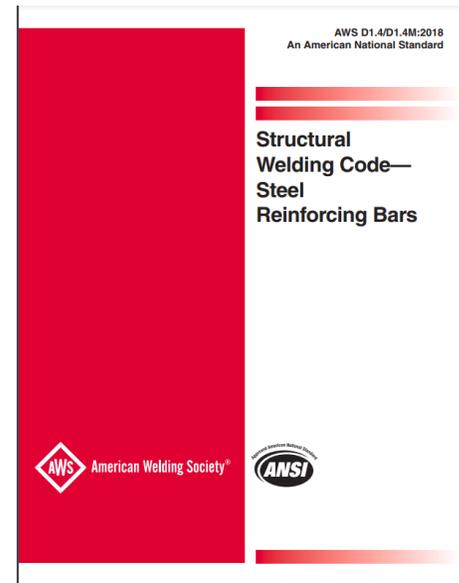
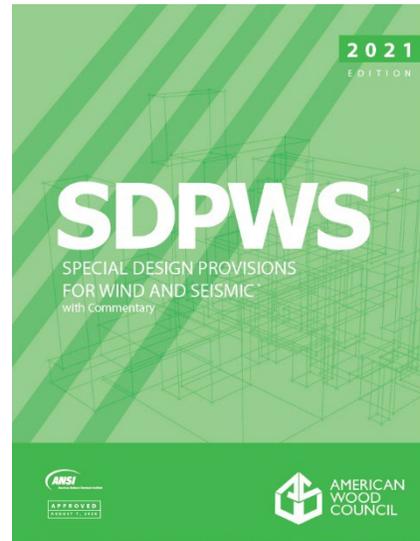
Major Reference Standards Updated

- **ASCE 7-22** including Supplement 1.
- **ANSI/AISC 360-22** Specifications for Structural Steel Buildings
- **ANSI/AISC 341-22** Seismic Provisions for Structural Steel Buildings
- **TMS 402/602 – 22** Building Code for Masonry Structures
- **ANSI/AWC NDS-2024** National Design Specification (NDS) for Wood Construction – with 2024 NDS Supplement



Major Reference Standards Not Updated

- **ACI 318-19** Building Code Requirements for Structural Concrete
- **AISI** Code of Standard Practice cold form steel
 - **S100-16 s/S2-20 & 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**



Chapter 2 DEFINITIONS

SECTION 202 – DEFINITIONS

...

OFF-SITE CONSTRUCTION. [OSHPD 1, 1R, 2, 4 & 5] *A modular building, modular component, panelized system or tiny house which is designed and constructed in compliance with Sections 1710 or 1710A of this code and is wholly or in substantial part fabricated or assembled in off-site fabrication plants for installation or assembly and installation - on a separate building site and has been fabricated in such a manner that all parts or processes cannot be inspected at the installation site without disassembly, damage to, or destruction thereof.*

...

RETROFIT. [OSHPD 1, 1R, 2, 4 & 5] *The construction of any new element or system, or the alteration of any existing element or system required to bring an existing building, or portion thereof, conforming to earlier code requirements, into conformance with standards of the currently effective California Building Standards Code.*

Chapter 14 EXTERIOR WALLS

Summary of Changes

- Minimum bond shear strength for adhered veneer of 50 psi using field constructed mock-ups having the specified unit, mortar and substrate.
- Limited weight of adhered veneer to 15 psf from 30 psf.



Chapter 15 ROOFTOP ASSEMBLIES AND ROOFTOP STRUCTURES

Summary of Changes

- Added section references for design of supports and attachments for photovoltaic panel systems for wind and seismic.



Major Changes to Part 2 Volume 2

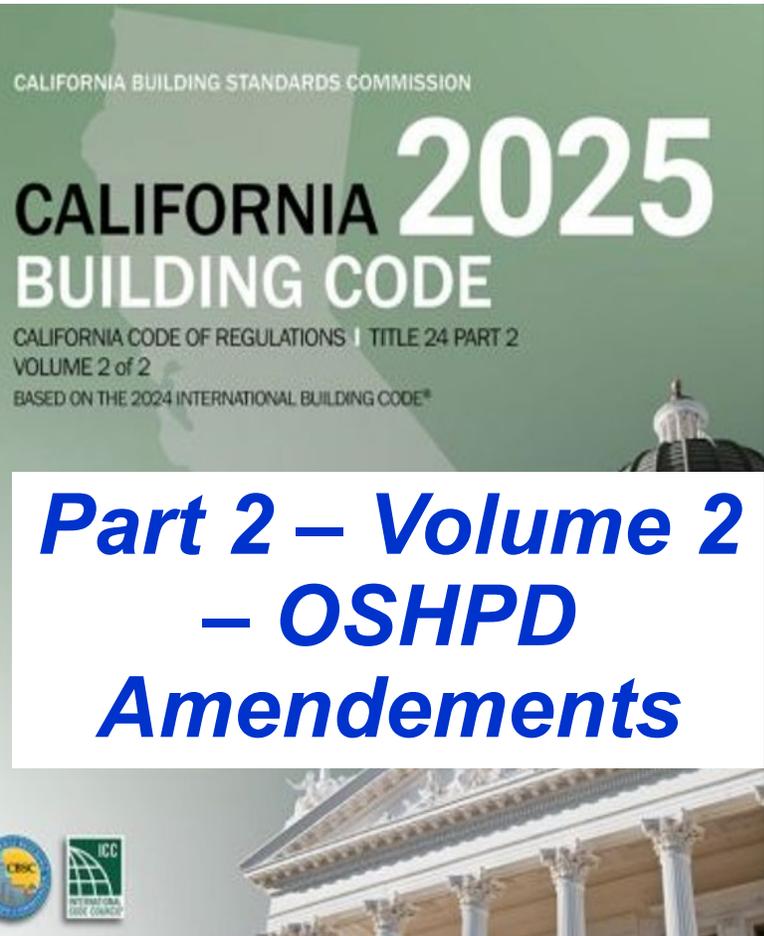


Part 2 – Volume 2 – OSHPD Amendements

- Chapter 16/16A Structural Design
- Chapter 17/17A Special Inspections and Tests
- Chapter 18/18A Soils and Foundations
- Chapter 19/19A Concrete
- Chapter 20 Aluminum
- Chapter 21/21A Masonry
- Chapter 22A Steel



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 20 Aluminum
- Chapter 21/21A Masonry
- Chapter 22A Steel

Chapter 16/16A STRUCTURAL DESIGN

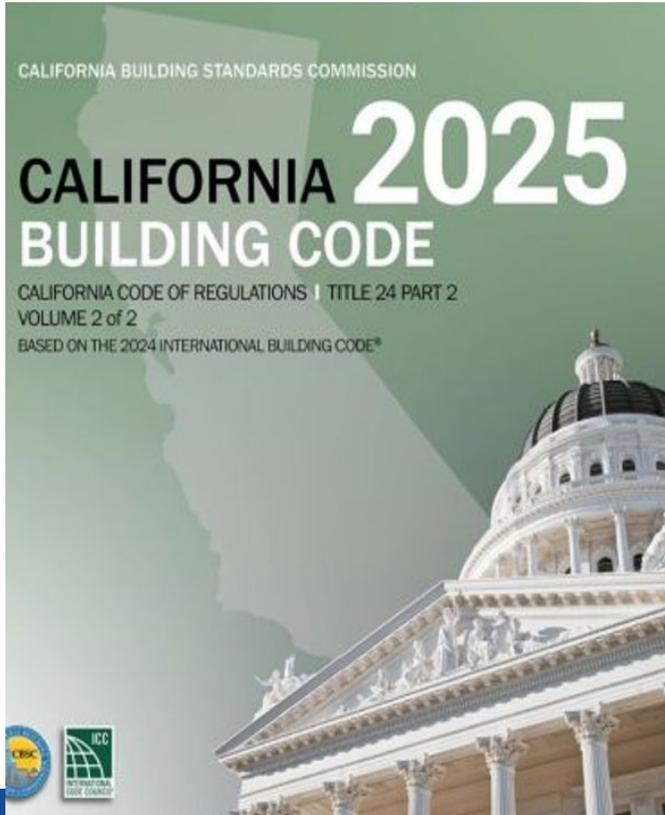
Summary of Changes

- Carried forward OSHPD amendments for risk categories for skilled nursing and acute psychiatric facilities.
- Ballasted photovoltaic system is an alternative design.
- Deleted amendments that have been deleted or updated in model code.
 - Early adoption items for passed ballots in ASCE 7-22.
 - Adoption of the NEHRP 2020 multi-period spectrum.
 - Structural separations, deleted the dependance on I_e .
 - Prohibited horizontal structural irregularities
- Permit use of screw anchors for exterior conditions.
- Wind tunnel tests are considered as an alternative system.
- Added new bracing requirements for aluminum ceiling panel grids.

Chapter 16A

STRUCTURAL DESIGN

SECTION 1604A - GENERAL DESIGN REQUIREMENTS

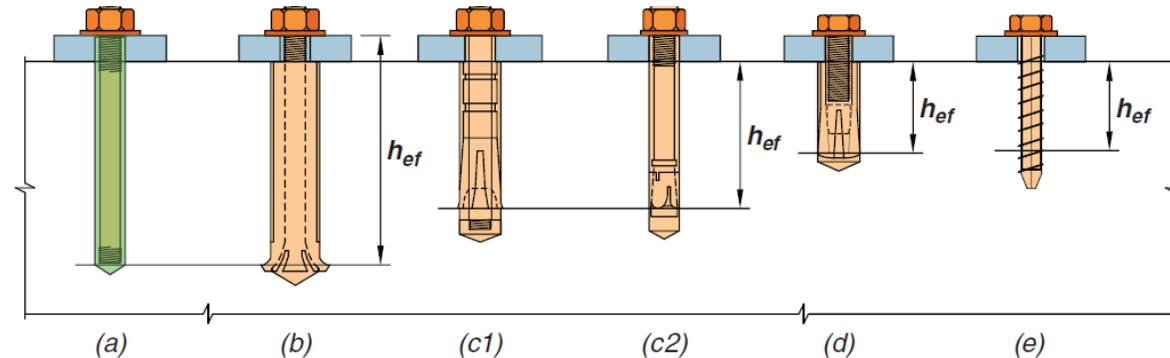


RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> • Agricultural facilities. • Certain temporary facilities. • Minor storage facilities.
II	Buildings and other structures except those listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to:
IV	Buildings and other structures designated as essential facilities and buildings where loss of function represents a substantial hazard to occupants or users, including but not limited to: <ul style="list-style-type: none"> • [OSHPD 1 & 4] General Acute-care Hospital Buildings, General Acute-care Hospital Buildings providing only acute medical rehabilitation center services, and Correctional Treatment Center Buildings and all structures required for their continuous operation or access/egress. • Group I-2 occupancies. • Ambulatory care facilities having emergency surgery or emergency treatment facilities. • Group I-3 occupancies other than Condition 1. • Fire, rescue, ambulance and police stations and emergency vehicle garages. • Designated earthquake, hurricane or other emergency shelters. • Designated emergency preparedness, communications and operations centers and other facilities required for emergency response. • Public utility facilities providing power generation, potable water treatment, or wastewater treatment. • Power-generating stations and other public utility facilities required as emergency backup facilities for Risk Category IV structures.

Chapter 16A STRUCTURAL DESIGN

SECTION 1617A - MODIFICATIONS TO ASCE 7

CBC 2022: Acceptability of Post-Installed Anchors



(B) Post-installed anchors: (a) adhesive anchor; (b) undercut anchor;
 (c) torque-controlled expansion anchors [(c1) sleeve-type and (c2) stud-type];
 (d) drop-in type displacement-controlled expansion anchor; and (e) screw anchor.

Fig. R2.1—Types of anchors.

1617A.1.19 ASCE 7, Section 13.4 Replace ASCE 7, Sections 13.4.2.3, with the following:

13.4.2.3 Prequalified post-installed anchors and specialty inserts in concrete and masonry.

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

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

Chapter 16A STRUCTURAL DESIGN

SECTION 1617A - MODIFICATIONS TO ASCE 7

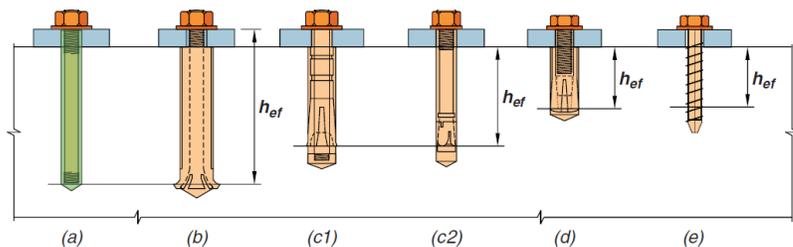
CBC 2025: Acceptability of Post-Installed Anchors

1617A.1.19 ASCE 7, Section 13.4 Replace ASCE 7, Sections 13.4.2.3, with the following:

13.4.2.3 Prequalified post-installed anchors and specialty inserts in concrete and masonry.

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

Note: The removal and resetting of post-installed mechanical anchors are prohibited by ACI 318 Section 17.1.3.



(B) Post-installed anchors: (a) adhesive anchor; (b) undercut anchor;
(c) torque-controlled expansion anchors [(c1) sleeve-type and (c2) stud-type];
(d) drop-in type displacement-controlled expansion anchor; and (e) screw anchor.

Fig. R2.1—Types of anchors.

17.1.3 The removal and resetting of post-installed mechanical anchors is prohibited.

R17.1.3 ACI 355.2 prohibits reuse of post-installed mechanical anchors.

What's new in acceptability of screw anchors?



- Screw anchors are permitted for use in exterior conditions
- Screw anchors are allowed in building enclosure walls
- Proof testing of screw anchors can be conducted through torque testing

Chapter 16A STRUCTURAL DESIGN

SECTION 1617A - MODIFICATIONS TO ASCE 7

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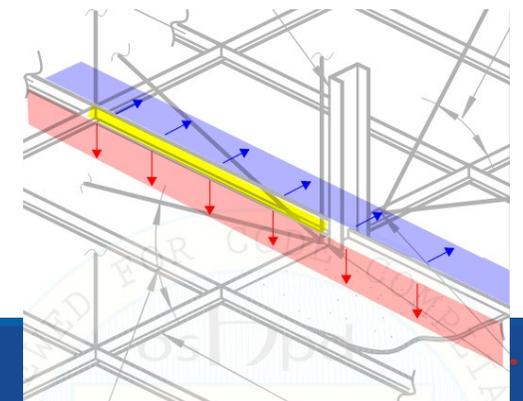
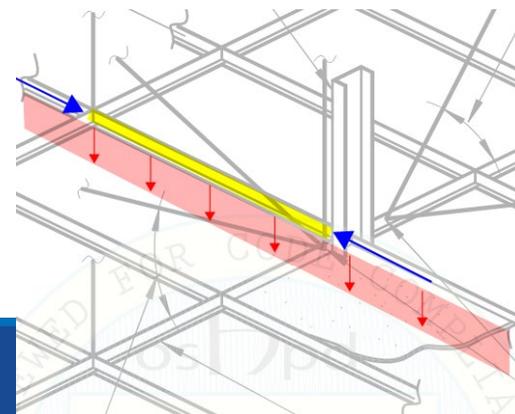
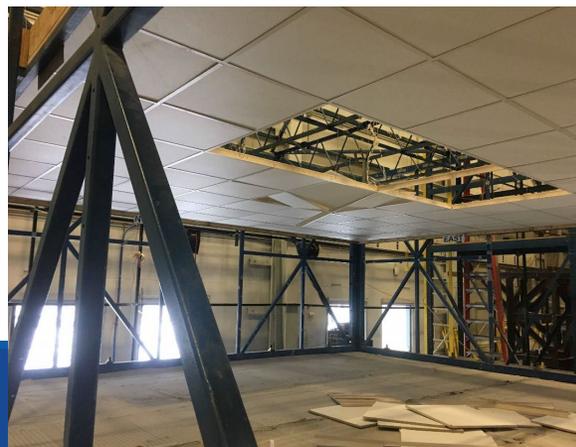
1617A.1.21 ASCE 7, Section 13.5.6.2. Modify ASCE 7, Section 13.5.6.2 by the following exception added to the end of Section 13.5.6.2.2 and by adding Section 13.5.6.2.3 as follows:

Exception to Section 13.5.8.1 shall not be used in accordance with ASTM E580 Section 5.5.

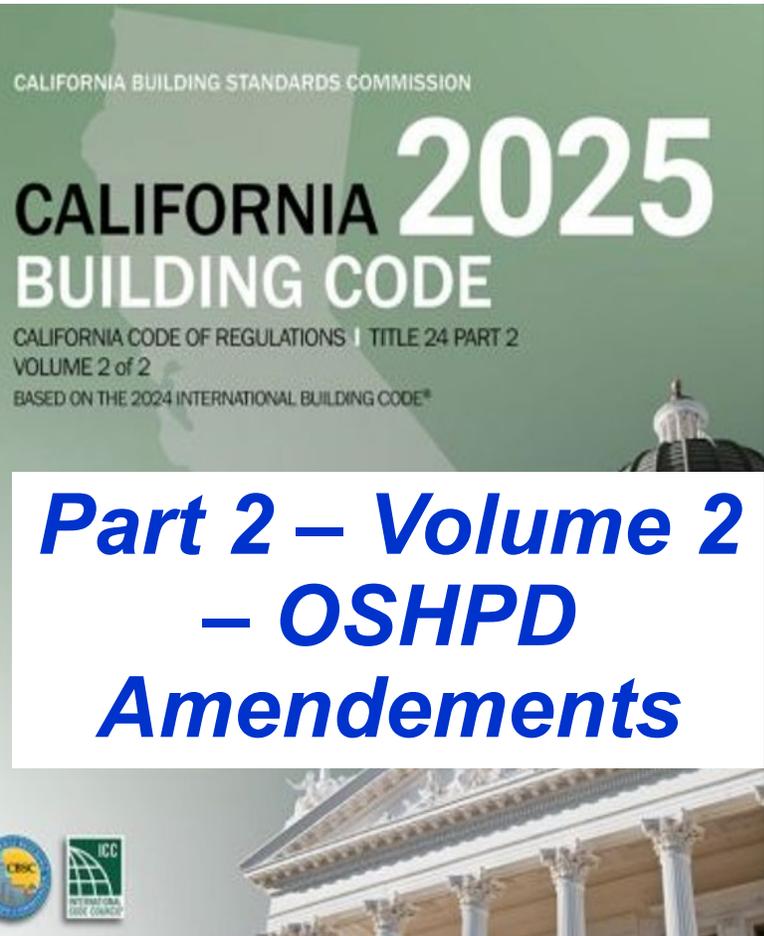
13.5.6.2.3 Modification to ASTM E580. Modify ASTM E580 by the following:

...

6. [OSHPD 1 & 4] Acoustical tile or lay-in panel ceiling grids constructed of aluminum shall have the hanger spacing at 2'-0" on center each way and total ceiling weight of such systems, W_p , shall not exceed 2 psf.



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 20 Aluminum
- Chapter 21/21A Masonry
- Chapter 22A Steel

Chapter 17/17A SPECIAL INSPECTIONS AND TESTS

Summary of Changes

- Updated section references to match model code changes.
- Referenced national standards where applicable.
- Updated amendments for special inspection and nondestructive testing requirements for structural steel.
- Deleted Table 1705A.2.1 as the tests are already prescribed in the appropriate QA/QC sections prescribed in AISC 360, AISC 358 and AISC 341, or AISC 370 as applicable. (See PIN 77 for HCAI QA/QC for Steel)
- Deleted TMS 602 Table 4 footnote d, for adhered veneer periodic inspection.
- Revised exceptions for special seismic certification requirements.
- Added new amendments for off-site construction.

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

OSP Labeling

- “OSP” is OSHPD’s Special Seismic Certification (SSC) Preapproval Program.
- Equipment that requires SSC is often (but not always) certified through the OSP program.
- OSP requirements are described in PIN 55.

1705A.14.3 Special seismic certification. For structures assigned to Seismic Design Category D, E or F *equipment and components* that are subject to the requirements of Section 13.2.2 of ASCE 7 for *special seismic* certification, the registered design professional shall specify on the approved construction documents the requirements to be met by analysis *or* testing as specified therein. Certificates of compliance documenting that the requirements are met shall be submitted to the building official as specified in Section 1704A.5.

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

OSP Labeling

From PIN 55:

Label must be factory installed before it is shipped to job site.



19. Each equipment/component shall have a label as required by CBC Section 1703.5 or 1703A.5.
20. In accordance with CBC Section 1705.12.4 or 1705A.12.4, the special inspector shall verify:
 - a. **Label** for conformance with the certificate of compliance.
 - b. **Anchorage and mounting** for conformance with the certificate of compliance and construction documents.

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

OSP Labeling

This equipment has been certified through the OSP program.

This label, however, does NOT comply with CBC 1703A.5.3.

1703A.5.3 Label information. The label shall contain the manufacturer's identification, model number, serial number or definitive information describing the performance characteristics of the product, material or assembly and the approved agency's identification.



Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

OSP Labeling

Examples of Labels that comply with CBC 1703A.5.3.

SEISMIC CERTIFICATION LABEL

Mfg. Series: 3000/3200
 Product type: Single and Dual Duct VAV
 Mounting method: Rigid Rod Hung, Cable brace
 Seismic Performance: $S_{DS}=2.5$; $z/h=1.0$; $I_p=1.5$; $F_D/W_p=1.88$
 Code: IBC 2009, 2012, 2015; CBC 2010, 2013, 2016
 Mfg Model: i.e. 30RWQ OSP#: 0xxx-##
 Mfg ID.#: ##### COC#: N101-COC-1701




Seismic Certification Label
 California Building Code (CBC-2010)
 OSHPD Special Seismic Certification
 OSP-0187-10
 PHOENIX POWER PRODUCTS




Product Information

Name	Type	I.D. #
Day Tank	DD-200	B882 95700

Maximum Seismic Performance Data

S _{ds} (g)	z/h	I _p
2.5	0.0	1.5

Minimum Anchorage Requirements

Type of Bolts	# of Bolts	Anchor Diameter	Embedment	Edge Distance	Concrete Depth	Concrete Strength	Special Inspection
Hilti KWIK Bolt TZ	4	3/4"	4 3/4"	8"	8"	3000 psi	YES

Chapter 17 & 17A SPECIAL INSPECTIONS AND TESTS

OSP Labeling

This equipment has been certified through the OSP program.

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

Three Big Changes for Steel

1. All steel bolted moment connections in AISC 356 will be permitted.
2. **Special inspections will follow the model code.**
3. Design of stainless steel will utilize AISC 370.



CBC 2025 Chapters 17 & 17A

- Special Inspections and Testing for Structural Steel shall be in accordance with IBC 2024, AISC 360 and AISC 341, as applicable, with minor modification in the CBC 2025
- Special Inspection of Cold-Formed Steel shall be in accordance with AISI S240, with minor modification in the CBC 2025
- PIN 77 permits the CBC 2025 provisions for the CBC 2016, 2019, and 2022.

Chapter 17 SPECIAL INSPECTIONS AND TESTS

SECTION 1705 - REQUIRED SPECIAL INSPECTIONS AND TESTS

...

1705.2.1 Structural steel. *Special inspections* and nondestructive testing of *structural steel elements* in *buildings, structures* and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 360 **[OSHPD 1R, 2 & 5]** [and this code](#).

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

~~**[OSHPD 1R, 2 & 5]** *Special inspections and nondestructive testing of structural steel elements in buildings, structures and portions thereof shall be in accordance with the quality assurance inspection requirements of AISC 360, Chapter 22 and quality control requirements of AISC 360, AISC 341 and AISC 358. AISC 360, Chapter N and AISC 341, Chapter J are adopted, except as noted below:*~~

*The following provisions of AISC 360, Chapter N are **not permitted by OSHPD**.* **adopted:**

- ~~1. N4, Item 2 (Quality Assurance Inspector Qualifications).~~
- ~~2. N5, Item 2 (Quality Assurance).~~
- 1. 3. N5, Item 3. (Coordinated Inspection).**
- ~~4. N5, Item 4 (Inspection of Welding).~~
- 2. 5. N6 (Approved Fabricators and Erectors).**
- ~~6. N7 (Nonconforming Material and Workmanship).~~

...

Chapter 17A SPECIAL INSPECTIONS AND TESTS

SECTION 1705A - REQUIRED SPECIAL INSPECTIONS AND TESTS

1705A.2.1

...

~~Additionally, the requirements of Table 1705A.2.1 of the California Building Code shall apply.~~

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

SPECIAL INSPECTIONS AND TESTS

**TABLE 1705A.2.1
REQUIRED SPECIAL INSPECTIONS AND TESTS OF STEEL CONSTRUCTION**

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD	CBC REFERENCE ³
<i>1. Material identification and testing of high-strength bolts, nuts and washers:</i>				
<i>a. Identification markings to conform to ASTM standards specified in the approved construction documents.</i>	—	X	RCSC: 1.5, AISC 360: A3.3, J3.1 and applicable ASTM material standards	2202A.1, [DSA-SS/CC] 2202.1
<i>b. Manufacturer's certificate of compliance required.</i>	—	X	RCSC: 1.5 & 2.1; AISC 360: A3.3 & N3.2	—
<i>c. Testing of high-strength bolts, nuts and washers.</i>	—	—	RCSC: 7.2, Applicable ASTM material standards	1705A.2.6, [OSHPD 1 & 4] 2213A.1
<i>2. Inspection of high-strength bolting:</i>				
<i>a. Snug-tight joints.</i>	—	X	RCSC: 7-9, AISC 360: J3.1, J3.2, M2.5 & N3.6	1705A.2.6, 2204A.2, [DSA-SS/CC] 2204.2
<i>b. Pretensioned and slip-critical joints using turn-of-nut with matchmarking, twist-off bolt or direct tension indicator methods of installation.</i>	—	X		
<i>c. Pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation.</i>	X	—		
<i>3. Material identification and testing of structural steel and cold-formed steel deck:</i>				
<i>a. For structural steel, identification markings to conform to AISC 360.</i>	—	X	AISC 360: A3.1	2202A.1, [DSA-SS/CC] 2202.1
<i>b. For other steel, identification markings to conform to ASTM standards specified in the approved construction documents.</i>	—	X	Applicable ASTM material standards	2202A.1, [DSA-SS/CC] 2202.1
<i>c. Manufacturer's certified test reports.</i>	—	X	AISC 360: A3.1 & N3.2	—
<i>d. Testing of unidentified steel.</i>	—	—	Applicable ASTM material standards	2202A.1, [DSA-SS/CC] 2202.1

[[OSHPD 1 & 4] Deleted

Chapter 17A SPECIAL INSPECTIONS AND TESTS



Department of Health Care Access and Information
 Office of Statewide Hospital Planning and Development
 2020 West El Camino Avenue, Suite 800 • Sacramento, CA 95833 • (916) 440-8300
 355 South Grand Avenue, Suite 1900 • Los Angeles, CA 90071 • (213) 897-0166

POLICY INTENT NOTICE

PIN: 77

SUBJECT

Steel Quality Assurance (QA) and Quality Control (QC)

Effective: 02/25/2025



PURPOSE

2022 California Building Code (CBC) Sections 1705 and 1705A provide the special inspection and nondestructive testing (NDT) requirements for steel construction in buildings, structures, and portions thereof. Legacy practice in the CBC is to include an abridged version of these requirements and refer to the material standards for complete details. Some engineers, fabricators and erectors interpret the abridged requirements in the CBC as a substitute for those in the referenced material standards and are looking for clarifications.

The International Building Code (IBC), also referred to as model code, and steel material standards over time largely incorporated most of the legacy amendments for steel Quality Assurance and Quality Control (QA and QC) in the CBC. Recognizing potential cost savings and quality improvements, OSHPD proposed to eliminate most of the California-specific amendments for steel special inspections and nondestructive tests in the CBC 2025. Going forward, referenced material standards, as amended by the CBC, will serve as the basis of the steel QA/QC requirements.

This Policy Intent Notice (PIN) is intended to streamline and simplify the transition from the legacy California amendments-based steel special inspection and nondestructive testing requirements to those based mostly on model code and steel material standards.

2.0 Quality Assurance (QA) Tasks for Structural Steel

2.1 The following table lists common code required quality assurance/special inspections and nondestructive testing for steel.

Type	Reference Standards	CBC Reference Sections
Material Identification, Test Reports, and Certifications	AISC 360 N3.2 & N5.2	1705.2.1, 1705A.2.1, 2201.2, 2201A.2
Welding	AISC 360: N5.2, N5.4, Tables N5.4-	1705.2.1, 705A.2.1, 1705.2.7, 1705A.2.7

2.2 The following table lists common code required quality assurance/special inspections and nondestructive testing for steel specific to the structural steel seismic force resisting system, in addition to those in Table 2.1.

Type	Reference Standards	CBC Reference Sections
Material Identification, Test Reports, and Certifications	AISC 360 N3.2; AISC 341 J3.2, J3.3, J3.4	1705.13.1, 1705.13.2, 1705A.13.1, 1705A13.2, 2201.2, 2201A.2
Welding Inspection and nondestructive Testing	AISC 360 Chapter N; AISC 341 Section J7, Table J7.1; AWS D1.8	1705.13.1, 1705.13.2, 1705A.13.1, 1705A13.2, 1705.14.1, 1705A.14.1, 1705.14.2, 1705A.14.2
Inspection of High Strength Bolts	AISC 360 Chapter N	1705.13.1, 1705.13.2, 1705A.13.1, 1705A13.2

AISC 360: Welding Inspection

**Table N5.4-1
Inspection Tasks Prior to Welding**

Inspection Tasks Prior to Welding	QC	QA
Welder qualification records and continuity records	P	O
WPS available	P	P
Manufacturer certifications for welding consumables available	P	P
Material identification (type/grade)	O	O
Welder identification system <ul style="list-style-type: none"> Fabricator or erector, as applicable, shall maintain a system by which a welder who has welded a joint or member can be identified. Die stamping of members subjected to fatigue shall be prohibited unless approved by the engineer of record. 	O	O
Fit-up of groove welds (including joint geometry) <ul style="list-style-type: none"> Joint preparations Dimensions (alignment, root opening, root face, bevel) Cleanliness (condition of steel surfaces) Tacking (tack weld quality and location) Backing type and fit (if applicable) 	O	O
Fit-up of CJP groove welds of HSS T-, Y-, and K-connections without backing (including joint geometry) <ul style="list-style-type: none"> Joint preparations Dimensions (alignment, root opening, root face, bevel) Cleanliness (condition of steel surfaces) Tacking (tack weld quality and location) 	P	O
Configuration and finish of access holes	O	O
Fit-up of fillet welds <ul style="list-style-type: none"> Dimensions (alignment, gaps at root) Cleanliness (condition of steel surfaces) Tacking (tack weld quality and location) 	O	O
Check welding equipment	O	-

**TABLE N5.4-2
Inspection Tasks During Welding**

Inspection Tasks During Welding	QC	QA
Control and handling of welding consumables <ul style="list-style-type: none"> Packaging Exposure control 	O	O
No welding over cracked tack welds	O	O
Environmental conditions <ul style="list-style-type: none"> Wind speed within limits Precipitation and temperature 	O	O
WPS followed <ul style="list-style-type: none"> Settings on welding equipment Travel speed Selected welding materials Shielding gas type/flow rate Preheat applied Interpass temperature maintained (min./max.) Proper position (F, V, H, OH) 	O	O
Welding techniques <ul style="list-style-type: none"> Interpass and final cleaning Each pass within profile limitations Each pass meets quality requirements 	O	O
Placement and installation of steel headed stud anchors	P	P

**TABLE N5.4-3
Inspection Tasks After Welding**

Inspection Tasks After Welding	QC	QA
Welds cleaned	O	O
Size, length, and location of welds	P	P
Welds meet visual acceptance criteria <ul style="list-style-type: none"> Crack prohibition Weld/base-metal fusion Crater cross section Weld profiles Weld size Undercut Porosity 	P	P
Arc strikes	P	P
k-area ^[a]	P	P
Weld access holes in rolled heavy shapes and built-up heavy shapes ^[b]	P	P
Backing removed and weld tabs removed (if required)	P	P
Repair activities	P	P
Document acceptance or rejection of welded joint or member ^[c]	P	P
No prohibited welds have been added without the approval of the engineer of record	O	O

^[a]When welding of doubler plates, continuity plates, or stiffeners has been performed in the k-area, visually inspect the web k-area for cracks within 3 in. (75 mm) of the weld.
^[b]After rolled heavy shapes (see Section A3.1d) and built-up heavy shapes (see Section A3.1e) are welded, visually inspect the weld access hole for cracks.
^[c]Die stamping of members subjected to fatigue shall be prohibited unless approved by the engineer of record.

Chapter 16 STRUCTURAL DESIGN

SECTION 1604 - GENERAL DESIGN REQUIREMENTS

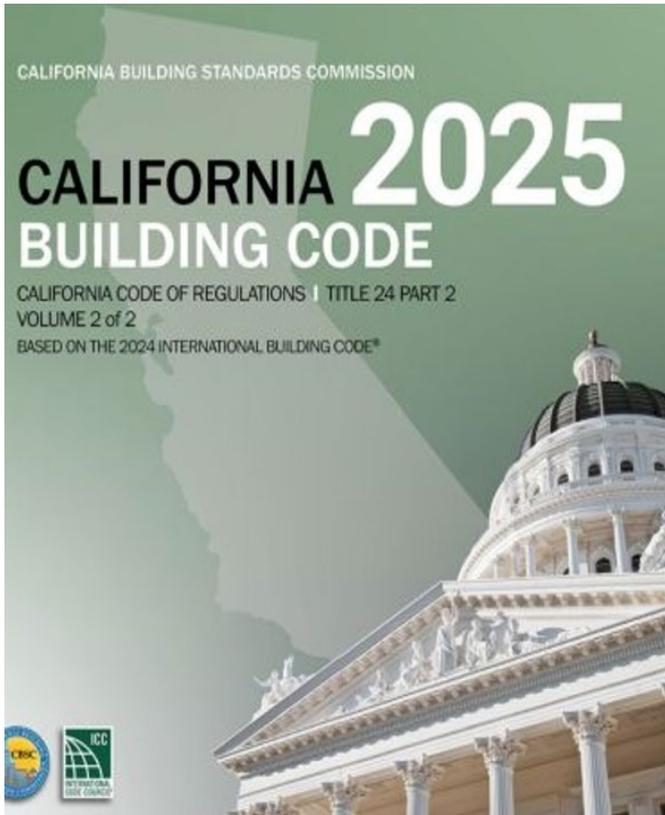


TABLE 1604.5 - RISK CATEGORY OF BUILDINGS AND OTHER STRUCTURES	
RISK CATEGORY	NATURE OF OCCUPANCY
I	Buildings and other structures that represent a low hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> • Agricultural facilities. • Certain temporary facilities.
II	Retained existing amendments as listed in Risk Categories I, III and IV.
III	Buildings and other structures that represent a substantial hazard to human life in the event of failure, including but not limited to: <ul style="list-style-type: none"> • Buildings and other structures whose primary occupancy is public assembly with an occupant load greater than 300. • Buildings and other structures containing one or more public assembly spaces, each having an occupant load greater than 300 and a cumulative occupant load of these public assembly spaces of greater than 2,500. • Buildings and other structures containing Group E or Group I-4 occupancies or combination thereof, with an occupant load greater than 250. • Buildings and other structures containing educational occupancies for students above the 12th grade with an occupant load greater than 500. • [OSHPD 2] Skilled nursing facilities, intermediate care facilities, Group I-2 occupancy with 50 or more care recipients. • [OSHPD 5] Acute psychiatric hospitals, Group I-2 occupancy with 50 or more care recipients. • Group I-3, Condition 1 occupancies. • Any other occupancy with an occupant load greater than 5,000.^a • Power-generating stations with individual power units rated 75 MW_{AC} (megawatts, alternating current) or greater, water treatment facilities for potable water, wastewater treatment facilities and other public utility facilities not included in Risk Category IV. • Buildings and other structures not included in Risk Category IV containing quantities of toxic or explosive materials that:

AISC 360: Bolting Inspection

**TABLE N5.6-1
Inspection Tasks Prior to Bolting**

Inspection Tasks Prior to Bolting	QC	QA
Manufacturer's certifications available for fastener materials	O	P
Fasteners marked in accordance with ASTM requirements	O	O
Correct fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	O	O
Correct bolting procedure selected for joint detail	O	O
Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	O	O
Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used	P	O
Protected storage provided for bolts, nuts, washers, and other fastener components	O	O

**TABLE N5.6-2
Inspection Tasks During Bolting**

Inspection Tasks During Bolting	QC	QA
Fastener assemblies placed in all holes, and washers and nuts are positioned as required	O	O
Joint brought to the snug-tight condition prior to the pretensioning operation	O	O
Fastener component not turned by the wrench prevented from rotating	O	O
Fasteners are pretensioned in accordance with the RCSC <i>Specification</i> , progressing systematically from the most rigid point toward the free edges	O	O

**TABLE N5.6-3
Inspection Tasks After Bolting**

Inspection Tasks After Bolting	QC	QA
Document acceptance or rejection of bolted connections	P	P

AISC 341: Composite Structures and H-Piles

TABLE J10.1 Inspection of Composite Structures Prior to Concrete Placement				
Inspection of Composite Structures Prior to Concrete Placement	QC		QA	
	Task	Doc.	Task	Doc.
Material identification of reinforcing steel (type/grade)	O	-	O	-
If welded, determination of carbon equivalent for reinforcing steel other than ASTM A706/A706M	O	-	O	-
Proper reinforcing steel size, spacing, and orientation	O	-	O	-
Reinforcing steel has not been rebent in the field	O	-	O	-
Reinforcing steel has been tied and supported as required	O	-	O	-
Required reinforcing steel clearances have been provided	O	-	O	-
Composite member has required size	O	-	O	-
Note: Doc. = documentation - = indicates no documentation is required				

TABLE J10.2 Inspection of Composite Structures During Concrete Placement				
Inspection of Composite Structures During Concrete Placement	QC		QA	
	Task	Doc.	Task	Doc.
Concrete: Material identification (mix design, compressive strength, maximum large aggregate size, maximum slump)	O	D	O	D
Limits on water added at the truck or pump	O	D	O	D
Proper placement techniques to limit segregation	O	-	O	-
Note: Doc. = documentation - = indicates no documentation is required				

TABLE J11.1 Inspection of H-Piles				
Inspection of Piling	QC		QA	
	Task	Doc.	Task	Doc.
Protected zone—no holes or unapproved attachments made by the responsible contractor, as applicable	P	D	P	D
Note: Doc.= documentation				

PIN 77: Steel Quality Assurance (QA) and Quality Control (QC)

Observe (O).

Tasks listed as Observe (O) for QA in the steel material standards shall be inspected by the QAI/special inspector on a random basis.

Operations that do not interfere with the ability to observe (O) for inspections need not be delayed pending these inspections.

Frequency of observations shall be adequate to confirm that the work has been performed in accordance with approved construction documents.

User Note: Observe (O) and Perform (P) in the steel material standards are loosely equivalent to periodic and continuous special inspections in the CBC.

PIN 77: Steel Quality Assurance (QA) and Quality Control (QC)

User Note:

Quality Assurance Inspector (QAI) in AISC and AISI standards and Special Inspector in the CBC are equivalent.

Terms Quality Assurance Inspector (QAI) and Special Inspector are used interchangeably.

When material standards require inspections by QAIs they are performed by the approved special Inspectors working for an approved agency employed by the Owner.

Quality Assurance (QA) vs Quality Control (QC)



Quality assurance. Monitoring and inspection tasks to ensure that the material provided and work performed by the fabricator and erector meet the requirements of the approved construction documents and referenced standards. Quality assurance includes those tasks designated “special inspection” by the applicable building code.

Quality control. Controls and inspections implemented by the fabricator or erector, as applicable, to ensure that the material provided and work performed meet the requirements of the approved construction documents and referenced standards.

Periodic Inspection vs Observe

Periodic special inspection. *Special inspection by the special inspector who is intermittently present where the work to be inspected has been or is being performed and at the completion of the work.*

Observe (O): The inspector shall observe these items on a random basis. Operations that do not interfere with the ability to observe (O) for inspections need not be delayed pending these inspections. Frequency of observations shall be adequate to confirm that the work has been performed in accordance with approved construction documents.

- AISC 341: Any tasks listed as Observe (O) shall be performed at least daily.

**You Can Learn A Lot
Just By Observing!**



Continuous Inspection vs Perform



Continuous special inspection. *Special inspection* by the **special inspector who is present continuously** when and where the work to be inspected is being performed.

Perform (P). **Tasks listed as Perform (P) for QA in the steel material standards shall be performed for each joint or member by the QAI/special inspector** and shall be documented including the part inspected, date inspected, and results of the inspection.

Chapter 17 SPECIAL INSPECTIONS AND TESTS

SECTION 1705 - REQUIRED SPECIAL INSPECTIONS AND TESTS

...

1705.4.1 Glass unit masonry and masonry veneer in Risk Category IV. ...

[TMS 602 Table 4 footnote d is not permitted, periodic special inspection shall be performed for all veneer.](#)

...

S-26

TMS 602-22

Table 4: Minimum Special Inspection Requirements

MINIMUM SPECIAL INSPECTION					
Inspection Task	Frequency ^(a)			Reference for Criteria	
	Level 1	Level 2	Level 3	TMS 402	TMS 602
1. As masonry construction begins, verify that the following are in compliance:					
a. Proportions of site-prepared mortar	NR	P	P		Art. 2.1 & 2.6 A & C
b. Grade and size of prestressing tendons and anchorages	NR	P	P		Art. 2.4 B & 2.4 M & N
c. Grade, type and size of reinforcement, connectors, and anchor bolts	NR	P	P		Art. 2.4 A, D, E, F, G, H, I, J, K, & L
d. Prestressing technique	NR	P	P		Art. 3.6 B
e. Properties of thin-bed mortar for AAC masonry	NR	C ^(b) /P ^(c)	C		Art. 2.1 DC.1

j. Placement of prestressing grout for bonded tendons	NR	C	C		3.6 C
k. Placement of AAC masonry units and construction of thin-bed mortar joints	NR	C ^(b) /P ^(c)	C		Art. 3.3 B.8 & 3.3 G.1.b
4. Observe preparation of grout specimens, mortar specimens, and/or prisms	NR	P	C		Art. 1.4 B.2.a.3, B.2.b.3, B.2.c.3, B.3, & B.4

(a) Frequency refers to the frequency of inspection, which may be continuous during the listed task or periodically during the listed task, as defined in the table. NR=Not Required, P=Periodic, C=Continuous

(b) Required for the first 5000 square feet (465 square meters) of AAC masonry.

(c) Required after the first 5000 square feet (465 square meters) of AAC masonry.

(d) Periodic inspection of veneers is required when the height of the veneer exceeds 60 ft (18.3 m) above grade plane.

Chapter 17 SPECIAL INSPECTIONS AND TESTS



SECTION 1710 - OFF-SITE CONSTRUCTION

[OSHPD 1R, 2 & 5]

1710.1 General. This section applies to off-site construction and shall govern the requirements for planning, design, fabrication, assembly, inspection and regulatory compliance.

1710.2 Construction. In addition to other applicable requirements in this code, off-site construction shall be constructed in accordance with ICC 1200, with the texts modified by Sections 1710.2.1 through 1710.2.2.

1710.2.1 ICC 1200 Section 301.4. Replace ICC 1200 Section 301.4 as follows:

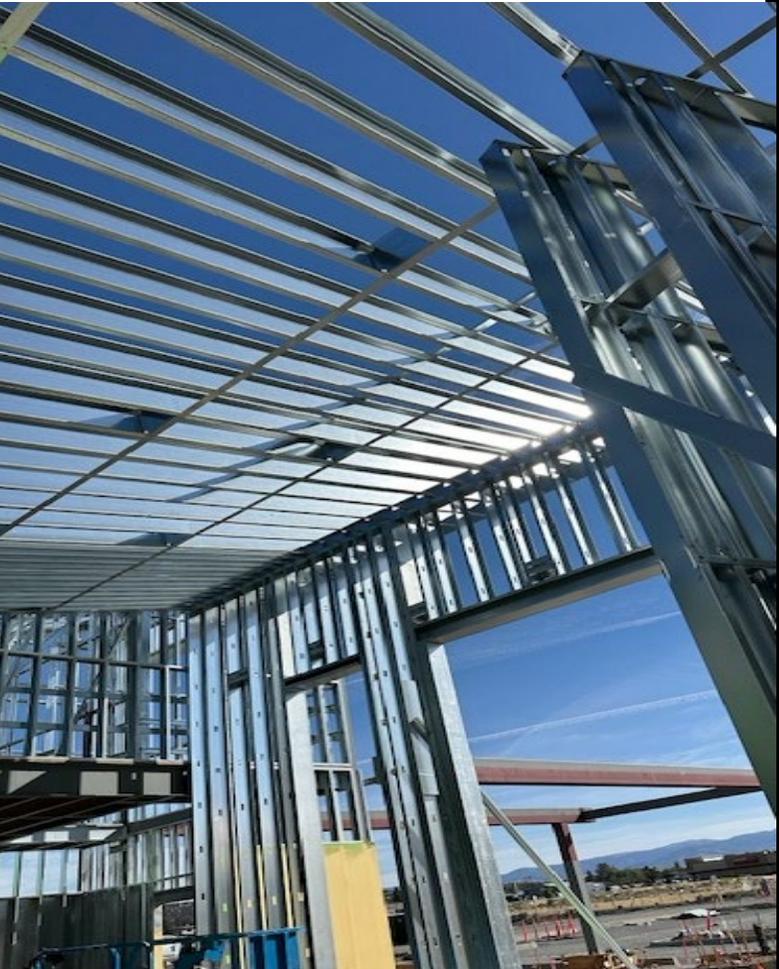
301.4 Use of shipping containers repurposed as buildings and building components. Use of shipping containers repurposed as buildings and building components is not permitted by the California Building Code (CBC) Section 3115.

1710.2.2 ICC 1200 Section 503.1. Modify ICC 1200 Section 503.1 by adding the following:

QA/QC shall satisfy all the requirements for Testing, Inspection, and Observation (TIO) in the California Building Standards Code (CBSC).

...

Chapter 17 SPECIAL INSPECTIONS AND TESTS



SECTION 1710 - OFF-SITE CONSTRUCTION **[OSHPD 1R, 2 & 5]**

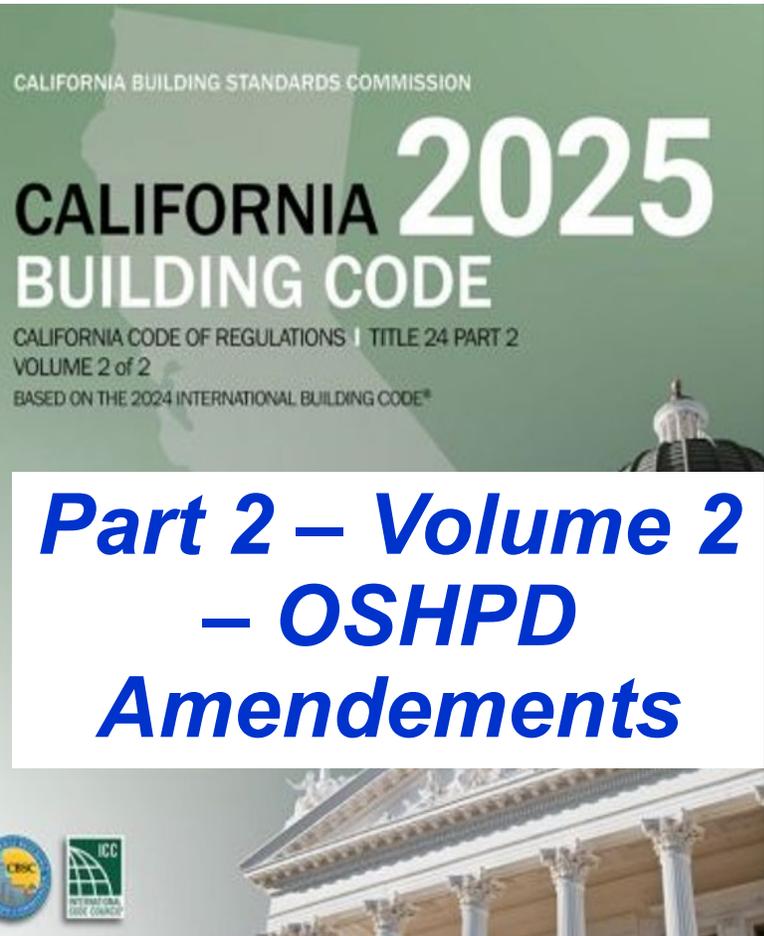
1710.3 Regulatory Compliance. *In addition to other applicable requirements in this code, off-site construction shall be inspected and regulated in accordance with ICC 1205, with texts modified by Sections 1710.3.1 through 1710.3.2.*

1710.3.1 ICC 1205 Section 302.1. *Modify ICC 1205 Section 302.1 by adding the following:*
Construction documents for plan approval shall satisfy all the requirements in the California Building Standards Code (CBSC).

1710.3.2 ICC 1205 Section 501.1. *Modify ICC 1205 Section 501.1 by adding the following:*
Testing, Inspection, and Observation (TIO) program shall satisfy all the requirements in the California Building Standards Code (CBSC).

...

Major Changes to Part 2 Volume 2



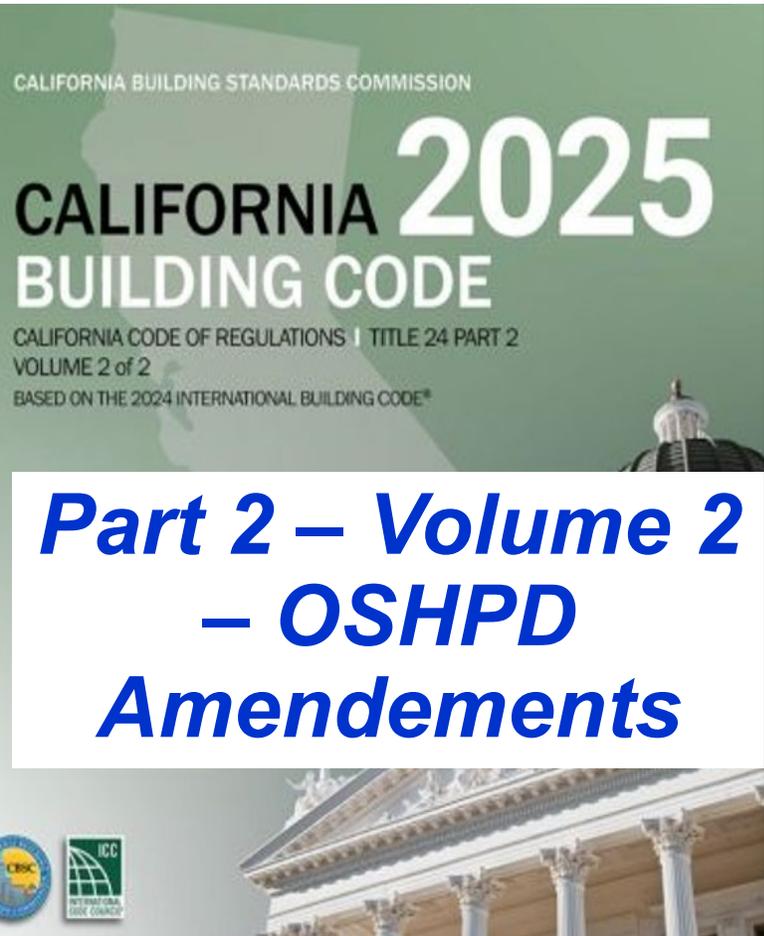
- Chapter 16/16A Structural Design
- Chapter 17/17A Special Inspections and Tests
- **Chapter 18/18A Soils and Foundations**
- Chapter 19/19A Concrete
- Chapter 20 Aluminum
- Chapter 21/21A Masonry
- Chapter 22A Steel

Chapter 18/18A SOILS AND FOUNDATION

Summary of Changes

- Deleted existing amendments adequately addressed in model code.
 - Freestanding cantilever retaining walls
- Deleted requirement for ground motions to correspond to NGA West 2 relations used for site specific ground motions.
- Name of the CGS Special Publication 42 is revised to new name for buildings in the fault rupture zone.
- Deleted reference to cyclic load testing of deep foundations.
- Updated section references and other editorial revisions.

Major Changes to Part 2 Volume 2



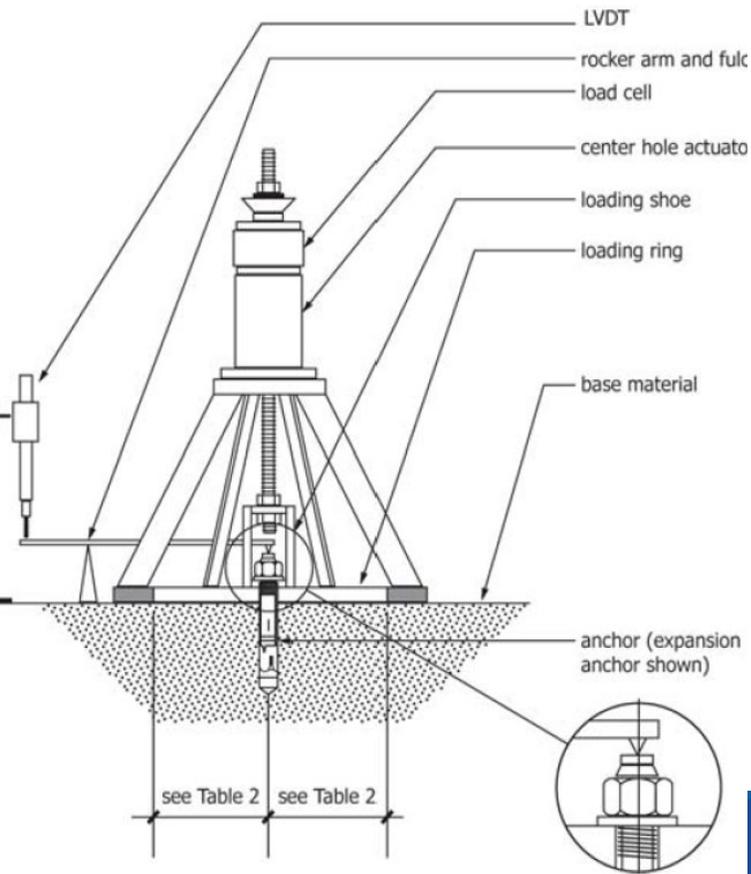
- Chapter 16/16A Structural Design
- Chapter 17/17A Special Inspections and Tests
- Chapter 18/18A Soils and Foundations
- **Chapter 19/19A Concrete**
- Chapter 20 Aluminum
- Chapter 21/21A Masonry
- Chapter 22A Steel

Chapter 19/19A CONCRETE

Summary of Changes

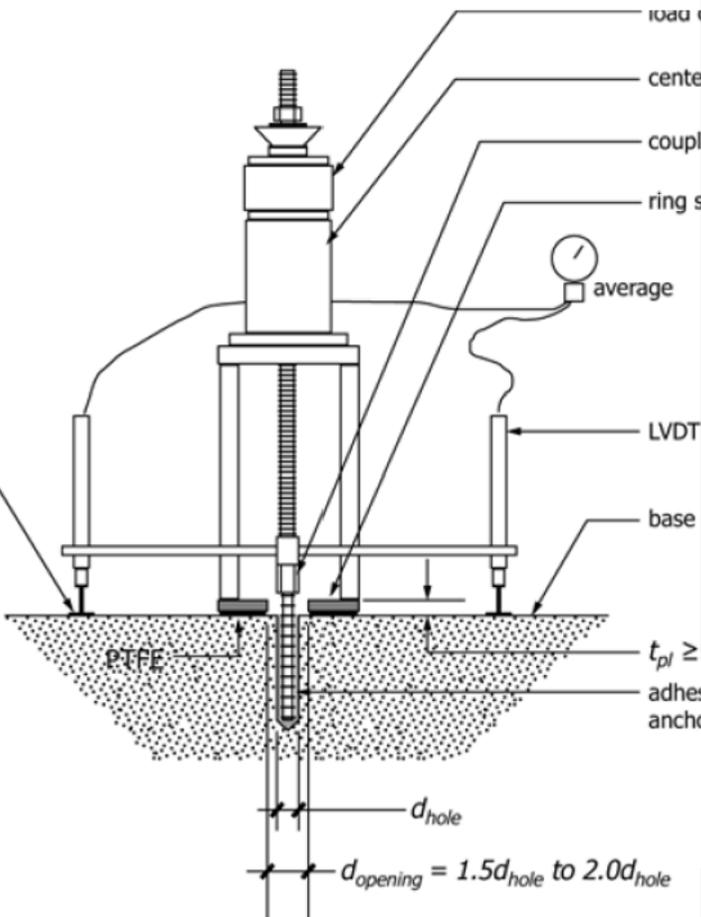
- Updated testing requirements for post installed anchors in concrete.
- Plain concrete not permitted by OSHPD.
- Deleted amendments adequately covered in model code/reference standard.
- Not permitting structural concrete with GFRP reinforcement.
- Deleted structural systems not permitted in ASCE 7.
- Updated section references and other editorial revisions.

Testing Post-Installed Anchor Bolts



- Completely reorganized for ease of use
- **Tension testing conducted in accordance with ASTM E3121:**
 - Unconfined condition tests are allowed for all anchors
 - Certain adhesive anchors may utilize confined condition tests
- **Anchors for Distributed Systems or Repetitively Used Architectural Components:**
 - **Testing frequency reduced from 50% to 20%**
 - Anchors with a diameter of $\frac{1}{4}$ inch or less will not require testing
- Mechanical and electrical components will still require 50% testing

Proof Testing Procedure



- Post-installed anchors shall be subjected to tension testing to ensure proper installation in accordance with ASTM E3121
 - Tension tests do not require displacement measurement unless indicated in the approved construction documents.

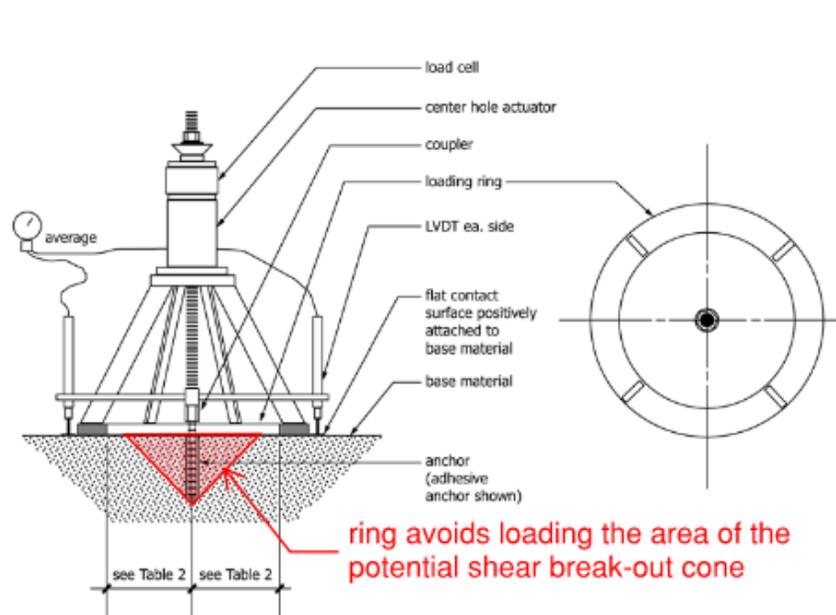
Exception: Torque-controlled post-installed anchors and screw-type anchors may be torque tested if they have a valid evaluation report.

1901.3.4.2 Proof testing procedure. [OSHPD 1R, 2 & 5] Post-installed anchors shall be tension tested in accordance with ASTM E3121 with test frequency and test loads in accordance with Sections 1901.3.4.3 and 1901.3.4.4, respectively. Proof tests using ASTM E3121 tension test procedure do not require displacement measurement.

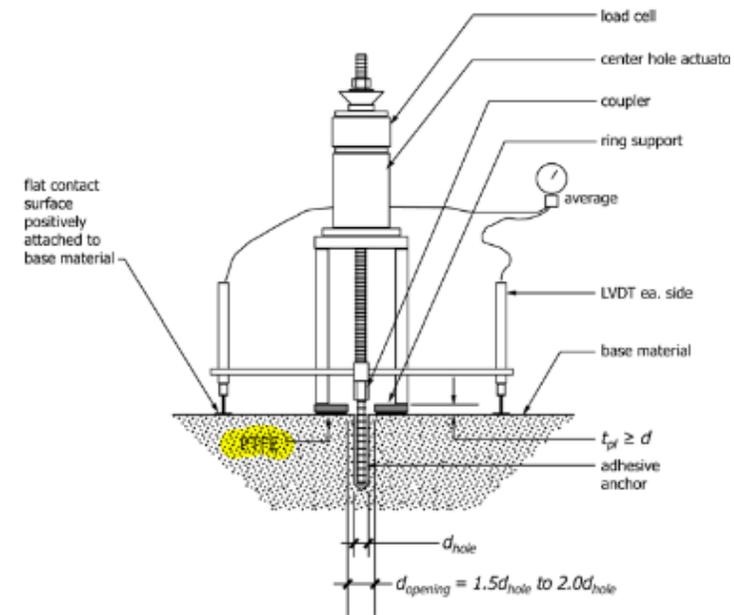
Exception: Torque-controlled post-installed and screw-type anchors shall be permitted to be tested using torque based on a valid evaluation report using criteria adopted in this code.

Adhesive and Screw Anchor Tests - Tension

- CBC 1910A.5.2: tension tests are in accordance with ASTM E3121, which explains unconfined vs. confined testing conditions.

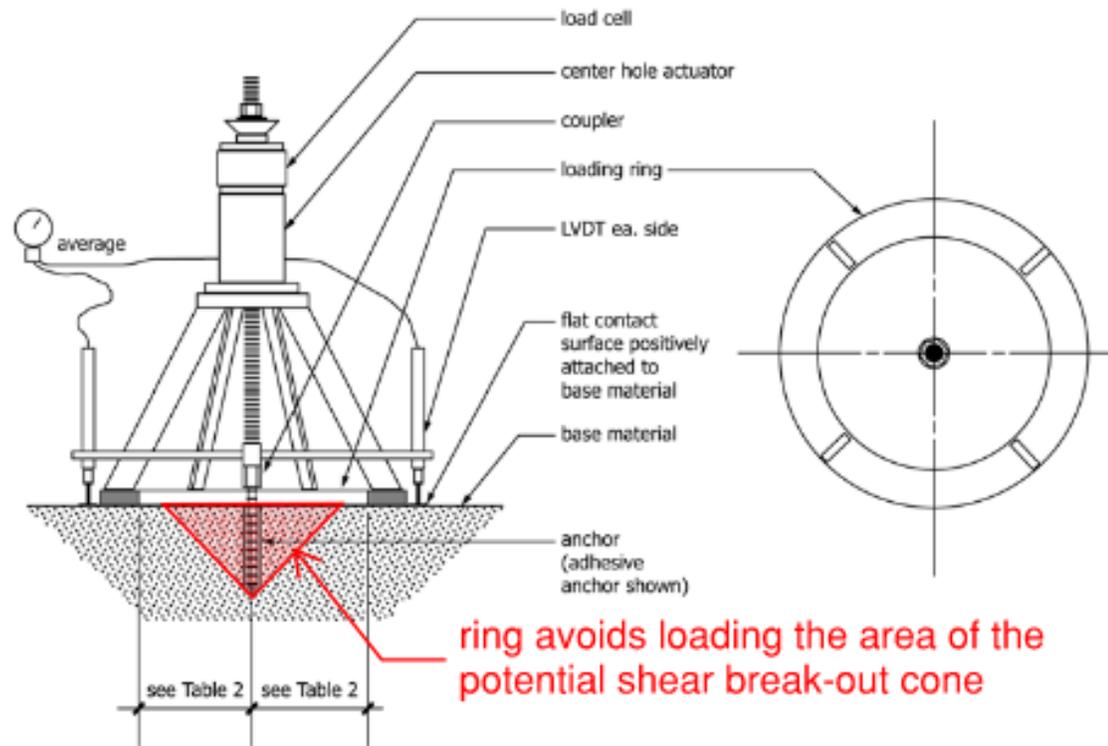


UNCONFINED



CONFINED

Adhesive and Screw Anchor Tests - Tension



UNCONFINED

- CBC 1910A.5.5 governs over ASTM E3121

1910A.5.5 Test acceptance criteria. Acceptance criteria for post-installed anchors shall be based on an approved evaluation report using criteria adopted in this code. Field tests shall satisfy the following minimum requirements.

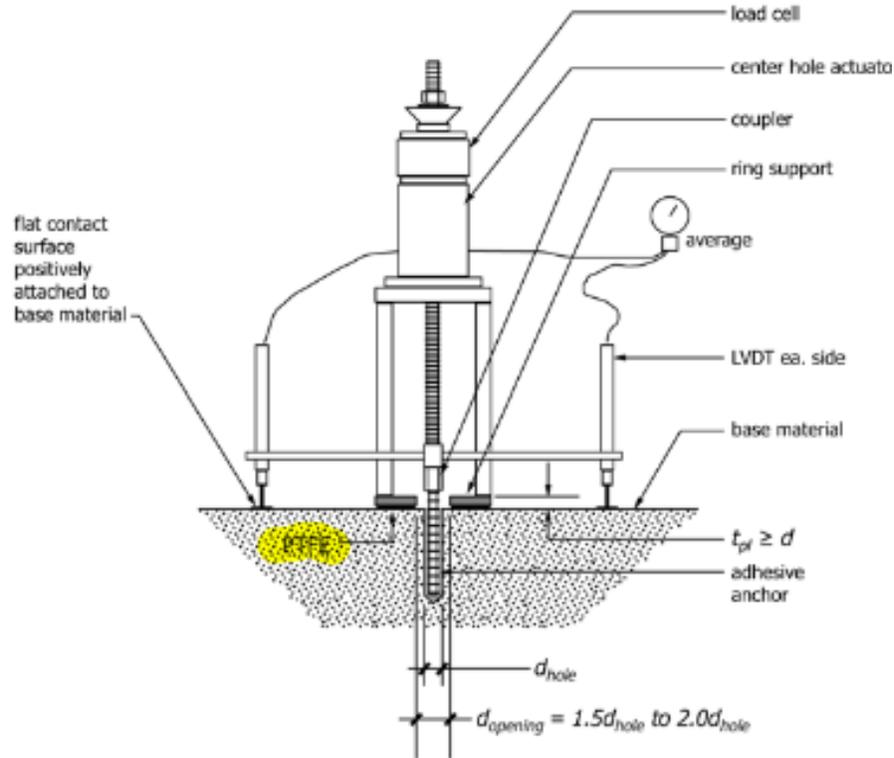
1. Hydraulic ram method:

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

The testing apparatus support locations shall not be 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.

Adhesive and Screw Anchor Tests - Tension



CONFINED

NOTE: ASTM E3121 specifies that, for confined tests, a sheet of TFE, PTFE, FEP, or PFA be placed between the loading plate and the surface of the member.

1910A.5.5 Test acceptance criteria. Acceptance criteria for post-installed anchors shall be based on an approved evaluation report using criteria adopted in this code. Field tests shall satisfy the following minimum requirements.

1. Hydraulic ram method:

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

The testing apparatus support locations shall not be 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.

Test Acceptance Criteria

- *Screw-type anchors tested with a calibrated torque wrench shall attain the specified torque within one-quarter (1/4) turn of the screw after initial seating of the screw head.*



1901.3.4.5 Test acceptance criteria. [OSHPD 1R, 2 & 5] Proof test shall satisfy the following minimum requirements.

1. **Tension test:** Anchors shall be tested in the unconfined condition in accordance with ASTM E3121 except that the minimum clearance to the test frame shall be 1.5 times the anchor's embedment depth. Test load shall be maintained for a
2. **Torque test:** Torque-controlled post-installed anchors tested with a calibrated torque wrench shall attain the specified torque within $1/2$ turn of the nut; or one-quarter ($1/4$) turn of the nut for a $3/8$ -inch sleeve anchor only.
Screw-type anchors tested with a calibrated torque wrench shall attain the specified torque within one-quarter ($1/4$) turn of the screw after initial seating of the screw head.

Post-Installed Anchor Tests - Undercut

- Undercut anchors that allow visual confirmation of full set require **NO** testing.

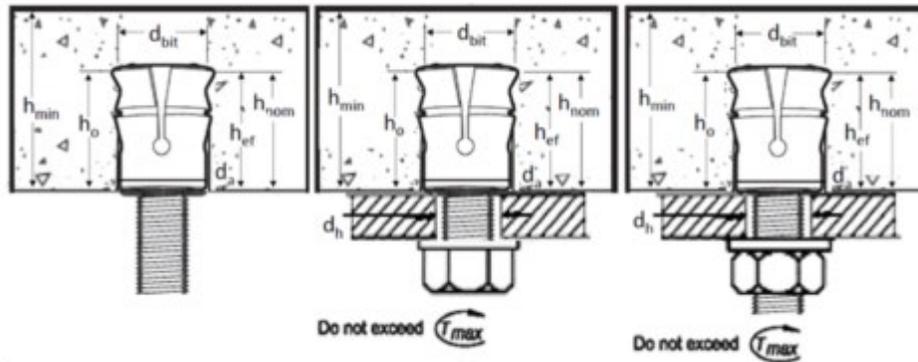


FIGURE 2—MINI-UNDERCUT+ ANCHOR INSTALLED WITH STEEL INSERT ELEMENT

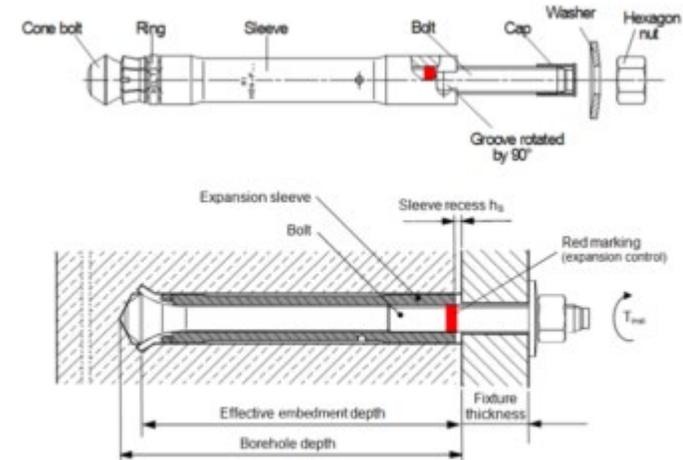


FIGURE 1—PRE-SETTING ANCHOR HDA-P AND HDA-PR (PRE-POSITIONING)

- But inspection during installation is still important (and required).
- Verify that the installer does not exceed the torque specified in the ICC-ESR. (This is also important for screw anchors.)

Chapter 19 CONCRETE



SECTION 1908 - SHOTCRETE

- *Shotcrete construction shall be in accordance with the requirements of ACI SPEC-506.2*

Chapter 19 CONCRETE

IN-LB Inch-Pound Units

An ACI Standard

Specification for Crack
Repair by Epoxy Injection

Reported by ACI Committee 548

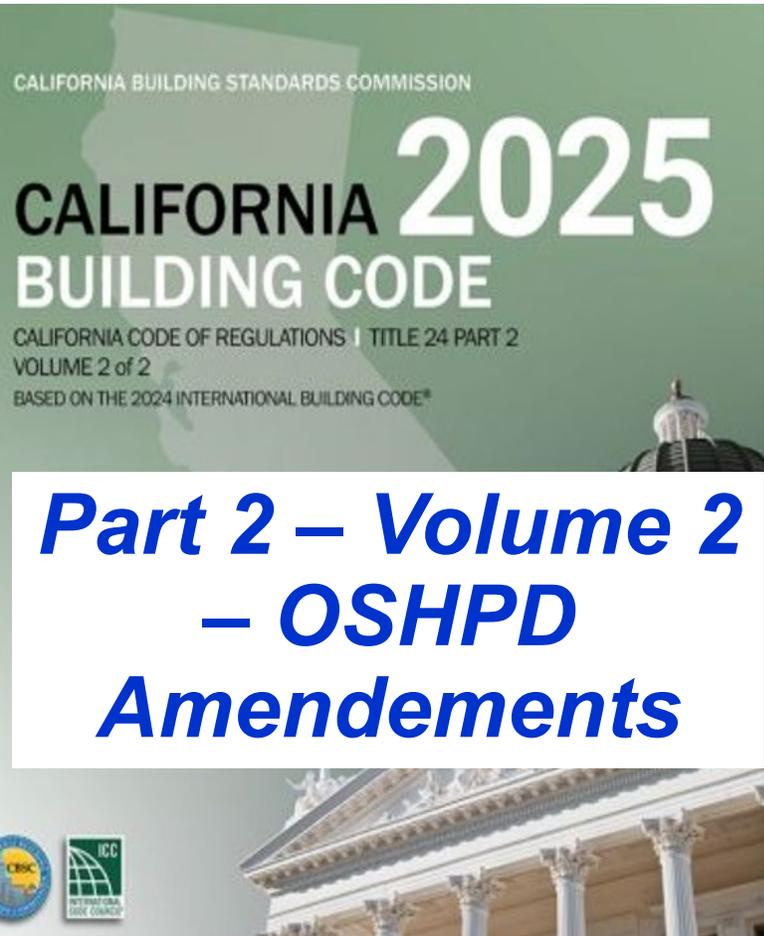
ACI 548.15-20



SECTION 1911 - EXISTING CONCRETE STRUCTURES [OSHPD 1R, 2 & 5]

- **1911.2 Crack repair by epoxy injection.** *Crack Repair of concrete and masonry member by epoxy injection shall conform to all requirements of ACI ~~503.7~~ [SPEC-548.15](#).*

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 20 Aluminum
- **Chapter 21/21A Masonry**
- Chapter 22A Steel

Chapter 21/21A Masonry

Summary of Changes

- Editorial and restructure revisions.
- Deleted/modified existing amendments where requirements are adequately addressed in TMS.
 - Maximum rebar diameter
 - Maximum percentage of flexural reinforcement.
- Deleted amendments specific to grouting.
 - *TMS 602, Article 3.2 F Cleanouts.*
 - *TMS 602, Article 3.5 C Grout pour height.*
 - *TMS 602, Article 3.5 D Grout lift height.*
- Revised minimum f'_m for design from 1500 psi to 2000 psi.

Chapter 21 MASONRY

SECTION 2103 - MASONRY CONSTRUCTION MATERIALS

2103.6 Specified compressive strength of masonry and grout. [OSHPD 1R, 2 & 5] Replace TMS 402 Table 4.3.1 by the following:

TABLE 4.3.1—SPECIFIED COMPRESSIVE STRENGTH REQUIREMENTS		
TYPE OF MASONRY	SPECIFIED COMPRESSIVE STRENGTH OF MASONRY	SPECIFIED COMPRESSIVE STRENGTH OF GROUT
Concrete masonry	$2,000 \text{ psi (13.79 MPa)} \leq f'_m \leq 3,000 \text{ psi (20.68 MPa)}$	$f'_g \geq f'_m \leq 5,000 \text{ psi (34.47 MPa)}$
Clay masonry	$1,500 \text{ psi (10.34 MPa)} \leq f'_m \leq 4,500 \text{ psi (31.02 MPa)}$	$f'_g \leq 6,000 \text{ (41.37 MPa)}$

Chapter 21 MASONRY

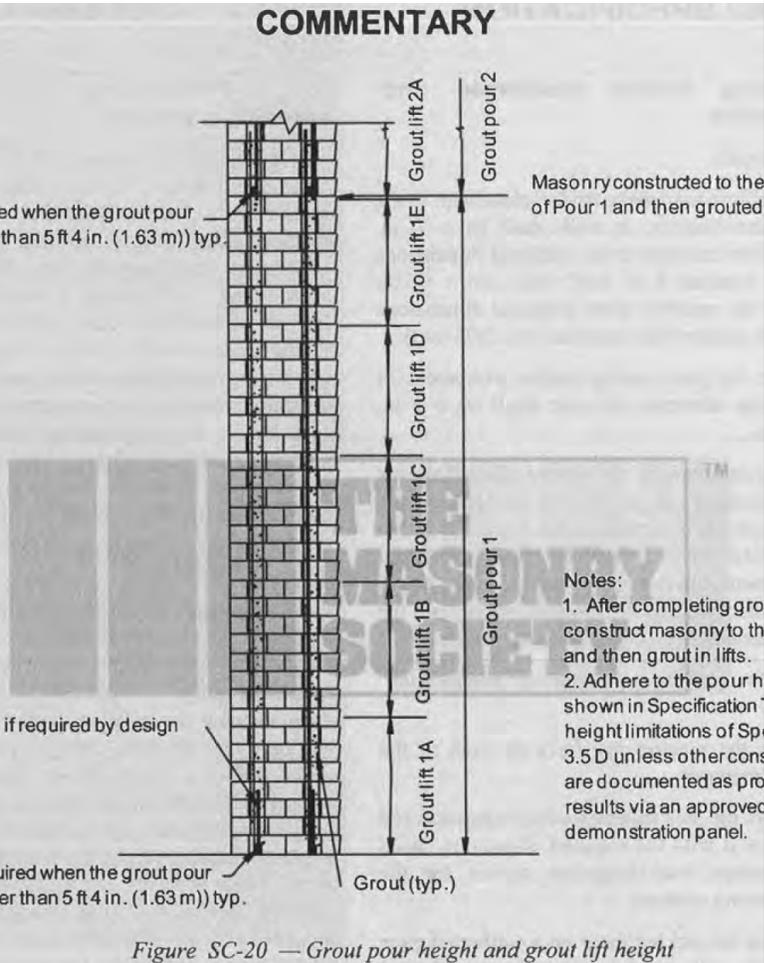


Figure SC-20 — Grout pour height and grout lift height

SECTION 2104—CONSTRUCTION

- Amendments related to grout lifts and pour heights in previous version of TMS, have been deleted.

Chapter 21 MASONRY

SECTION 2104—CONSTRUCTION

Table 7: Grout Space Requirements

Grout type ¹	Maximum grout pour height, ft (m)	Minimum clear width of grout space, ^{2,3} in. (mm)	Minimum clear grout space dimensions for grouting cells of hollow units, ^{3,4} in. x in. (mm x mm)
Fine	1 (0.30)	³ / ₄ (19.1)	1½ x 2 (38.1 x 50.8)
Fine	5.33 (1.63)	2 (50.8)	2 x 3 (50.8 x 76.2)
Fine	12.67 (3.86)	2½ (63.5)	2½ x 3 (63.5 x 76.2)
Fine	24 (7.32)	3 (76.2)	3 x 3 (76.2 x 76.2)
Coarse	1 (0.30)	1½ (38.1)	1½ x 3 (38.1 x 76.2)
Coarse	5.33 (1.63)	2 (50.8)	2½ x 3 (63.5 x 76.2)
Coarse	12.67 (3.86)	2½ (63.5)	3 x 3 (76.2 x 76.2)
Coarse	24 (7.32)	3 (76.2)	3 x 4 (76.2 x 102)

¹ Fine and coarse grouts are defined in ASTM C476.

² For grouting between masonry wythes.

³ Minimum clear width of grout space and minimum clear grout space dimension are the net dimension of the space determined by subtracting masonry protrusions and the diameters of horizontal reinforcement from the as-built cross section of the grout space. Select the grout type and maximum grout pour height based on the minimum clear space.

⁴ Minimum grout space dimension for AAC masonry units shall be 3 in. (76.2 mm) x 3 in. (76.2 mm) or a 3 in. (76.2 mm) diameter cell.

Type of Grouting*	Grouting with no cure time limit	Conventional grout with no intermediate bond beams	Conventional grout with intermediate bond beams	Self-consolidating grout with or without intermediate bond beams
TMS 602 Article	3.5 D.1.c 3.5 D.2.b	3.5 D.1.a	3.5 D.1.b	3.5 D.2.a
Lift Limit	5 ft-4 in.	12 ft-8 in.	See Limitation	Pour Height
Pour Height	Per Table 7	Per Table 7	Per Table 7	Per Table 7
Configuration				
Limitations	<ul style="list-style-type: none"> Grout slump between 8 and 11 inches Conventional grout or self-consolidating grout Lift height is 1-1/2 inches less than pour height for shear key, except at top of wall. 	<ul style="list-style-type: none"> Masonry cured for at least 4 hours Grout slump between 10 and 11 inches 	<ul style="list-style-type: none"> Masonry cured for at least 4 hours Grout slump between 10 and 11 inches Lift cannot exceed maximum 12 ft-8 in. Limit grout lift to the bottom of lowest bond beam that is more than 5 ft-4 in. above bottom of grout lift Lift height is 1-1/2 inches below the top of block for shear key, except at top of wall 	<ul style="list-style-type: none"> Masonry cured for at least 4 hours
Cleanouts Required	No	Yes	Yes	Yes

*Grout must conform to ASTM C476

Figure SC-20 — Grout Pour Height and Grout Lift Height

Chapter 21 MASONRY

SECTION 2104—CONSTRUCTION

Table 7: Grout Space Requirements

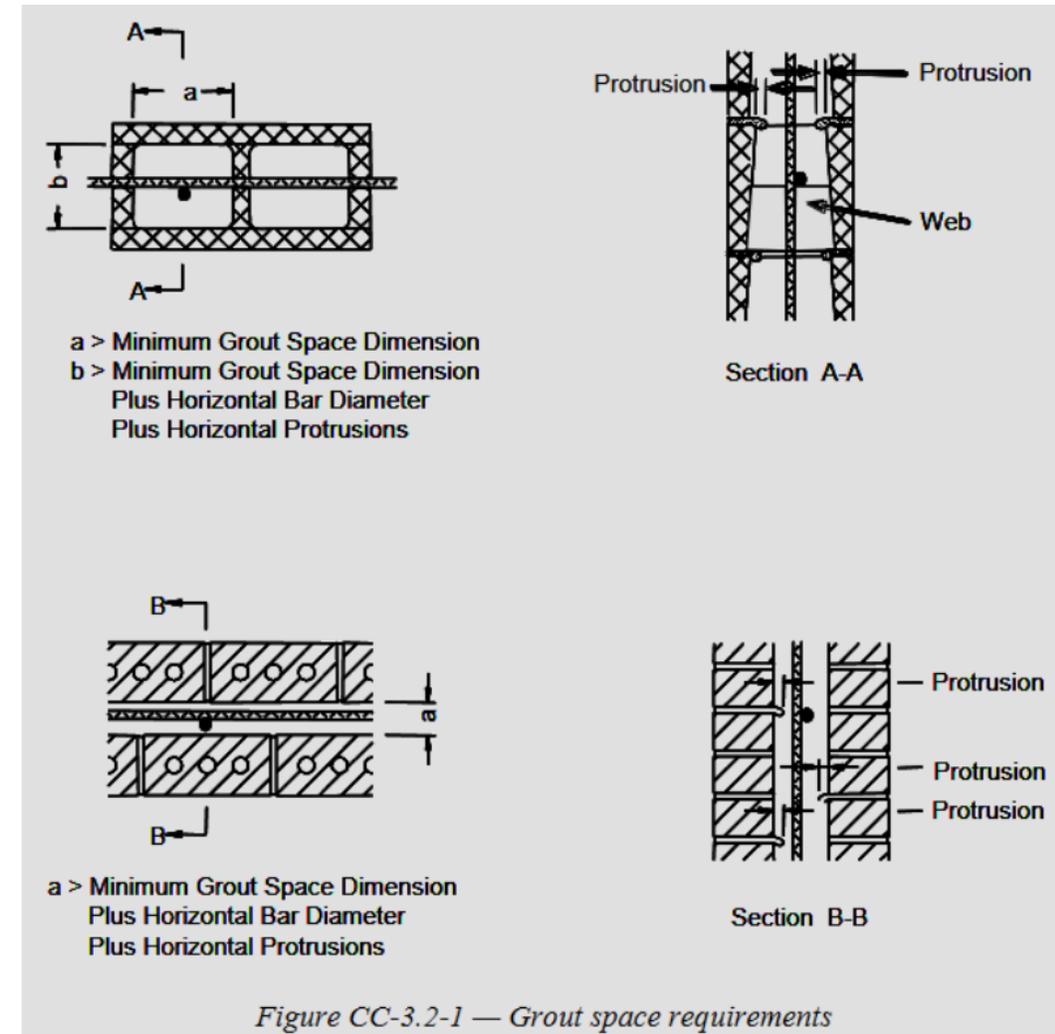
Grout type ¹	Maximum grout pour height, ft (m)	Minimum clear width of grout space, ^{2,3} in. (mm)	Minimum clear grout space dimensions for grouting cells of hollow units, ^{3,4} in. x in. (mm x mm)
Fine	1 (0.30)	$\frac{3}{4}$ (19.1)	$1\frac{1}{2} \times 2$ (38.1 x 50.8)
Fine	5.33 (1.63)	2 (50.8)	2×3 (50.8 x 76.2)
Fine	12.67 (3.86)	$2\frac{1}{2}$ (63.5)	$2\frac{1}{2} \times 3$ (63.5 x 76.2)
Fine	24 (7.32)	3 (76.2)	3×3 (76.2 x 76.2)
Coarse	1 (0.30)	$1\frac{1}{2}$ (38.1)	$1\frac{1}{2} \times 3$ (38.1 x 76.2)
Coarse	5.33 (1.63)	2 (50.8)	$2\frac{1}{2} \times 3$ (63.5 x 76.2)
Coarse	12.67 (3.86)	$2\frac{1}{2}$ (63.5)	3×3 (76.2 x 76.2)
Coarse	24 (7.32)	3 (76.2)	3×4 (76.2 x 102)

¹ Fine and coarse grouts are defined in ASTM C476.

² For grouting between masonry wythes.

³ Minimum clear width of grout space and minimum clear grout space dimension are the net dimension of the space determined by subtracting masonry protrusions and the diameters of horizontal reinforcement from the as-built cross section of the grout space. Select the grout type and maximum grout pour height based on the minimum clear space.

⁴ Minimum grout space dimension for AAC masonry units shall be 3 in. (76.2 mm) x 3 in. (76.2 mm) or a 3 in. (76.2 mm) diameter cell.

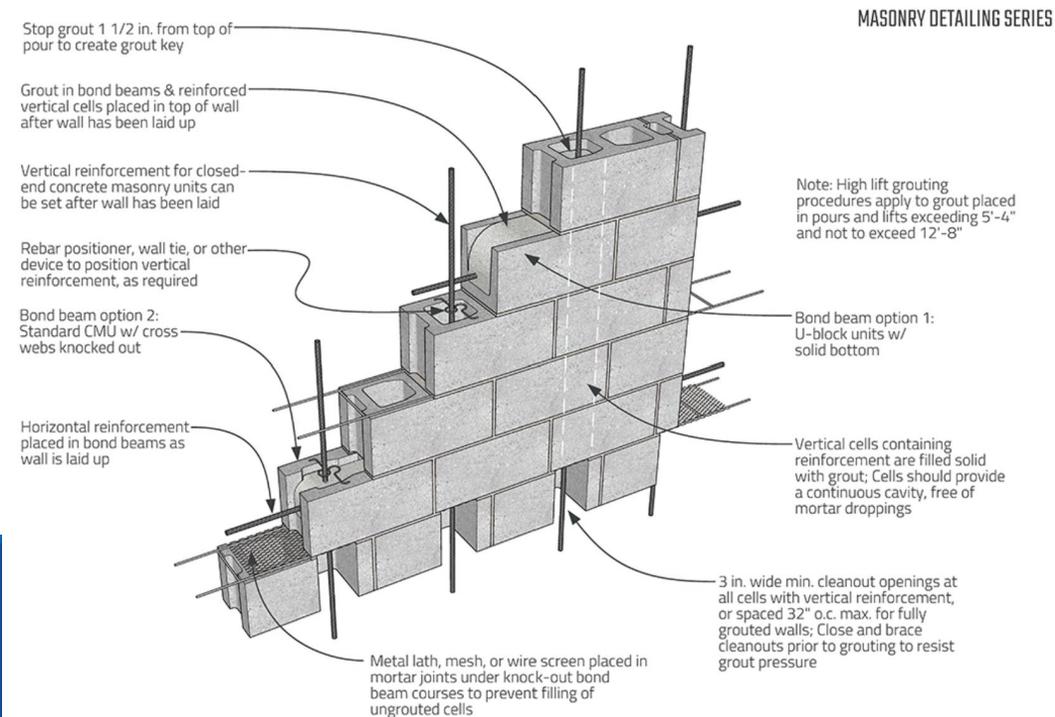


Chapter 21 MASONRY

SECTION 2104—CONSTRUCTION

2104.2.5 TMS 602, Article 3.5 F.1 Grout key. Replace TMS 602, Article 3.5 F.1 as follows:

1. Between grout pours or where grouting has been stopped more than an hour, a horizontal construction joint shall be formed by terminating grout a minimum of 1 ½ inches (38.1 mm) and a maximum of one-half the masonry unit height below a mortar joint, except at the top of the wall. Where bond beams occur, the grout pour shall be terminated a minimum of ½ inch (12.7 mm) below the mortar joint. Horizontal reinforcement shall be placed in bond beam units with a minimum grout cover of 1 inch (25.4 mm) above reinforcing steel for each grout pour.



Chapter 21 MASONRY

SECTION 2105 - QUALITY ASSURANCE

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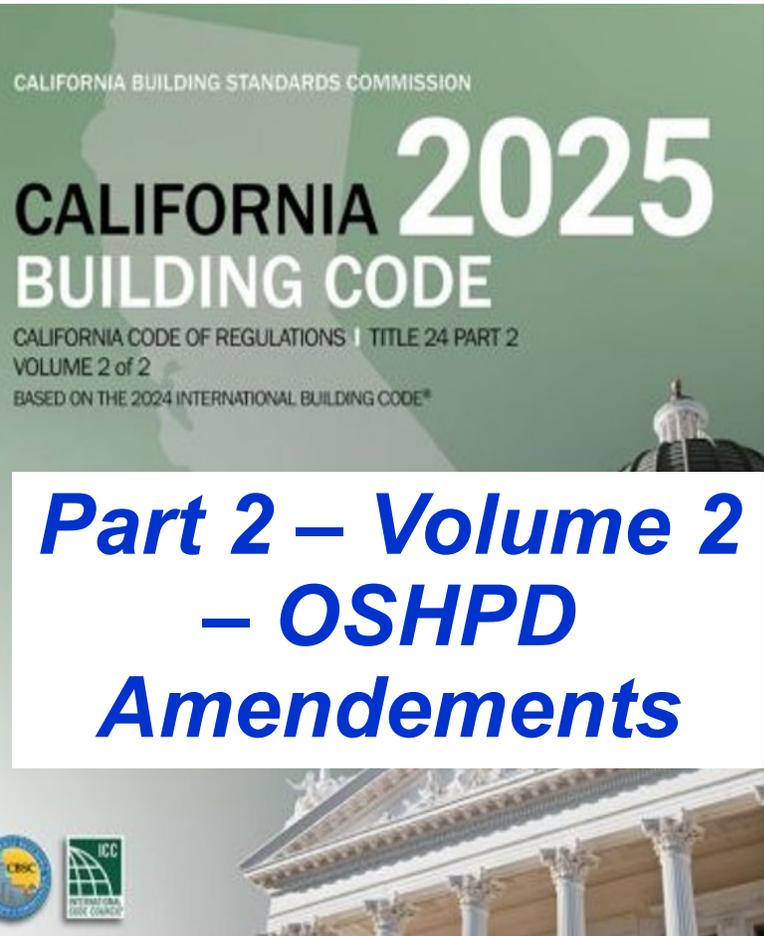
2105.3 Mortar and grout tests. TMS 602, Article 1.4 B Compressive Strength Determination. [OSHPD 1R, 2 & 5] Modify TMS 602, Article 1.4 B as follows by adding:

5. Additional testing requirements:

a. At the beginning of all masonry work, at least one test sample of the mortar shall be taken on 3 successive working days and at least at 1-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. [Mortar sampling and testing is not required for preblended mortars in conformance with ASTM C1714 with a material certificate.](#)

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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 20 Aluminum
- Chapter 21/21A Masonry
- **Chapter 22A Steel**

Chapter 22/22A Steel

Summary of Changes

- Added additional requirements for shear transfer at column base plates.
- Permit use of prequalified bolted moment connections.
- Nonlinear procedures for SidePlate bolted moment connections is not considered as an alternative system.
- Added additional amendments for Simpson Strong Tie moment connections.
- Added additional amendments for DuraFuse Frames moment connections.
- Seismic force-resisting systems and composite structural steel and concrete seismic force-resisting systems is considered as an Alternative System.
- Added model code changes to Chapter 22A.
- Editorial revisions.

Chapter 22 STEEL

SECTION 2202 - STRUCTURAL STEEL AND COMPOSITE STRUCTURAL STEEL AND CONCRETE

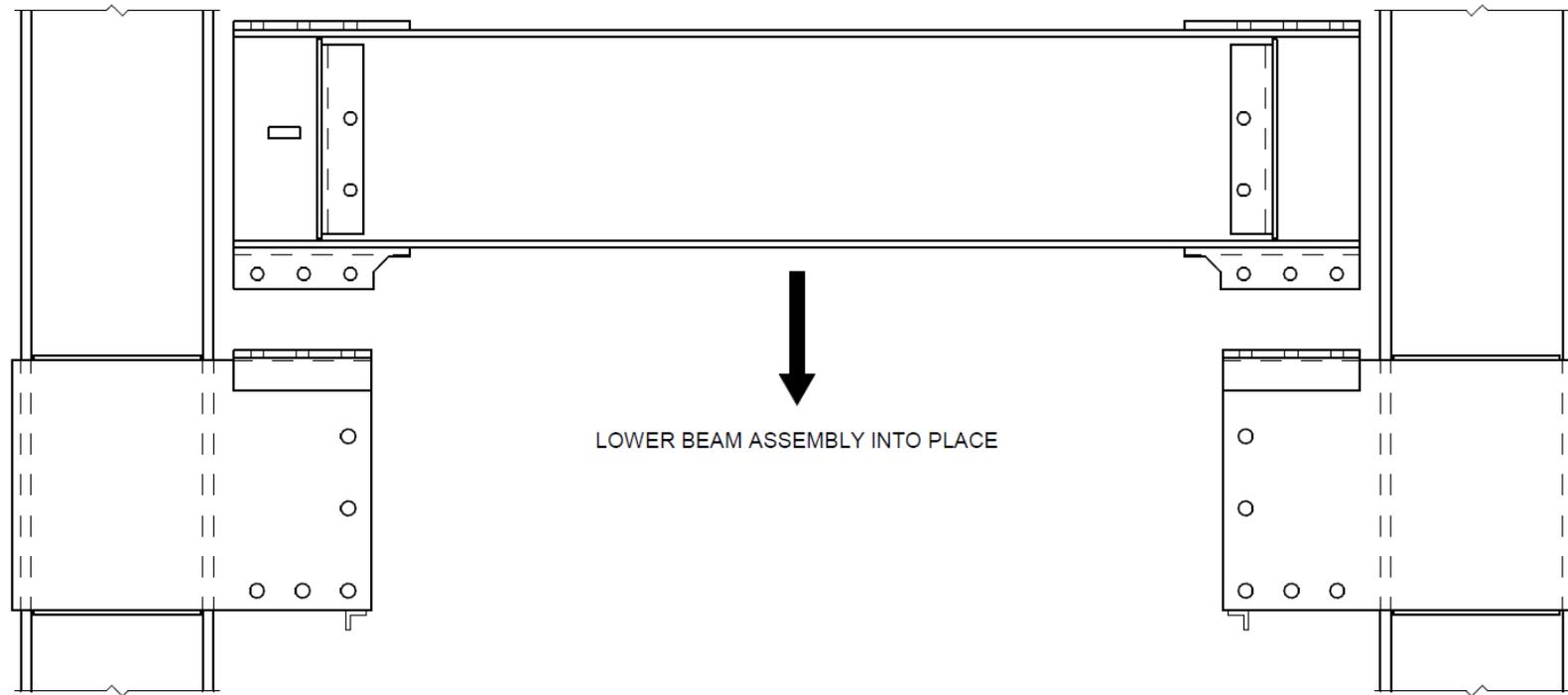
2202.2.2 Structural steel elements. The design, detailing, fabrication and erection of *structural steel elements* in *seismic force resisting systems* other than those covered in Section 2202.2.1, including struts, *collectors*, chords and foundation elements, shall be in accordance with AISC 341 where either of the following applies:

1. The *structure* is assigned to *Seismic Design Category* D, E or F, except as permitted in ASCE 7, Table 15.4-1.
2. A response modification coefficient, R, greater than 3 in accordance with ASCE 7, Table 12.2-1, is used for the design of the structure assigned to *Seismic Design Category* B or C.

[\[OSHPD 1R, 2 & 5\] All structural steel elements shall satisfy the requirements in AISC 341, when applicable.](#)

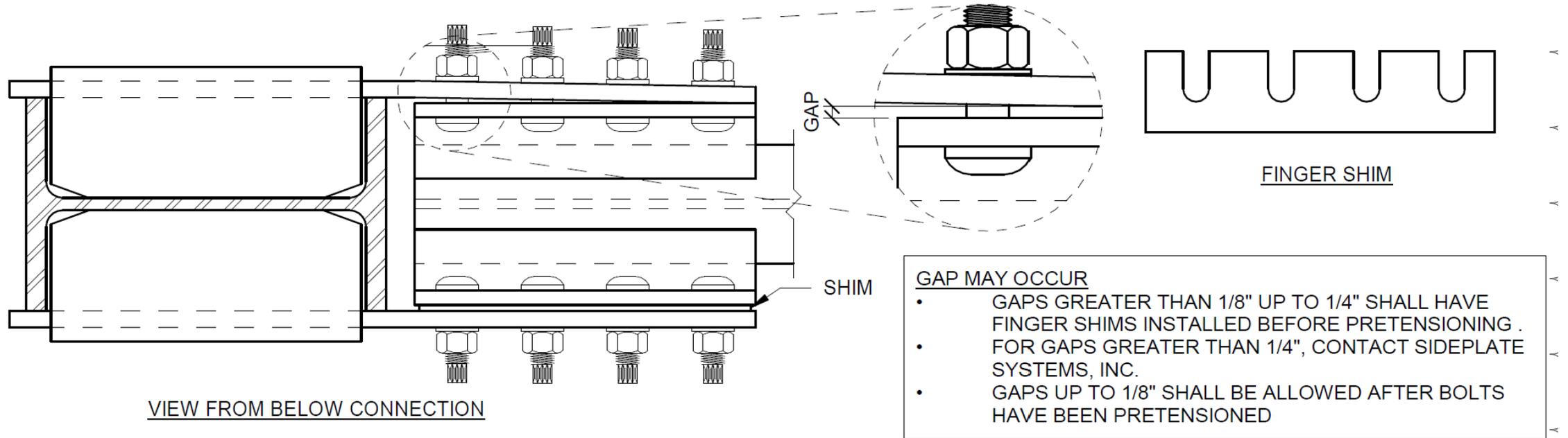
Chapter 22A – STEEL – SidePlate Bolted Connection

- **Section 2205A.5.3 Bolted Moment Connection - Chapter 11, Supplement No. 1 (AISC 358-16)**



GRAPHIC NO. 9 - FIELD ERECTION OF SIDEPLATE BEAM ASSEMBLY

Chapter 22A – STEEL – SidePlate Bolted Connection



GRAPHIC NO. 12 - SNUG TIGHT CONDITION PRIOR TO PRETENSIONING BOLTS

Chapter 22A – STEEL

Bolt Tests

2213A.1 Tests of high-strength bolts, nuts and washers. High-strength bolts, nuts and washers shall be sampled and tested in accordance with Section 1705A.2.6 [OSHPD 1 & 4] and this section.

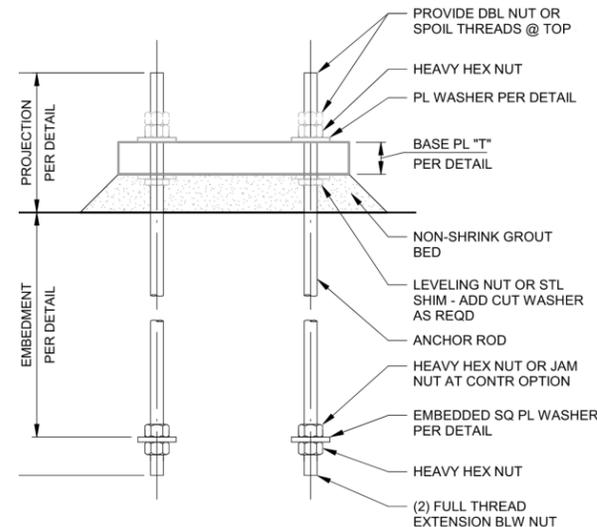
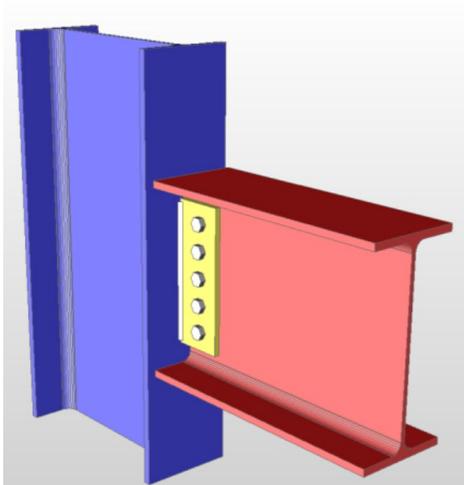
[OSHPD 1 and 4] A minimum of nine samples per lot, as defined in the ASTM standards for bolts [not nuts and washers], shall be tested for tensile properties in accordance with ASTM F606, but need not exceed three samples per 400 bolts.

Samples of high-strength bolts shall be taken and tested.

This is not the “Skidmore” test that verifies the tension produced in the “twist-off” type of bolt, but a tension test of the bolt to failure.

Includes:

- ASTM A325 and A490 bolts in steel connections between structural steel members
- Grade 105 anchor rods



Other Items to be aware of ...

Concrete mix designs – Are the appropriate ASTM standards being followed?

Structural Steel Welding – Are they being performed in accordance with the WPS?

Curtain Walls – Are the appropriate AAMA tests performed?

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