CHAPTER 22

STEEL

Adopt and/or codify chapter as amended below:

PROPOSED ADOPTION	DSA-SS	DSA-SS/CC	Comments
Adopt entire chapter without amendments			
Adopt entire chapter with amendments listed below	-	X	
Adopt only those sections listed below			
2201.1.1		X	
2201.1.2		X	
2201.1.3		X	
2201.1.4		X	
2212		X	
~~*2212.1*~~		~~X~~	
~~*2212.1.1*~~		~~X~~	
~~*2212.2*~~		~~X~~	
~~*2212.3*~~		~~X~~	
~~*2212.4*~~		~~X~~	
~~*2212.5*~~		~~X~~	
~~*2212.6*~~		~~X~~	

(All existing California amendments that are not revised below shall continue without change)

DRAFT INITIAL EXPRESS TERMS

SECTION 2201

GENERAL

2201.1 Scope. *The provisions of this chapter govern the quality, design, fabrication and erection of steel used structurally in buildings or structures.*

2201.1.1 Application. [DSA-SS/CC] *The scope of application of Chapter 22 is as follows:*

Community college buildings regulated by the Division of the State Architect-Structural Safety/Community Colleges (DSA-SS/CC), as listed in Section 1.9.2.2.

2201.1.2 Identification of amendments. [DSA-SS/CC]

Division of the State Architect-Structural Safety/Community Colleges amendments appear in this chapter preceded with the appropriate acronym, as follows:

***[DSA-SS/CC]** - For community college buildings listed in Section 1.9.2.2*

***2201.1.3 Reference to other chapters. [DSA-SS/CC]** Where reference within this chapter is made to sections in Chapter 17 the provisions in Chapter 17A, shall apply instead.*

***2201.1.4 Amendments. [DSA-SS/CC]** See Section 2212 for additional requirements.*

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SECTION 2212

ADDITIONAL REQUIREMENTS <u>FOR COMMUNITY COLLEGES</u> [DSA-SS/CC]

2212.1 Connections.

***2212.1.1 Column base plate.** When shear and/or tensile forces are intended to be transferred between column base plates and anchor bolts, provision shall be made in the design to eliminate the effects of oversized holes permitted in base plates by AISC 360 by use of shear lugs and/or welded shear transfer plates or other means acceptable to the enforcement agency, when the oversized holes are larger than the anchor bolt by more than 1/8 inch (3.2 mm). When welded shear transfer plates and shear lugs or other means acceptable to the enforcement agency are not used, the anchor bolts shall be checked for the induced bending stresses in combination with the shear stresses.*

2212.2 Modifications to AISC 341.

***<u>2212.2.1 Section A4.</u>** <u>Replace Section A4.1 item (3) as follows:</u>*

***<u>(3)</u>** <u>Locations and dimensions of protected zones, including provision by the owner or owner's' designated representative for construction to permanently mark and maintain the protection.</u>*

***<u>2212.2.2</u> ~~2212.2.1~~ Section D1.** Add Section D1.6 as follows:*

6. Diaphragm bracing systems. *The required strength of diagonal bracing members used as the diaphragm shall be determined from either of the following:*

(1) The load effect resulting from the diaphragm analysis per the applicable building code provided the members satisfy all of the following requirements:

1. Diagonal bracing members comply with Section D1.1 for moderately ductile members.

2. Each diagonal bracing member resists no more than 30 percent of the diaphragm shear at each line of resistance.

3. Diagonal bracing members shall not support gravity loads other than self-weight.

4. The slenderness ratio (KL/r) of diagonal bracing members shall not exceed 4$\sqrt{E/Fy}$, except tension-only bracing.

(2) The load effect required for collectors using the load combinations stipulated in the applicable building code.

2212.2.3 ~~***2212.2.2***~~ ***Section D2.*** *Modify Section D2.6c(b)(ii) as follows:*

(ii) the moment calculated using the load combinations of the applicable building code, including the amplified seismic load, provided the connection or other mechanism within the column base is designed to have the ductility necessary to accommodate the column base rotation resulting from the design story drift.

2212.2.4 ~~***2212.2.3***~~ ***Section D2****. Add Section D2.9 as follows:*

9. Diaphragm bracing systems. *The required strength of the connections of diagonal bracing members used as the diaphragm shall be the load effect required for collectors using the load combinations stipulated in the applicable building code.*

2212.2.5 ~~***2212.2.4***~~ ***Section F2.*** *Modify Section F2.3 Exception (2)(a) as follows:*

(a) The maximum of the forces determined using load combination stipulated by the applicable building code including the amplified seismic load, applied to the building frame model in which all compression braces have been removed and those determined with no compression braces removed per D1.4a(2).

2212.2.6 Section F1. *Add Section F1.4c as follows:*

***4c. Multi-tiered Braced Frames**: Braced-frames configured with two or more tiers of bracing between diaphragm levels or locations of out-of-plane support shall comply with the additional requirements of section F2.4e.*

***2212.2.7 ~~2212.2.5~~ Section F2.** Modify Section F2.4a by adding the following:*

Where each framing bay on a line of resistance does not have opposing diagonal braces within the same column bay, then the collector forces along that line shall be designed considering the redistribution of seismic forces to other bays as a result of the post buckled redistribution of loads using the analysis requirements of Section F2.3. The collector shall not be designed for a load less than that stipulated by the applicable building code:

The required strength of the collector need not exceed the forces determined using load combination stipulated by the applicable building code including the amplified seismic load, applied to the building model in which all compression braces have been removed.

***2212.2.8 Section F2.** Add Section F2.4e as follows:*

***4c. Multi-tiered Braced Frames**: Braced-frames configured with two or more tiers of bracing between diaphragm levels or locations of out-of-plane support shall comply with the additional requirements of this section:*

(1) Braces shall be used in symmetrical pairs at every tier level.

(2) Horizontal beams at intermediate tier levels for V- and inverted V-brace configurations shall have out-of-plane strength, stiffness, and beam-to-column connections adequate to resist torsional moments arising from brace buckling when braces are designed to buckle out-of-plane.

(3) Columns shall be restrained against rotation about their longitudinal axis at each intermediate tier level and shall resist out-of-plane bending moments due to second-order effects, geometric imperfections, and out-of-plane brace buckling.

***2212.3 Seismic requirements for composite structural steel and concrete construction.** In addition to the requirements of Section 2206.2, steel and concrete composite special moment frame with the approved moment connections in accordance with AISC 358 Chapter 10 shall be permitted provided:*

1. Beams are provided with reduced beam sections (RBS),

~~2. Columns shall be hollow structural sections (HSS) and completely filled with structural concrete having unit weight not less than 110 pounds per cubic foot (17 kN/ m3). Concrete shall have 28-day compressive strength not less than 4,000 psi (28 MPa).~~

2. ~~3.~~Web extension to beam web two sided fillet weld welds are sized to develop expected strength of the beam web and shall not be less than a ¼ inch fillet weld, and

~~4. The high strength bolt design shall consider interaction between shear and tension as required by AISC 360, and~~

3. ~~5.~~ The built-up box column wall thickness shall not be less than 1.25" and ~~T~~ the HSS column wall thickness shall not be less than 1/2 inch.

2212.4 Steel joists.

2212.4.1 Design approval. *Joist and joist girder design calculations and profiles with member sizes and connection details, and joist placement plans shall be provided to the enforcement agency and approved prior to joist fabrication, in accordance with Title 24, Part 1. Joist and joist girder design calculations and profiles with member sizes and connection details shall bear the signature and stamp or seal of the registered engineer or licensed architect responsible for the joist design. Alterations to the approved joist and joist girder design calculations and profiles with member sizes and connection details, or to fabricated joists are subject to the approval of the enforcement agency.*

2212.4.2 Joist chord bracing. *The chords of all joists shall be laterally supported at all points where the chords change direction.*

2212.5 Cold-formed steel light-frame construction.

2212.5.1 Trusses.

2212.5.1.1 Analysis submittals. *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.*

2212.5.1.2 Deferred submittals*. AISI S214 Section B4.2 shall not be deleted.*

2212.5.2 Anchorage for shear. *Cold formed steel stud foundation plates or sills shall be bolted or fastened to the foundation or foundation wall in accordance with Section 2304.3.4, Item 2.*

2212.5.3 Limitations on shear wall assemblies. *Shear wall assemblies in accordance with ~~per~~ Section C2.2.3 of AISI- S213 are not permitted within the seismic force-resisting system of buildings or structures assigned to Occupancy Category II, III, IV., or buildings designed to be relocatable.*

2212.6 Testing.

2212.6.1 Tests of high-strength bolts, nuts and washers. *High-strength bolts, nuts and washers shall be sampled and tested by an approved independent testing laboratory for conformance with the requirements of Section 2205.*

2212.6.2 Tests of end-welded studs. *End-welded studs shall be sampled and tested in accordance with ~~per~~ the requirements of the AWS D1.1.*