REPORT TO COUNCIL
City of Sacramento

915 I Street, Sacramento, CA 95814-2604
www. CityofSacramento.org

CONSENT
June 26, 2007

Honorable Mayor and
Members of the City Council

Title: Addition to the Sacramento City Code relating to Building Standards for Structural Design Requirements

Location/Council District: Citywide

Recommendation: Adopt an **Ordinance** adding Section 15.20.040 to the Sacramento City Code to make local amendments to the 2001 California Building Code to update structural design requirements.

Contact: Robert Lee Chase, AIA, Chief Building Official (916) 808-8024; Carl Hefner, Deputy Chief Building Official, (916) 808-8779

Presenters: Not applicable

Department: Development Services

Division: Building

Organization No: 4881

Description/Analysis

Issue: The Building Standards Commission (BSC) is responsible for the adoption of the model codes and standards used throughout the State of California to govern the construction of building in all jurisdictions, including the City of Sacramento. In August 2003, the BSC adopted amendments to the 2001 California Building Standards Code concerning structural design standards. The adopted standards were deemed critical by the BSC to align with currently accepted nationally recognized standards and engineering principles, which were considered lacking in the California Building Code.

In Building Standards Bulletin 01-03, the BSC specifically stated that the new standards will serve as a template for local municipalities to adopt as local modifications to the California Building Standards Code, thus providing for a uniform level of public safety throughout California. The amendment of the 2001

edition of the California Building Standards Code to provide modified standards for building safety is necessary to serve the public interest by reducing the risk to life and property of citizens of the City of Sacramento. The City is authorized to make the local modifications to the Building Standards Code pursuant to California Health and Safety Code Sections 17958.5 and 17958.7.

Policy Considerations: The proposed Code addition would provide the City with enhanced structural design standards leading to safer structures and public safety in general. Failure to adopt the proposed design standards could lead to adverse insurances ratings for the public, businesses, and government.

Committee/Commission Action: Normally, this addition to the Sacramento City Code would have been sent to the Law and Legislation Committee for review. However, it was deemed time sensitive, but non-controversial, and the Law and Legislation Committee, by a majority vote on June 5th, 2007, allowed staff to proceed with bringing the proposed addition directly to Council.

Environmental Considerations: The proposed ordinance is exempt from the provisions of the California Environmental Quality Act (Section 15061(b)(3)).

Rationale for Recommendation: Adoption of the proposed Code is consistent with the proposed 2007 California Building Standards Code scheduled to be published by the State of California on or about July 1, 2007 to become effective on or about January 1, 2008. By taking this action now, the City is moving in a proactive manner to transition to the new Codes.

Financial Considerations: None

Emerging Small Business Development (ESBD): No goods or services are being purchased under this report.

Respectfully Submitted by: _____
Robert Lee Chase, AIA
Chief Building Official

Approved by: _____
William Thomas
Director of Development Services

Recommendation Approved:

Ray Kerridge
City Manager

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Attachment 1

ORDINANCE NO.

Adopted by the Sacramento City Council

ADDITION TO THE SACRAMENTO CITY CODE RELATING TO BUILDING STANDARDS FOR STRUCTURAL DESIGN REQUIRMENTS

BE IT ENACTED BY THE COUNCIL OF THE CITY OF SACRAMENTO:

SECTION 1. Section 15.20.040 is added to the Sacramento City Code read as follows:

A. Findings.

1. The Building Standards Commission (BSC) is responsible for the adoption of the model codes and standards used throughout the State of California to govern the construction of building in all jurisdictions, including the City of Sacramento.

2. The BSC has specific authority to regulate state buildings, buildings constructed by the Trustees of the California State University, and those constructed by the Regents of the University of California. In August 2003, the BSC adopted Building Standards Bulletin 01-03 to update the structural standards in the previously adopted 2001 California Building Standards Code. The Standards in the bulletin were deemed critical by the BSC to align with currently accepted nationally recognized standards and engineering principles, which were considered lacking in the California Building Code.

3. The BSC specifically stated in the cover letter for the adoption of its bulletin that the Standards will serve as a template for local municipalities to adopt as local modifications to the California Building Standards Code, thus providing for a uniform level of public safety throughout California.

4. The amendment of the 2001 edition of the California Building Standards Code to provide modified standards for building safety is necessary to serve the public interest by reducing the risk to life and property of citizens of the City of Sacramento because of the following geological reason:

The City of Sacramento and surrounding area is subject to ground tremors for seismic events. This area is in seismic Zone 3. Flooding has occurred in the portions of the City that lie adjacent to Sacramento's numerous rivers and streams. Many areas of the development have the potential for seismic damage and/or flooding.

B. Additional Definitions.

Section 213 of the California Building Code is amended to include the following

definition:

"Light-Frame Construction" means any type of construction whose vertical and horizontal structural elements are primarily frame by a system of repetitive wood or light gauge steel framing members, and which does not use structural concrete as floor or roof diagram.

C. Structural Design Requirements.

1. Section 1612.3.2 of the California Building Code is amended to read as follows:

Alternate basic load combinations. In lieu of the basic load combinations specified in Section 1612.3.1, structures and portions thereof shall be permitted to be designed for the most critical effects resulting from the following load combinations. When using these alternate basic load combinations, a one-third increase shall be permitted in allowable stresses for all combinations including W or E but not concurrent with the duration of load increase permitted in Division III of Chapter 23.

D + L + (L or S)	(12-12)
D + L + (W or E/1.4)	(12-13)
D + L + W + S/2	(12-14)
D + L + S + W/2	(12-15)
D + L + S + E/1.4	(12-16)
0.9D ± E/1.4	(12-16-1)

Exceptions:

1. Crane hook loads need not be combined with roof live load or with more than three fourths of the snow load or one half of the wind load.
2. Design snow loads of 30 psf (1.44 kN/m²) or less need not be combined with seismic loads. Where design snow loads exceed 30 psf (1.44 kN/m²), the design snow load shall be included with seismic loads, but may be reduced up to 75 percent where consideration of siting, configuration and load duration warrant when approved by the Building Official.

2. Section 1630 of the California Building Code is amended by adding the following and renumbering Section 1630.2.3.4 as Section 1630.2.3.5:

Horizontal Distribution. Diaphragms constructed of untopped steel decking or wood structural panels or similar light-frame construction are permitted to be considered as flexible.

3. Section 1630.4.2 of the California Building Code is amended to read as follows:

Vertical Combinations. The value of R used in the design of any story shall be less

than or equal to the value of R used in the given direction for the story above.

Exception: This requirement need not be applied to a story where the dead weight above that story is less than 10 percent of the total dead weight of the structure.

Structures may be designed using the procedures of this section under the following conditions:

1. The entire structure is designed using the lowest R of the lateral-force-resisting systems used, or
2. The following two-stage static analysis procedures may be used for structures conforming to Section 1629.8.3, Item 4.
   - 2.1 The flexible upper portion shall be designed as a separate structure, supported laterally by the rigid lower portion, using the appropriate values of R and ρ.
   - 2.2 The rigid lower portion shall be designed as a separate structure using the appropriate values of R and ρ. The reactions from the upper portion shall be those determined from the analysis of the upper portion multiplied by the ratio of the (R/ ρ) of the upper portion over (R/ ρ) of the lower portion. This ratio shall not be taken less than 1.0.

4. Section 1630.8.2.1 of the California Building Code is amended to read as follows:

General. Where any portion of the lateral-load-resisting system is discontinuous, such as for vertical irregularity Type 4 in Table 16-L or plan irregularity Type 4 in Table 16-M, concrete, masonry, steel and wood elements (i.e. columns, beams, trusses or slabs) supporting such discontinuous systems shall have the design strength to resist the combination loads resulting from the special seismic load combinations of Section 1612.4. The Connections of such discontinued elements to the supporting members shall be adequate to transmit the forces for which the discontinuous elements were required to be designed.

Exceptions:

1. The quantity E_m in Section 1612.4 need not exceed the maximum force that can be transferred to the element by the lateral-force-resisting system.
2. Concrete slabs supporting light-frame wood shear wall systems or light-frame steel and wood structural panel shear wall systems.

For Allowable Stress Design, the design strength may be determined using an allowable stress increase of 1.7 and resistance factor, Φ, or 1.0. This increase shall not be combined with the one-third stress increase permitted by Section 1612.3, but may be combined with the duration of load increase permitted in Chapter 23, Division III.

5. Section 1630.8.2.2 of the California Building Code is amended to read as

follows:

Detailing requirements in Seismic Zones 3 and 4. In Seismic Zones 3 and 4, elements supporting discontinuous systems shall meet the following detailing or member limitations:

1. Reinforced concrete or reinforced masonry elements designed primarily as axial-load members shall comply with Section 1921.4.4.5
2. Reinforced concrete elements designed primarily as flexural members and supporting other than light-frame wood shear wall systems or light-frame steel and wood structural panel shear wall systems shall comply with Sections 1921.3.2 and 1921.3.3. Strength computations for portions of slabs designed as supporting elements shall include only those portions of the slab that comply with the requirements of these Sections.
3. Masonry elements designed primarily as axial-load carrying members shall comply with Sections 2106.1.12.4, Item 1, and 2108.2.6.2.6.
4. Masonry elements designed primarily as flexural members shall comply with Section 2108.2.6.2.5.
5. Steel elements designed primarily as flexural members or trusses shall have bracing for both top and bottom beam flanges or chords at the location of the support of the discontinuous system and shall comply with the requirements of AISC-Seismic Part 1, Section 9.4b.
6. Wood elements designed primarily as flexural members shall be provided with later bracing or solid blocking at each end of the element and at the connection location(s) of the discontinuous systems.

Table 16-N of the California Building Code is herby amended to read as follows:

TABLE 16-N – Structural Systems[1]

BASIC STRUCTURAL SYSTEM[2]	LATERAL-FORCE-RESISTING SYSTEM DESCRIPTION	R	Ω_0	HEIGHT LIMIT FOR SEISMIC ZONES 3 AND 4 (feet)
				x 304.8 for mm
1. Bearing wall system	1. Light-framed walls with shear panels			
	a. Wood structural panel walls for structures three stories or less	5.5	2.8	65
	b. All other light-framed walls	4.5	2.8	65
	2. Shear walls			

	a. Concrete	4.5	2.8	160
	b. Masonry	4.5	2.8	160
	3. Light steel-framed bearing walls with tension-only bracing	2.8	2.2	65
	4. Braced frames where bracing carries gravity load			
	a. Steel	4.4	2.2	160
	b. Concrete[3]	2.8	2.2	-
	c. Heavy timber	2.8	2.2	65
2. Building frame system	1. Steel eccentrically braced frame (EBF)	7.0	2.8	240
	2. Light-framed walls with shear panels			
	a. Wood structural panel walls for structures three stories or less	6.5	2.8	65
	b. All other light-framed walls	5.0	2.8	65
	3. Shear wall			
	a. Concrete	5.5	2.8	240
	b. Masonry	5.5	2.8	160
	4. Ordinary braced frames			
	a. Steel[6]	5	2	35[6]
	b. Concrete[3] (not permitted)	--	--	-
	c. Heavy timber	5.6	2.2	65
	5. Special concentrically braced frames			
	a. Steel	6.4	2.2	240
3. Moment-resisting frame system	1. Special moment-resisting frame (SMRF)			
	a. Steel	8.5	2.8	N.L.
	b. Concrete[4]	8.5	2.8	N.L.
	2. Masonry moment-resisting wall frame (MMRWF)	6.5	2.8	160
	3. Intermediate moment-resisting frame (IMRF)			
	a. Steel[6]	4.5	2.8	35[6]
	b. Concrete[5]	5.5	2.8	--
	4. Ordinary moment-resisting frame			-

	(OMRF)			
	a. Steel[6]	3.5	2.8	35[6]
	b. Concrete[8]	3.5	2.8	--
	5. Special truss moment frames of steel (STMF)	6.5	2.8	240
4. Dual systems	1. Shear walls			
	a. Concrete with SMRF	8.5	2.8	N.L.
	b. Concrete with steel OMRF (Not Permitted)	--	--	--
	c. Concrete with concrete IMRF[5]	6.5	2.8	160
	d. Masonry with SMRF	5.5	2.8	160
	e. Masonry with steel OMRF (Not Permitted)	--	--	--
	f. Masonry with concrete IMRF[3]	--	--	-
	g. Masonry with masonry MRWF	6.0	2.8	160
	2. Steel EBF			
	a. With steel SMRF	8.5	2.8	N.L.
	b. With steel OMRF (Not Permitted)	--	--	--
	3. Ordinary braced frames (Not Permitted)			
	b. Steel with steel OMRF (Not Permitted)	4.2	2.8	160
	5. Steel SMRF (Not Permitted)	--	--	--
5. Cantilevered column building systems	1. Cantilevered column elements	2.2	2	35[7]
6. Shear wall-frame interaction systems	1. Concrete[8]	5.5	2.8	160
7. Undefined systems	See Section 1629.37 and 1629.9.2	-	-	

N.L. - no limit
1 See Section 1630.4 for combination of structural systems.
2 Basic structural systems are defined in Section 1629.6.
3 Prohibited in Seismic Zones 3 and 4.
4 Includes precast concrete conforming to Section 1921.2.7.
5 Prohibited in Seismic Zones 3 and 4, except as permitted in Section 1634.2.
6. In Seismic Zones 3 and 4 steel IMRF, OMRF and Ordinary Braced Frames are permitted as follows:
a. Steel IMRF and OMRF are permitted, provided the dead load of the floors, walls or roof does not exceed 35 psf respectively and 35 ft or less in height. Steel IMRF and

OMRF are permitted for single-story buildings 60 ft or less in height where the moment joints of field connections are constructed of bolted end plates, provided the dead load of the walls or roof does not exceed 15 psf respectively.
b. Steel Ordinary Braced Frames are permitted for single-story buildings 60 ft or less in height, provided the dead load of the roof does not exceed 15 psf.
7. Total height of the building including cantilevered columns.
8. Prohibited in Seismic Zones 2A, 2B, 3 and 4. See Section 1633.2.7.

D. Structural Tests and Inspections.

1. Section 1701.5.5.2 of the California Building Code is amended by adding the following thereto:

Lateral force resisting steel frames. During the welding of lateral force resisting steel frames. In addition to Item 5.1 requirements, nondestructive testing as required by Section 1703 of this code.

2. Section 1702 of the California Building Code is amended to read as follow:

Structural observation shall be provided in Seismic Zone 3 or 4 when one of the following conditions exists:

1. The structure is defined in table 16-K as Occupancy Category I. II or III.
2. The Structure is required to comply with Section 403.
3. The structure is in Seismic Zone 4 and a lateral design is required for the entire structure.

Exception: One and two-story wood framed Group R, Division 3, B, F, M and S Occupancies provided the adjacent grade is not steeper than 1 unit vertical in 10 units horizontal (10% sloped)

4. When so designated by the architect or engineer of record, or
5. When such observation is specifically required by the Building Official.

The owner shall employ the engineer or architect responsible for the structural design, or another engineer or architect designated by the engineer or architect responsible for the structural design to perform structural observation as defined in Section 220.

The owner or owner's representative shall coordinate and call a pre-construction meeting between the engineer or architect responsible for the structural design, structural observer, contractor, affected subcontractors and deputy inspectors. The structural observer shall preside over the meeting. The purpose of the meeting shall be to identify the major structural elements and connections that affect the vertical and lateral load systems of the structure and to review scheduling of the required observations. A record of the meeting shall be included in the first report submitted to the Building Official.

Observed deficiencies shall be reported in writing to the owner's representative, special inspector, contractor and Building Official. Upon the form prescribed by the Building Official, the structural observer shall submit to the Building Official a written statement at each significant construction stage stating that the site visits have been made and identifying any reported deficiencies which, to the best of the structural observer's knowledge, have not been resolved. A final report by the structural observer, which states that all observed deficiencies have been resolved, is required before acceptance of the work by the Building Official.

3. Section 1703 of the California Building Code is amended to read as follows:

In Seismic Zones 3 and 4, welded connections between the primary members of lateral force resisting frames, which are subject to net tensile forces shall be tested by nondestructive methods in accordance with AISC-Seismic Part I Section 16 for compliance with approved standards and job specifications. This testing shall be a part of the special inspection requirements of Section 1701.5. A program for this testing shall be established by the person responsible for structural design and as shown on plans and specifications.

As a minimum, this program shall include following:

1. All complete penetration groove welds contained in joints and splices shall be test 100 percent either by ultrasonic testing or by radiography.

Exceptions:

1. When approved, nondestructive testing rate for an individual welder or welding operator may be reduced to 25 percent, provided the reject rate is demonstrated to be 5 percent or less of the welds tested for the welder or welding operator. A sampling of at least 40 completed welds for a job shall be made for such reduction evaluation. Reject rate is defined as the number of welds containing rejectable defect divided by the number of welds completed. For evaluating reject rate of continuous welds over 3 feet (914mm) in length where the effective throat thickness is 1 inch (25mm) or less, each 12-inch increment (305mm) or fraction thereof shall be considered as one weld. For evaluating the reject rate on continuous weld over 3 feet (914mm) in length where the effective throat thickness is greater than 1 inch (25mm), each 6 inches (152mm) length or fraction thereof shall be considered one weld.
2. For complete penetration groove welds on materials less than 5/16 inch (7.9mm) thick, nondestructive testing is not required; for this welding, continuous inspection is required.
3. When approved by the Building Official and outlined in the project plans and specification, this nondestructive ultrasonic testing may be performed

in the shop of an approved fabricator utilizing qualified test techniques in the employment of the fabricator.

2. Partial penetration groove welds when used in column splices shall be tested either by ultrasonic testing or radiography when required by the plans and specifications. For partial penetration groove welds when used in column splices, with an effective throat less than ¾ inch (19.1mm) thick, nondestructive testing is not required; for this welding, continuous special inspection is required.

3. Base metal thicker than 1 ½ inches (38mm), when subjected to through-thickness weld shrinkage strains, shall be ultrasonically inspected for discontinuities directly behind such welds after joint completion.

Any material discontinuities shall be accepted or rejected on the basis of the defect rating in accordance with the (larger reflector) criteria of approved national standards.

E. Concrete.

1. Section 1915.2.2 of the California Building Code is amended to read as follows:

Base area of footing or number and arrangement of piles shall be determined from the external forces and moments (transmitted by footing to soil or piles) and permissible soil pressure or permissible pile capacity selected through principles of soil mechanics. External forces and moments are those resulting from the load combinations of Section 1612.3.

2. Section 1928.1.2.3 of the California Building Code is amended to read as follows:

Basic Combinations. When permitted by Section 1928.1, structures, component, and foundations shall be designed so that their design strength exceeds the effects of the factored loads in the following combinations:

1. 1.4D
2. 1.2D + 1.6L 6L + 0.5(L_r or S or R)
3. 1.2D + 1.6(L_r or S or R) + (0.5L 0.8W)
4. 1.2D + 1.3W + 0.5L + 0.5(L_r or S or R)
5. 1.2D ± 1.0E + (0.5L or 0.2S)
6. 0.9D ± (1.5W or 1.0E)

Exceptions:

1. The load factor on L in combinations 3, 4 and 5 shall equal 1.0 for garages, areas occupied and places of public assembly, and all areas where the live load is greater than 100 lb/ft^2 (pounds-force per square foot) (4.79 kPa).

2. Each relevant strength limit state shall be considered. The most unfavorable effect may occur when one or more of the contributing loads are not acting.

F. Steel.

1. Section 2204.1 of the California Building Code is amended to read as follows:

Load and resistance factor design. Steel design based on load and resistance factor design method shall resist the factored load combinations of Section 1612.2 in accordance with the applicable requirements of Section 2205.

2. Section 2204.2 of the California Building Code is amended to read as follows:

Allowable stress design. Steel design based on allowable stress design methods shall resist the factored load combinations of Section 1612.3 in accordance with the applicable requirements of Section 2205.

3. Chapter 22 – Steel of the California Building Code is amended by adding the following thereto:

Chapter 22B – Steel

Division 1 – Design and Construction Provisions

See Chapter 22, Steel, Division I for content of this division

Division II – Design Standard for Load and Resistance Factor Design Specification for Structural Steel Buildings

See Chapter 22, Steel, Division II for content of this division

Division III – Design Standard for Specification for Structural Steel Buildings Allowable Stress Design and Plastic
Design

See Chapter 22, Steel, Division III for content of this division

Division IV – Seismic Provisions for Structural Steel Buildings

Based on Seismic Provisions for Structural Steel Building
of the American Institute of Steel Construction

(Part I, dated April 15, 1997
and Supplement No. 2, dated November 10, 2000)

2210B – Adoption

Except for the modifications as set forth in Sections 2211B and 2212B of this division and the requirements of the Building Code, the seismic design, fabrication, and erection of structural steel shall be in accordance with the Seismic Provisions of Structural Steel Buildings, April 15, 1997 published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL. 60601, as if set out at length herein. The adoption of Seismic Provisions for Structural Steel Building in this Division, hereinafter referred to as AISC-Seismic, shall include Parts I (LRFD), and Supplement No. 2, dated November 10, 2000.

Where other codes, standards, or specifications are referred to in this specification, they are to be considered as only an indication of an acceptable method or material that can be used with the approval of the Building Official.

2211B – Design Methods

When the load combinations from Section 1612.2 for LRFD are used, structural steel buildings shall be designed in accordance with Chapter 22 Division II (AISC-LRFD) and Part I of AISC-Seismic as modified by this division.

2212B – Amendments

The AISC-Seismic adopted by this Division apply to the seismic design of structural steel members except as modified by this Section.

The following terms that appear in AISC-Seismic shall be taken as indicated in the 1997 Uniform Building Code.

AISC-Seismic	1997 Uniform Building Code
Seismic Force Resisting System	Lateral Force Resisting System
Design Earthquake	Design Basis Ground Motion
Load Combinations (Equations (4-1) and (4-2)	Chapter 16 Equations (12-17) and (12-18) respectively
LRFD Specification Section Equations (A4-1) through (A4-6)	Chapter 16 Equations (12-1) through (12-6) respectively
$\Omega_0 Q_E$	E_m

1. Part I, Sec. 1. of the AISC Seismic Provisions is revised as follows:

   1. Scope

   These provisions are intended for the design and construction of structural steel members and connections in the Seismic Force Resisting Systems in building for which the design forces resulting from earthquake motions have been determined on the basis of various levels of energy dissipation in the inelastic range of response. These provisions shall apply to buildings in Seismic Zone 2 with an importance factor I greater than one, in Seismic Zones 3 and 4 or

when required by the Engineer of Record.

These provisions shall be applied in conjunction with, Chapter 22, Division II, hereinafter referred to as the LRFD Specification. All members and connections in the Lateral Force Resisting System shall have a design strength as provided in the LRFD Specification to resist load combinations 12-1 through 12-6 (in Chapter 16) and shall meet the requirements in these provisions.

Part I includes a Glossary, which is specifically applicable to this Part, and Appendix S.

2. Part I, Sec. 4.1 of the AISC Seismic Provisions is deleted and replaced as follows:

4.1 Loads and Load Combinations

The loads and load combinations shall be those in Section 1612.2 except as modified throughout these provisions.

E_h is the horizontal component of earthquake load E required in Chapter 16. Where required in these provisions, an amplified horizontal earthquake load $\Omega_o E_h$ shall be used in lieu of E_h as given in the load combinations below. The term Ω_o is the system overstrength factor as defined in Chapter 16. The additional load combinations using amplified horizontal earthquake load are:

$$1.2D + 0.5L + 0.2S + \Omega_o E_h \qquad (4\text{-}1)$$
$$0.9 \pm \Omega_o E_h \qquad (4\text{-}2)$$

Exception: The load factor on L in load combination 4-1 shall be equal to 1.0 for garages, areas occupied as places of public assembly and all areas where the live load is greater than 100 psf.

Division V – Seismic Provisions for Structural Steel Buildings for use with Allowable Stress Design

Based on Seismic Provisions for Structural Steel Buildings
of the American Institute of Steel Construction

(Part III, dated April 15, 1997
and Supplement No. 2, dated November 10, 2000)

2213B – Adoption

Except for the modifications as set forth in Sections 2211B and 2212B of this division and the requirements of the Building Code, the seismic design, fabrication, and erection of structural steel shall be in accordance with the Seismic Provisions of

Structural Steel Buildings, April 15, 1997 published by the American Institute of Steel Construction, 1 East Wacker Drive, Suite 3100, Chicago, IL. 60601, as if set out at length herein. The adoption of Seismic Provisions for Structural Steel Building in this Division, hereinafter referred to as AISC-Seismic, shall include Parts III (LRFD), and Supplement No. 2, dated November 10, 2000.

Where other codes, standards, or specifications are referred to in this specification, they are to be considered as only an indication of an acceptable method or material that can be used with the approval of the Building Official.

2214-B – Design Methods

When the Allowable Stress Design (ASD) method is used for design of members, structural steel buildings shall be designed in accordance with Chapter 22 Division III (AISC-ASD) and Part I of AISC-Seismic as modified by this division.

2215B – Amendments

The AISC-Seismic adopted by this Division apply to the seismic design of structural steel members except as modified by this Section.

The following terms that appear in AISC-Seismic shall be taken as indicated in the 1997 Uniform Building Code.

AISC-Seismic	1997 Uniform Building Code
Seismic Force Resisting System	Lateral Force Resisting System
Design Earthquake	Design Basis Ground Motion
Load Combinations (Equations (4-1) and (4-2)	Chapter 16 Equations (12-17) and (12-18) respectively
$\Omega_0 Q_E$	E_m

1. Part III, Sec. 1 of the AISC Seismic Provisions is revised as follows:

   1. Scope

   These provisions are intended for the design and construction of structural steel members and connections in the Seismic Force Resisting Systems in building for which the design forces resulting from earthquake motions have been determined on the basis of various levels of energy dissipation in the inelastic range of response. These provisions shall apply to buildings in Seismic Zone 2 with an importance factor I greater than one, in Seismic Zones 3 and 4 or when required by the Engineer of Record.

   These provisions shall be applied in conjunction with, Chapter 22, Division III, hereinafter referred to as the ASD Specification. All members and connections in the Lateral Force Resisting System shall have a design strength

as provided in the ASD Specification to resist load combinations 12-1 through 12-6 (in Chapter 16) and shall meet the requirements in these provisions.

Part I includes a Glossary, which is specifically applicable to this Part, and Appendix S.

2. Part III, Sec. 4.1 of the AISC Seismic Provisions is deleted and replaced as follows:

2.1 Loads and Load Combinations

The loads and load combinations shall be those in Section 1612.2 except as modified throughout these provisions.

E_h is the horizontal component of earthquake load E required in Chapter 16. Where required in these provisions, an amplified horizontal earthquake load $\Omega_o E_h$ shall be used in lieu of E_h as given in the load combinations below. The term Ω_o is the system overstrength factor as defined in Chapter 16. The additional load combinations using amplified horizontal earthquake load are:

$$1.2D + 0.5L + 0.2S + \Omega_o E_h \qquad (4\text{-}1)$$
$$0.9 \pm \Omega_o E_h \qquad (4\text{-}2)$$

Exception: The load factor on L in load combination 4-1 shall be equal to 1.0 for garages, areas occupied as places of public assembly and all areas where the live load is greater than 100 psf.

Division VI – Load and Resistance Factor Design Specification for Cold-Formed Steel Structural Members

See Chapter 22, Steel, Division VI for content of this Division

Division VII – Specification for Design of Cold-Formed Steel Structural Members

See Chapter 22 , Steel, Division VII for content of this division

Division VIII – Lateral Resistance for Steel Stud Wall Systems

See Chapter 22, Steel, Division VIII for content of this division

Division IX – Open Web Steel Joists

See Chapter 22, Steel, Division IX for content of this division

Division X – Design Standard for Steel Storage Racks

See Chapter 22, Steel, Division X for content of this division

Division XI – Design Standard for Structural Applications of Steel Cables for Buildings

See Chapter 22, Steel, Division XI for content of this division

G. Wood.

1. Section 2315 of the California Building Code is amended to include the following Section 2315.5.6:

Hold-down connectors. Hold-down connector bolts into wood framing require steel plate washers in accordance with Table 23-II-L. Hold-downs shall be re-tightened just prior to covering the wall framing.

2. Chapter 23, Division II, Part II of the California Building Code is amended to include the following Section 2315.5.6:

Table 23-II-L – Minimum Size Steel Plate Washers Used with Hold-Down Connectors

Bolt Size	**Plate Size**
x 25.4 for mm	**x 25.4 for mm**
1/2 in	3/16" x 2" x 2"
5/8 in	1/4" x 2-1/2" x 2-1/2"
3/4 in	5/16" x 2-3/4" x 2-3/4"
7/8 in	5/16" x 3" x 3"
1 in	3/8" x 3-1/2" x 3-1/2"

3. Division III, Part I, Paragraphs 1 and 2 of the California Building Code are amended to read as follows:

This standard, with certain exceptions, is the ANSI/NFoPA National Design Specification for Wood Construction of American Forest and Paper Association (NDS), 1997 Edition, and the Supplement to the 1997 Edition, National Design Specification (NDS), adopted by reference.

The National Design Specification for Wood Construction (NDS), 1997 Edition, and Supplement are available from the American Forest and Paper Association, 1111 19th Street, NW., Eighth Floor, Washing DC, 20036.

4. Section 2316.1 of the California Building Code is amended to read as follows:

Adoption and scope. The National Design Specification for Wood Construction (NDS), 1997 Edition, as amended by Section 2316.2, which is hereby adopted, except for Items 14, 26 and 27, as a part of this code, shall apply to the design and construction of wood structures using visually graded lumber, mechanically graded lumber, structural graded laminate timber, and timber piles. National Design Specification Appendix Section F, Design for Creep and Critical Deflection. Applications, Appendix Section G, Effective Column Length, and Appendix Section J, Solution of Hankinson Formula are specifically adopted and made a part of this standard. The Supplement to the 1997 Edition National Design Specification, Tables 2A, 4A, 4B, 4C, 4D, 4E, 5A, 5B, and 5C are specifically adopted and made a part of this standard.

5. Section 2316.2, Item 12 of the California Building Code is amended to read as follows:

Sec. 3.2.3.3 Add to end of paragraph as follows:

Cantilevered portions of beams less than 4 inches (120mm) in nominal thickness shall not be notched unless the reduced section properties and lumber defects are considered in the design. For effects of notch on shear strength, see Section 3.4.4.

6. Section 2316.2, Item 14 of the California Building Code is not adopted by the City of Sacramento.

7. Section 2316.2, Item 26 of the California Building Code is not adopted by the City of Sacramento.

8. Section 2316.2, Item 27 of the California Building Code is not adopted by the City of Sacramento.